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Synergies and Conflicts in Dual-Designated UNESCO Sites: Managing Governance, Conservation, Tourism, and Community Engagement at Mount Hakusan Global Geopark and Biosphere Reserve, Japan

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Abstract: UNESCO's dual designations of Biosphere Reserves (BRs) and Global Geoparks (UGGps) offer unique opportunities for integrating biodiversity and geodiversity conservation with sustainable development. This study investigates the synergies and conflicts between these designations at Mount Hakusan, Japan, the country's only site with overlapping BR and UGGp territories. Employing qualitative methods, including semi-structured interviews and document analysis, the research highlights key governance challenges, conservation impacts, and community engagement outcomes. Findings highlight key synergies, including enhanced global recognition, collaborative educational initiatives, and the potential for interdisciplinary conservation efforts. However, the study also identifies significant conflicts, such as governance inefficiencies, budgetary constraints, and tensions between biodiversity conservation and geotourism priorities. While the BR framework emphasizes ecosystem protection, the UGGp's focus on geotourism can create challenges in balancing conservation with economic development. Furthermore, low public awareness and limited youth engagement pose barriers to fully realizing the potential benefits of both designations. Recommendations are provided for integrated management strategies, emphasizing multi-stakeholder collaboration, and enhancing community participation to align conservation and tourism objectives. The study enhances the understanding of managing Multi-Internationally Designated Areas (MIDAs) and offers practical strategies to support global conservation and sustainable development initiatives.

Keywords: UNESCO Biosphere Reserves; Global Geoparks; Mount Hakusan; sustainable development; governance; conservation

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1. Introduction

UNESCO's Biosphere Reserves (BRs) and Global Geoparks (UGGps) represent two of the most significant international frameworks for conservation and sustainable development. Both programs are included in UNESCO's Natural Science Sector. BRs are designated under UNESCO's Man and Biosphere Programme, which began in 1971 with the goal of improving the relationship between people and their environments through conservation,

sustainable development, and logistic support for research and education. As of 2023, there are over 700 BRs in 129 countries, each serving as a model for balancing the conservation of biodiversity with sustainable resource use and community engagement [1].

Global Geoparks, on the other hand, are "single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development" [2,3]. Initiated in 2004, the Global Geoparks Network includes 213 sites in 48 countries, each highlighting the connections between geodiversity and biodiversity, cultural heritage, and community well-being. However, UNESCO did not officially recognize geoparks as a designation until 2015, when the UNESCO Global Geoparks (UGGp) program was established. Unlike BRs, UGGps use geological heritage conservation as the foundation for the comprehensive conservation of geological, cultural, and natural heritage, utilizing those heritages for education and sustainable development [4], using a bottom-up management approach that actively involves local communities in decision-making processes. This distinction in focus—biodiversity for BRs and comprehensive sustainability founded on geodiversity for UGGps—creates a complex landscape for conservation strategies, particularly in areas like Mount Hakusan, Japan. Differences between BRs and UGGps are outlined in Table 1.

Table 1. Outline of the key differences between BRs and UGGps. (Compiled from author's analysis of UNESCO databases).

Designations	UNESCO Biosphere Reserves	UNESCO Global Geoparks
Focus	Biodiversity, ecosystems, human–nature interaction	Geodiversity, geological heritage
Start Year	1971 (Man and the Biosphere Programme)	2004 (Global Geoparks Network; UNESCO in 2015)
Goals	Biodiversity conservation, sustainable development, education	Geotourism, geological conservation, education
Management	Top-down and bottom-up with a focus on sustainable resource use	Bottom-up, community-led geotourism
Conservation	Biodiversity (flora, fauna, ecosystems)	Geodiversity (geology, landforms, natural and cultural heritage)
Community Role	Involves communities in balancing conservation and development	Involve communities in promoting geotourism and sustainability
Ecotourism	Biodiversity-related ecotourism	Promotes geotourism to empower local communities and the economy
Education	Environmental education on biodiversity and sustainability	Education on interconnected nature of geological, natural, and cultural heritage
Research	Ecological research, human–nature interactions, and biodiversity	Geosciences, geotourism, relationship between geodiversity and human activity
Zone/Areas	Core, buffer, and transition	Geosites, natural sites, and cultural sites
Sustainability	Conservation with local community development, resource management, and biodiversity protection	Economic development through geotourism while preserving heritage

The integration of conservation and development within UNESCO designations is a subject of growing interest. While both BRs and UGGps aim to promote holistic conservation and sustainable development, their differing focuses—biodiversity versus geodiversity-based comprehensive heritages—can lead to both synergies and conflicts. Dual designations might enhance a site's overall conservation efforts, providing a more holistic approach that integrates ecological, geological, and cultural values [5,6]. A growing number of conservation sites worldwide are designated under multiple UNESCO frameworks, forming what are known as Multi-Internationally Designated Areas (MIDAs). MIDAs are regions that hold two or more overlapping international conservation or heritage designations,

such as UNESCO BRs, UGGps, World Heritage Sites, and Ramsar Wetlands [6]. These designations often share complementary goals, yet they also introduce complexities in governance, resource allocation, and stakeholder engagement. While MIDAs can benefit from increased global recognition and funding opportunities, they also face challenges such as administrative redundancies, conflicts between conservation and tourism, and difficulties in aligning management strategies across different regulatory frameworks. MIDA requires harmonizing objectives to ensure the complementarities of BR and UGGp designations without causing confusion or competition among stakeholders. On the other hand, conflicts may arise from competing priorities or resource allocation, particularly in areas where the objectives of BRs and UGGps diverge. For instance, the emphasis on geotourism in UGGps might conflict with the biodiversity conservation goals of BRs, leading to tensions in management strategies [7]. Promoting geotourism often involves increasing visitor access to geological sites, which may overlap with ecologically sensitive areas where BR policies prioritize habitat protection and visitor restrictions. This creates challenges in balancing accessibility with conservation, requiring careful zoning and stakeholder coordination. Such challenges are not unique to UNESCO designations; similar conflicts have been observed in recreational use and nature conservation efforts in protected areas, which underline the need for holistic approaches to manage overlapping objectives [8]. However, literature on dual designations, particularly at the intersection of biodiversity and geodiversity conservation, remains sparse. Most studies focus on either BRs or UGGps in isolation, with limited attention to their overlapping functions and potential conflicts.

Integrated landscape management (ILM) offers a theoretical framework for understanding how different land uses and conservation priorities can be harmonized. ILM advocates for a holistic approach that balances the needs of local communities with the objectives of conservation programs. Globally, regions with dual UNESCO designations have demonstrated varying degrees of success in achieving integrated management [9,10]. For example, Jeju Island in the Republic of Korea, which uniquely holds multiple UNESCO designations, including Biosphere Reserve, World Heritage Site, and Global Geopark status, has faced challenges in balancing urban development and conservation objectives. Research highlights how significant land-use changes on the island, such as urbanization and agricultural expansion, have impacted ecosystem services, including biodiversity conservation and water regulation [11]. Huangshan in China, a site holding UNESCO Biosphere Reserve, Global Geopark, and World Heritage Site designations, demonstrates the benefits of an integrated management approach guided by the IUCN Green List Standard. This approach has enhanced conservation outcomes and fostered community engagement in maintaining the site's natural and cultural values [12]. These cases exemplify both the tensions and opportunities inherent in managing dual-designated or multi-designated sites. ILM is particularly relevant to Mount Hakusan's dual designations, as BR and UGGp. Effective governance of such sites requires a structured framework that balances conservation, sustainable development, and community engagement. ILM provides this framework through adaptive management, multi-stakeholder collaboration, and evidence-based decision-making. It fosters adaptive management, stakeholder collaboration, and evidence-based decision-making to integrate biodiversity conservation with geotourism while preventing land-use conflicts. Strengthening governance networks, aligning policies, and enhancing community participation can ensure sustainable tourism and conservation. As a model for MIDAs, Mount Hakusan can demonstrate effective ILM implementation for long-term sustainability.

Other studies show that community-based governance is crucial for managing multi-designated areas effectively. Armitage et al. [13] propose principles that prioritize equity, community engagement, and reconciliation, offering a framework for addressing social and

ecological dimensions of conservation. Cameron and Rössler [14] highlight the integration of natural and cultural heritage as key to holistic management strategies, relevant to areas like Mount Hakusan. Phillips [15] introduces adaptive governance for protected landscapes, addressing competing priorities through harmonized strategies. Bridgewater [16] emphasizes the evolving role of BRs in advancing sustainability science, presenting them as laboratories for innovative conservation and development practices. Price [17] focuses on the unique challenges of mountain BRs, providing comparative insights into managing biodiversity and geodiversity. Together, these studies outline the importance of integrated governance models to balance conservation and development.

Research on the governance challenges and synergies of dual UNESCO designations remains limited, particularly in Asia. This study addresses this gap by examining Mount Hakusan, Japan's only site with overlapping BR and UGGp designations. By focusing on governance, conservation, and community engagement, this research highlights the significant challenges Mount Hakusan faces in aligning the goals of its BR and UGGp statuses, necessitating innovative strategies to harmonize management efforts. Findings from Mount Hakusan can provide valuable insights into best practices for managing MIDAs and offer guidance for other regions with similar governance complexities. As emphasized by Schaaf et al. [6], integrated governance mechanisms are crucial for leveraging synergies while mitigating conflicts between overlapping designations. Similarly, Mount Hakusan's case underscores the importance of coordinated governance and aligned policies to maximize the benefits of dual designations.

The purpose of this study is to analyse the synergies and conflicts between Mount Hakusan's BR and UGGp designations. It explores their impact on management strategies, conservation practices, and sustainable development, with an emphasis on community engagement, governance, biodiversity and geodiversity conservation, ecotourism, and education. Unlike previous research, this study prioritizes governance dynamics and stakeholder collaboration, offering practical insights and actionable recommendations for integrated management of overlapping conservation frameworks. This approach ensures a comprehensive understanding of governance structures, policy implementation, and strategic planning, which are critical for addressing the research questions outlined below:

1. How do dual designations influence community engagement and governance at Mount Hakusan?
2. What are the impacts of the dual designations on biodiversity and geodiversity conservation?
3. How do dual designations affect ecotourism and sustainable practices?
4. What role do education and research play in the context of Mount Hakusan's dual designations?

2. Methodology

2.1. Study Area

Mount Hakusan is an active volcano located in central Japan. At 2702 m, it is among Japan's highest 50 mountains and an important religious, cultural, and ecological landmark. The mountain and its surrounding areas were designated as Mount Hakusan UNESCO Biosphere Reserve (MH-BR) in 1980, encompassing a core area of 22,120 hectares, a buffer zone of 45,660 hectares, and a transition area of 131,549 hectares. The core and buffer zones are dedicated to conservation and research, while the transition zone includes local communities that engage in sustainable resource management and community-based activities. The MH-BR is located with Mt. Hakusan at its center, and encompasses parts of 4 prefectures (Ishikawa, Fukui, Gifu, Toyama), and 7 municipalities (Hakusan City, Katsuyama City, Ono City, Takayama City, Gujo City, Shirakawa Village, Nanto City) (Figure 1).

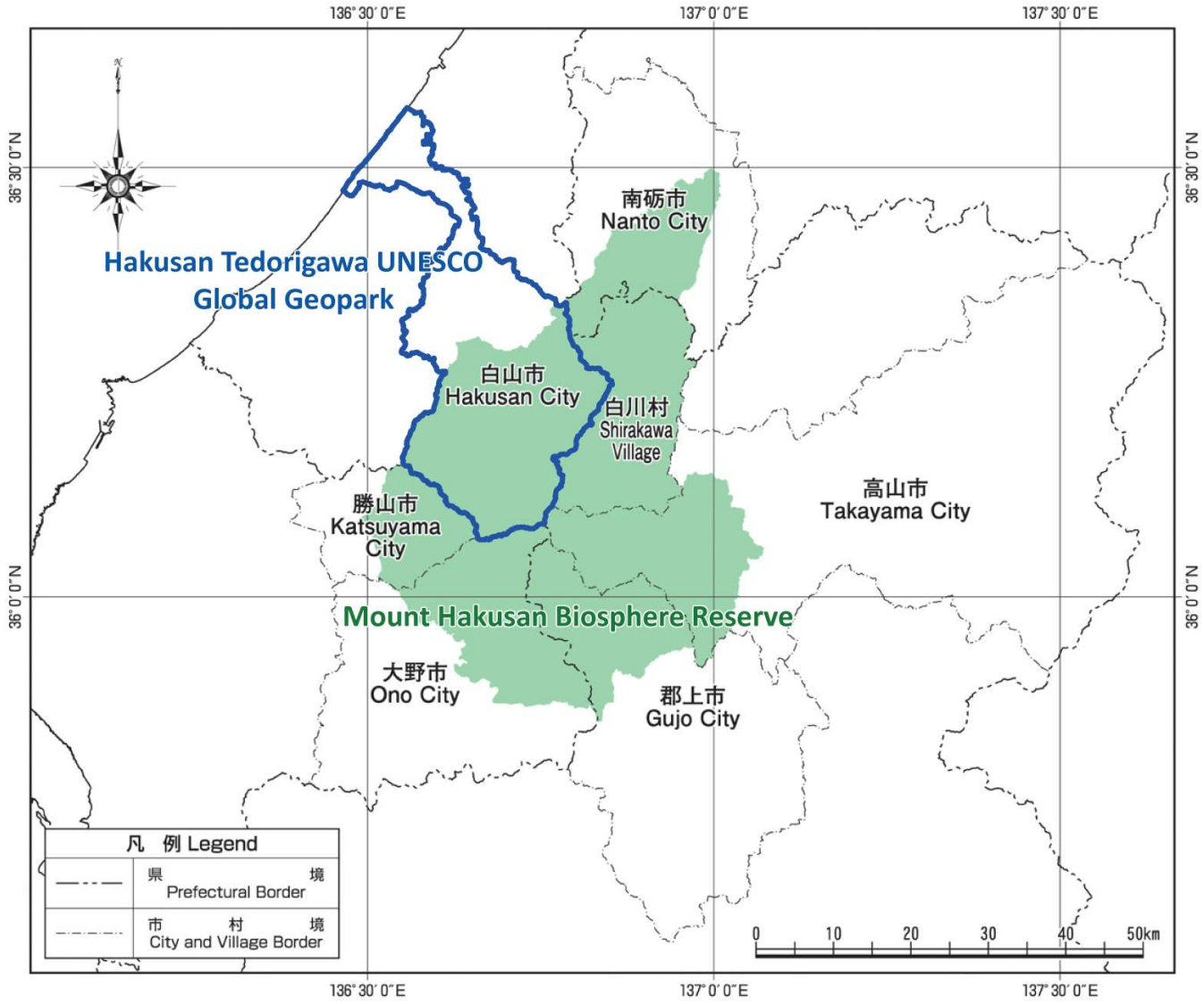


Figure 1. Hakusan Tedorigawa UNESCO Global Geopark and Mount Hakusan Biosphere Reserve. (This map was created with a 1:25,000 scale topographical map issued by Geospatial Information. Authority of Japan with permission (approval number 2013, No. 72-GSMAP32643).)

The designation of Mount Hakusan as a BR initially faced challenges due to limited community involvement and lack of recognition among local stakeholders. Progress was made following the adoption of UNESCO's Seville Strategy in 2010, which emphasized the importance of including transition zones and fostering local participation. In 2016, dialogue between local governments and communities led to the extension of the transition zone, facilitating a more integrated approach to conservation and development.

The Hakusan Tedorigawa UGGp (HT-UGGp) was designated as a UNESCO Global Geopark in 2023 and has been a Japanese National Geopark since 2011. It is situated in Ishikawa Prefecture on Japan's west coast, with Mt. Hakusan in the south of the territory, and the Sea of Japan to the north-west. It encompasses an area of 754.93 km^2 and overlaps the entire Hakusan City. This UGGp features Mount Hakusan and the Tedori River, which flows from the mountain to the Sea of Japan. The HT-UGGp is organized into three distinct zones: the Mountain and Snow Area, the River and Gorge Area, and the Sea and Alluvial Fan Area. It also features notable paleontological sites, such as the Kuwajima Fossil Bluff, a national natural monument and one of Japan's premier Mesozoic fossil sites.

The HT-UGGp is managed by the Hakusan Tedorigawa Geopark Promotion Council (established in 2010), and the MH-BR is managed by the Mount Hakusan Biosphere Reserve Council (established in 2014). The HT-UGGp council is made up of 36 constituent groups from the area, with a council president, vice president, and executive board elected from and by the groups. Non-voting members include the scientific committee. The MH-BR council is made up of 12 members—including a representative from each of the 4 prefectures and 7 municipalities, as well as a local NPO. The chairman and executive board are elected from and by the 12 members. Non-voting groups include the academic group and other local facilities and agencies. Both councils hold an annual meeting(s) with all council members to determine annual projects and budget use.

The budget of the HT-UGGp council comes predominantly from Hakusan City with some additional private sponsors, and is adjusted annually depending on project requirements. The budget of the MH-BR council comes from each of the 7 municipalities; the amount is set and does not change regardless of inflation or project requirements. Both councils have individual secretariats; however, the office of both is located in the Geopark and Biosphere Reserve Promotion Division of Hakusan City (located outside the MH-BR area). Hakusan City dispatches approx. 6 public workers act as staff of the Division, and each council hires 1 external staff member, i.e., the HT-UGGp council has 1 staff, the MH-BR council has 1 staff, and the promotion division has 6 staff—for a total of 8 staff members sharing an office space.

Around 50% territory of HT-UGGp overlaps the territory of MH-BR (Figure 1). Furthermore, overlapping the BR lies the World Heritage cultural site of the Historic Villages of Shirakawa-go and Gokayama, and the Globally Important Agricultural Heritage Site (GIAHS) of the Nagara River. A Japanese National Geopark also overlaps the BR in Katsuyama City (Fukui Prefecture)—the Dinosaur Valley Fukui Katsuyama Geopark. In terms of accessibility, the entirety of the HT-UGGp is well-connected and accessible. The MH-BR takes several hours to traverse, making access between each of the 7 municipalities difficult.

2.2. Methods and Data Collection

This study employed a combination of qualitative methods, including semi-structured interviews with local stakeholders (e.g., government officials, community leaders, park managers), document analysis (management plans, policy documents, and previous studies), and field observations. The focus was on institutional and managerial perspectives, which are critical for understanding governance and policy implementation. The primary goal was to explore institutional and stakeholder-level perceptions of the benefits and challenges associated with dual designations.

A survey targeting local communities was not conducted because the study's primary objective was to analyse the perspectives of those directly involved in decision-making and management processes. This study was specifically designed to explore higher-level institutional dynamics. Institutional and stakeholder-level insights were deemed essential to understanding the governance structures, policy implementation, and strategic planning associated with the dual designations.

2.3. Selection of Interviewees

Hakusan City was formed through the merging of several municipalities in 2005, yet the cultural identities of each former municipality remain distinct. These cultural divisions were considered when drawing the BR boundary. Within this region, the former Oguchi Village and Shiramine Village form the overlapping area where both the HT-UGGp and MH-BR coexist. Given that this research focuses on the interaction between the BR and UGGp designations, the study limited the selection of local representatives to this overlapping

area. Furthermore, between these two villages, Shiramine has the greatest involvement in ecotourism, education, and research related to both designations. Thus, Shiramine was chosen as the primary focus area for this study. In addition to community representatives, we interviewed key staff members from the Geopark and Biosphere Reserve Promotion Division of Hakusan City and both councils responsible for managing these designations.

A total of nine semi-structured interviews were conducted with key stakeholders, selected through purposive sampling to ensure representation from governance, conservation, and tourism sectors. Around 10 main questions and 52 sub-questions guided the interviews.

Interviewees included:

- Leader of a local organization involved in ecotourism, cultural preservation, and education. This individual played a key role in promoting both the MH-BR and HT-UGGp and was instrumental in the formation of the MH-BR council.
- Community member engaged in traditional practices and conservation efforts, particularly in biodiversity monitoring and ecosystem management.
- Representative of the local tourism association, actively involved in both conservation initiatives and tourism promotion within the BR.
- Geological expert from the Geopark and BR Promotion Division, contributing to scientific research, conservation planning, and educational outreach.
- MH-BR council staff member responsible for policy implementation, stakeholder engagement, and conservation strategy development.
- Government administrator overseeing both the HT-UGGp and MH-BR councils, involved in coordinating governance strategies and managing funding allocations.
- Local village leader, representing community perspectives on policy impacts, conservation, and tourism management.
- Another village leader, providing insights into municipal governance, community-level engagement, and resource management.
- HT-UGGp council staff member with direct experience in the UNESCO designation process, who also served as the primary interviewer for the study while contributing as an interviewee.

By focusing on stakeholders directly engaged in governance, conservation, and ecotourism, this study provides a comprehensive institutional perspective on the challenges and opportunities associated with the dual designations in Shiramine, the most engaged area within the BR and UGGp overlap.

Field observations were conducted to assess the implementation of management strategies and the integration of BRs and UGGps objectives on the ground. Document analysis provided additional context on the goals and management approaches of both designations. Together, these methods allowed for a comprehensive exploration of stakeholder perspectives and institutional dynamics.

The collected data were analysed using a qualitative thematic analysis approach, focusing on identifying patterns and themes for synergies and conflicts for MH-BR and HT-UGGp. Interviews were recorded and translated from Japanese into English, and their transcripts were coded inductively and deductively to uncover key insights related to governance, conservation, ecotourism, and education. The coding framework was developed based on the research questions and refined iteratively during the analysis process to identify patterns and relationships.

3. Results

The analysis across nine interviews showed different levels of the challenges and opportunities related to the UGGp and BR designations (Table 2). It highlighted varying levels of understanding, low community involvement, collaboration issues such as

administrative delays and public confusion, and the benefits of combining networks for global recognition. Understanding of the designations varies, with some interviewees (Int) seeing them as complementary but confusing (Int 1) and others noting overlap in purpose (Int 5). Community involvement is generally low, driven by events like the festival (Int 7) or key individuals (Int 9). Collaboration faces challenges such as administrative delays (Int 4) and budget disparities (Int 5), but benefits like rediscovering local heritage (Int 2) and combining networks for global recognition (Int 1) were noted. Conservation efforts focus on sustainability, invasive species management (Int 3), and preserving traditions (Int 8). However, public awareness remains low, especially for the BR, highlighting the need for clearer messaging and better outreach, for example through storytelling and community events.

Table 2. Summary of the interviewees' (Int) perspectives on designations, community involvement, and conservation challenges.

Int	Understanding of Designations	Community Involvement	Collaboration Challenges	Benefits of Overlap	Conservation Focus	Public Awareness
1	Sees designations as complementary but hard to explain to the public	Limited but emphasizes importance of shared assets	Perceives administrative challenges	Recognizes combined strengths for global recognition	Believes in integrating sustainability	Low; needs more clarity
2	Acknowledges heritage but views it as a natural part of life	Focused on cultural tourism	Minimal collaboration issues noted	Rediscovered local heritage value	Integrates local biodiversity into product	Moderate; rising through storytelling
3	Sees strong link between biodiversity and geology	Active in tourism and environmental conservation.	Complex due to diverse regional needs.	Highlights tourism potential	Focus on invasive species management	Improving through events and recognition
4	Sees potential for integration despite differences	Low due to limited public understanding	Administrative delays due to differing scopes	Complementary strengths noted	Aligned but lacks actionable collaboration	Limited awareness beyond core regions
5	Sees designations as overlapping in purpose	Limited but growing through events	Budget and staff disparities	Shared networks enhance reach	Broader coverage through BR	Very low, especially for the BR
6	Recognizes public confusion due to overlapping scopes	Varies widely across regions	Challenges in engaging multiple municipalities	Highlights shared secretariat advantages	Lack of clear collaborative strategy	Low; needs broader dissemination
7	Basic understanding; sees overlap in nature and community importance	Limited to organizing local events like festival	No major conflicts; sees the area as unified	Recognizes community contributions to conservation	Water-related conservation noted	Low; needs increased promotion
8	Sees designations as unified due to interconnectedness of natural elements	Active in festivals and tourism	Complex due to regional diversity	Supports unification of cultural and natural heritage	Focus on preserving traditional practices and landscapes	Low but improving through community events
9	Recognizes difficulty in distinguishing between the two	Driven by a few key individuals	Limited collaboration due to distinct organizational structures	Sees potential in combining networks	Low focus on active conservation	Gradually improving through strategic efforts

The survey of key stakeholders revealed varying levels of prioritization for certain concepts. Table 3 shows the details of the most frequently utilized concepts by the interviewees. The most frequently discussed concepts were operational challenges (100%) and synergy in conservation (89%), emphasizing shared efforts to protect biodiversity and geodiversity while addressing management complexities. Sustainability of programs (89%) and community engagement (78%) were also highly noted, with interviewees stressing the importance of local participation and long-term conservation. However, significant gaps were identified in information sharing (55%) and youth engagement (55%), highlighting the need for better coordination and involvement of younger generations. Local awareness (78%) and cultural heritage integration (78%) also emerged as critical areas for improvement, as many local communities lack understanding of the designations. Legal and administrative support (44%) and conflict in resource allocation (55%) were recurring challenges, with limited resources often leading to prioritization of one designation over the other. Overall, the results from analysis reflect the dual designation's potential for synergy but highlights the need for better coordination, broader community awareness, and sustainable practices to maximize its impact.

Table 3. Frequently used concepts by interviewees about dual designation of Mount Hakusan (in numbers).

Concept	Description	Frequency
Synergy in Conservation	Shared efforts to protect biodiversity and geodiversity.	8 (89%)
Community Engagement	Focus on improving local participation in BR and UGGp initiatives.	7 (78%)
Shared Goals	Both BR and UGGp aim to promote regional development, including tourism, local economy, and community engagement.	6 (66%)
Operational Challenges	Differences in management structures (e.g., local government control, administrative coordination).	9 (100%)
Information Sharing	Both systems require better information exchange between management councils, local communities, and stakeholders to improve coordination and awareness.	5 (55%)
Tourism Development	Both systems have potential to contribute to tourism but face challenges in balancing conservation with economic activities.	6 (66%)
Local Awareness	There is a lack of widespread understanding or recognition of the significance of both designations among local communities.	7 (78%)
Youth Engagement	Need to increase youth involvement in both systems to ensure sustainability and continuity in conservation efforts.	5 (55%)
Legal/Admin Support	Both systems rely on strong legal frameworks and administrative support, though there are challenges with funding and resource allocation and coordination.	4 (44%)
Council Cooperation	There is good coordination between the management councils of BR and UGGp, though not always across all areas.	6 (67%)
Resource Conflict	Limited resources, leading to prioritization of one designation over the other, especially in areas with overlapping activities.	5 (55%)
Heritage Integration	Both BR and UGGp focus on broad sustainability, including cultural heritage.	7 (78%)
Sustainability	Both systems emphasize long-term sustainability, particularly through community involvement and conservation.	8 (89%)

Table 4 and Figure 2 provide a summary of interviewees' insights into community engagement, focusing on examples, challenges, and recommendations. The comments highlight key aspects such as the limited local understanding of dual designations, the aging population's dominance in activities, and the reliance on a few motivated individuals to sustain community efforts. Approximately 31% of the issues stem from low public awareness of the UGGp and BR, with most locals being familiar with the UGGp but not

the BR, and even fewer understanding the differences between the two. Another 25% of the challenges are attributed to insufficient youth involvement in conservation activities, while 18% arise from fragmented efforts and a lack of coordination between UGGp and BR initiatives. Competition for attention and resources between the two designations accounts for 12%, and 12% reflects the need for simplified messaging to make the designations more relatable to the public. Recommendations include fostering intergenerational engagement, aligning community goals through inclusive strategies, and leveraging cultural traditions to increase conservation awareness. Interviewees particularly emphasized the need to make the UGGp and BR concepts easy to understand, expressing the importance of conveying their purpose in concise, relatable terms.

Table 4. Interviewees' perspectives on community engagement: examples, challenges, and recommendations.

Int	Community Engagement	Key Example	Challenges	Recommendations
1	Community efforts are seen as essential but lack consistent support and awareness.	Shared assets across eight areas of Hakusan City, such as cultural and ecological programs	Limited local understanding of dual designations and narrow youth engagement	Nurture younger generations and make programs relatable to daily life
2	Local traditions and cultural practices are underappreciated as conservation tools.	Local products making events and cultural exchanges with neighboring villages	Disconnect between traditional activities and modern conservation objectives	Integrate cultural heritage into educational and conservation activities
3	Tourism and environmental conservation efforts engage locals but face sustainability issues.	Invasive species management and nature-focused workshops	Aging population and limited youth involvement in conservation activities	Develop programs targeting younger generations and promote heritage preservation
4	Programs aim to connect communities with conservation but struggle with outreach.	Regional development exchange meetings and symposiums across municipalities	Low participation beyond core regions and administrative delays	Leverage social media and targeted events to increase engagement
5	Biosphere Reserve efforts struggle to attract attention outside core regions.	Regional symposia and exchange events within transition zones	Limited visibility and competition with UGGp for attention and resources	Promote joint events highlighting shared objectives of both designations
6	Local efforts are fragmented, limiting their impact on broader goals.	Community workshops and collaborative tourism initiatives	Lack of integration between UGGp and BR activities	Streamline activities under unified goals and improve inter-municipality collaboration
7	Community-led events contribute to cultural preservation but lack manpower.	Rein Festival and local environmental maintenance activities	Aging population and insufficient participation in conservation programs	Involve younger demographics and improve access to resources
8	Community events bridge traditions with modern goals but need broader outreach.	Preservation of traditional Shiramine landscapes and festivals	Regional diversity makes unified efforts challenging	Use inclusive strategies to align community goals across regions
9	Few key individuals drive activities, but broader participation is limited. Awareness is so low that there is no possibility for community engagement even if activities are organized.	Guided tours and community-led tourism events. Most have heard of the UGGp but not the BR; let alone can they tell the difference between them	Over-reliance on motivated individuals; lack of resources for scaling efforts. UGGp is difficult to understand. BR is easier to understand. But UGGp has more media attention	Broaden the volunteer base and provide consistent funding support. Find a way to make UGGp and BR easy to understand. Something that can be expressed in one sentence, not an hour lecture

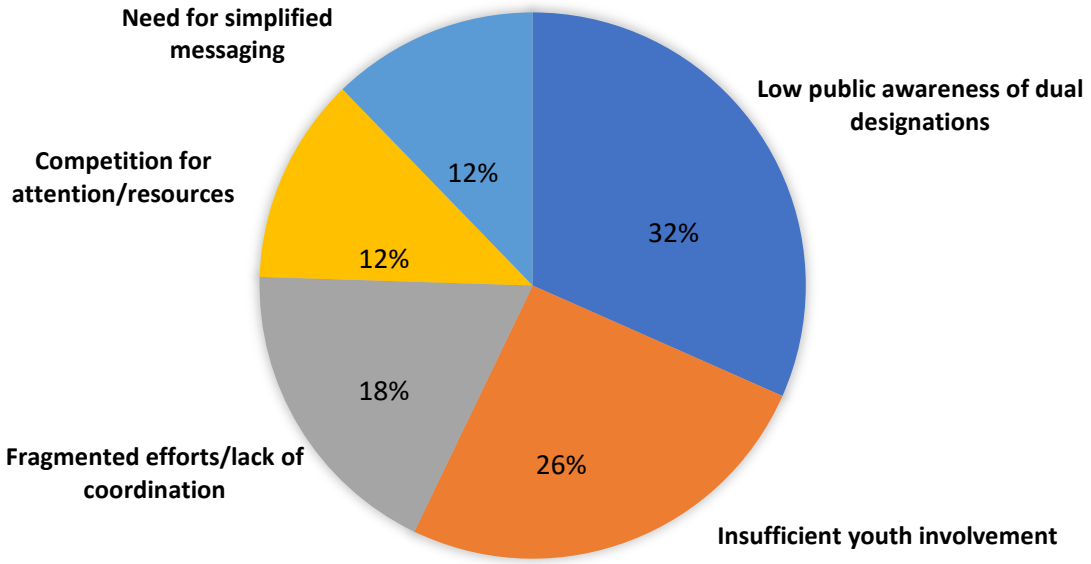


Figure 2. Distribution of challenges related to community engagement. Each segment represents the percentage of specific issues highlighted by the interviewees.

Table 5 shows the analysis of synergy and conflict points across interviewees. The first two columns show the total number of synergy and conflict points for each interviewee, and the last two columns provide only selected key examples of synergy and conflict points mentioned by interviewees, rather than a complete list of all recorded points.

Table 5. Analysis of synergy and conflict points across interviewees with counts and percentages.

Int	Synergy Points	Conflict Points	Synergy Points	Conflict Points
1	18 (90%)	2 (10%)	Integration of local traditions; Use of shared regional assets; Enhanced regional pride; Established regional networks; UGGp promotion raised awareness; Increased regional unity.	Limited local awareness; Challenges in youth engagement.
2	17 (85%)	3 (15%)	Traditional practices like sweets-making; Opportunities for cultural exchanges; Alignment between biodiversity and traditions.	Disconnect between traditions and conservation messaging; Dependence on older generations.
3	16 (80%)	4 (20%)	Collaboration in invasive species management; Nature walks promoting awareness; Engagement of local volunteers.	Aging population limits participation; Lack of youth-oriented programs.
4	15 (75%)	5 (25%)	Shared administrative resources; Cross-municipality events; Broad recognition enhancing visibility.	Low engagement in some regions; Delays in administrative processes.
5	14 (70%)	6 (30%)	Municipal collaborations enhancing effectiveness; Events leveraging dual designations	Resource competition; Low public awareness of distinctions.
6	17 (85%)	3 (15%)	Unified conservation goals; Collaborative networks for shared resources.	Fragmented efforts; Limited alignment across stakeholders.
7	16 (80%)	4 (20%)	Festivals and cultural events enhancing engagement; Conservation linked to traditions.	Generational gaps in knowledge transfer; Declining participation due to aging.
8	17 (85%)	3 (15%)	Preservation of traditional landscapes; Integration of festivals into sustainability.	Difficulty in unifying diverse regional goals; Limited collaboration resources.
9	18 (90%)	2 (10%)	Educational tourism initiatives; Integration of geology-focused programs.	Over-reliance on a small group of individuals; Limited resources for scalability.

The total synergy rate and total conflict rate were analyzed by calculating the proportion of positive and negative discussion points identified in interviews.

Synergy rate: The analysis showed an average synergy rate of 82%, meaning that 82% of the identified discussion points in the interviews reflected positive synergies, while the remaining 18% represented conflicts or challenges. Synergy points ranged from 14 to 18 across interviewees, indicating strong alignment and positive outcomes from the dual designations of the UGGp and BR at Mount Hakusan. Key synergies included cultural integration (e.g., local products, festivals), shared resources, and collaborative networks, with 90% synergy reported by interviewees 1 and 9.

Conflict rate: Challenges accounted for 18% on average, with conflict points ranging from 2 to 6. Common issues included manpower shortages, limited youth engagement, and governance inefficiencies due to multi-layered administrative structures. Competition for funding among overlapping frameworks such as BR, UGGp, and World Heritage designations was also a recurring concern. Major issues included low public awareness (reported by 6 interviewees), inefficiencies in multi-regional coordination (5 interviewees), and resource competition between UGGp and BR programs (3 interviewees). Interviewees expressed concerns about bureaucratic decision-making processes and the sporadic participation of middle-aged community members in conservation programs. Int 5 emphasized the difficulty of aligning regional priorities under the BR framework, while Int 9 highlighted dual branding's role in boosting international visibility despite budget constraints.

These findings underscore that while the dual designations bring substantial benefits, addressing challenges such as public awareness, coordination, resource allocation, and intergenerational engagement is crucial for long-term success. Stakeholders highlighted significant administrative inefficiencies in managing BR and UGGp due to overlapping responsibilities, fragmented decision-making, and resource allocation conflicts. The BR and GP councils operate separately, leading to duplication of efforts, inconsistent policy implementation, and inefficient resource management. While councils engage with each other, local stakeholders feel disconnected from decision-making, creating a gap between policy objectives and community needs. Additionally, financial and human resources are stretched thin, with competition for funding often favouring geotourism over biodiversity conservation. Bureaucratic governance structures further slow conservation and tourism project approvals, as decision-making remains concentrated among a few officials, limiting broader participation. Conflicts are not strongly observed inside both councils as they have direct communication with each other on a daily basis, and local communities interact and exchange information among themselves. What is missing is effective communication between the councils and the local communities. This gap highlights the need for stronger coordination between governing bodies and more inclusive engagement with local residents to ensure that conservation and development efforts align with community needs.

4. Discussions

4.1. Influence of Dual Designations on Community Engagement and Governance

The dual designations of Mount Hakusan as both a UNESCO Biosphere Reserve and a UNESCO Global Geopark have profoundly impacted governance structures and community engagement over the past 12 years. Stakeholder interviews highlighted several key factors influencing local governance and involvement:

1. Local Stakeholders Involvement: Since the adoption of the Seville Strategy in 2010, which encouraged active participation from local communities, the formation of the Mount Hakusan BR Council—bringing together four prefectures and seven municipalities—was recognized as a significant milestone. The council has provided a platform for local governments, community leaders, and park managers to collab-

orate on integrated conservation and development strategies, with approximately 55% of stakeholders noting that its efforts had moderately bridged the gap between government policies and community needs. However, interview data revealed that community involvement remains limited, with decisions often driven by a few key individuals rather than broader participation. However, Table 3 underscores that operational challenges (100%) and synergies in conservation (89%) were the most frequently discussed concepts, reflecting the stakeholders' focus on addressing governance inefficiencies and promoting conservation. In Figure 2, particularly low public awareness (32%) and insufficient youth involvement (26%)—underscores the ongoing need to make Mount Hakusan BR Council and participatory governance mechanisms more inclusive and representative. Moreover, representatives of the participating stakeholders of both the MH-BR and HT-UGGp frequently change, and are often not living in/directly near the key area. This has led to a lack of understanding, comprehension, and personal interest in BR and UGGps, even among key decision-makers. This disparity in comprehension between decision-makers and decision-performers (staff) leads to inefficient inclusion of new policies and a lack of active participation by stakeholders.

2. Community Engagement: Local residents have had a tight community, and have been actively involved in various community-based activities since before the MH-BR and HT-UGGp were designated. Interviews showed that the MH-BR and HT-UGGp designations have increased community engagement in sustainability, enhancing local pride and ownership. A staff member of the BR said, "We have been doing exchange events in each area these past few years, and wherever we go there are fantastic people active in the communities". About 78% of interviewees acknowledged that the designations provided a framework for engaging communities in sustainability activities. Local residents rediscovered the value of their traditions and cultural practices, such as sweets-making and regional festivals, through the global recognition of these designations.
3. Budgetary Issues and Financial Sustainability: A major challenge identified by 60% of stakeholders was the difficulty in securing sufficient funding for both designations. Neither the MH-BR nor HT-UGGp receive funding from the Prefectural Government. All funding is received from the directly involved municipalities, and some additional private sponsors. The HTGP receives the majority of its budget from Hakusan City, and as a city heavily invested in the SDGs, Hakusan City has invested well in the promotion of the UGGp. The MH-BR on the other hand receives its budget from 7 municipalities of differing sizes—and rather than each area investing at its own will, an agreement was made to each invest the same amount—which is very minimal, and offers little room for activities. While MH-BR requires funding for mostly biodiversity monitoring and conservation activities, the UGGp requires funding for multifaceted activities such as education (development of programs and events), tourism (development of tours and improving guide skills), and conservation (site monitoring and research), in addition to marketing and awareness activities. One interviewee mentioned the difficulty of receiving funding for the MH-BR, stating the "...inability to conduct activities under the current low budget, while requesting a higher budget risks losing the funding altogether".
4. Low Awareness and Unbalanced Participation: Many interviewees mentioned that both the HT-UGGp and MH-BR are not well understood in the area, and that the HT-UGGp is more well-known than the MH-BR in Hakusan City. Even in the dual-designated area, awareness and understanding of the BR is low. Furthermore, the use of the MH-BR and HT-UGGp brand logos for community activities is unbal-

anced, with the majority (83%) of logo/character-use applications coming from the HT-UGGp. Over the analyzed period, the HT-UGGp recorded more than 332 applications, compared to just 67 applications for the MH-BR. This stark difference highlights the UGGp's stronger presence and adoption in promotional and community-related activities. However, in the dual-designation area, the awareness of the few highly active community members is high, and both logos are frequently used together by these groups. This highlights that UGGps and BRs complement each other in promoting greater awareness and participation, and once awareness has been made—community members do actively participate in both designations.

The governance evolution at Mount Hakusan highlights the challenge of balancing ecological protection with local development. Mammadova et al. [18,19] discuss the role of local communities in regional development within UNESCO Biosphere Reserves, highlighting the importance of participatory management in achieving sustainable outcomes. The introduction of the Biosphere Reserve's management council fostered inclusive decision-making, aligning with findings by Schultz et al. [20] on the benefits of community-driven conservation efforts. However, tensions between the top-down BR model and the bottom-up UGGp approach, as also discussed by Fraser et al. [21], remain a challenge. Coordinated strategies between the two councils to improve communication and shared responsibility are crucial, as is improving local community involvement in the decision-making process, while leveraging both models' strengths.

4.2. Influence of Dual Designations on Biodiversity and Geodiversity Conservation

The dual designations of Mount Hakusan have had minimal impact on both biodiversity and geodiversity conservation, though they present both synergies and conflicts that require careful management:

1. Synergies in Conservation Strategies: Stakeholders noted that the dual designations allowed an integrated approach to conserving both biodiversity and geodiversity, as highlighted by the 90% synergy rate noted in Table 5 for some interviewees. The BR's focus on ecological preservation and the UGGp's emphasis on geological heritage could lead to joint conservation programs that prioritize the protection of areas rich in both biodiversity and geodiversity. Most conservation efforts in the area rely on the Hakusan National Park (Ministry of Environment), and other related conservation groups—which for the most part are not directly run by the BR or UGGp. However, an information-sharing platform has been formed by the MH-BR and participating groups share conservation status and activities. This platform has influenced the HT-UGGp, where HT-UGGp stakeholders have been encouraged to report on conservation status and activities regardless of their direct relation to the BR or UGGp. One interviewee states that "Through the MH-BR and HT-UGGp, conservation status is shared between a wider group—allowing for each group to conduct its own activities with greater awareness and collaboration".
2. Tourism and Conservation Conflicts: The BR's strong focus on ecosystem protection has the potential to conflict with the UGGp's strong emphasis on promoting geotourism, as mentioned by numerous interviewees. Tourism-focused policies under the UGGp have the potential to undermine bio- and geo-conservation efforts, as increased visitor numbers raise concerns about damage to fragile ecosystems. About 50% of stakeholders noted conflicts between the HT-UGGp's geotourism emphasis and the MH-BR's stricter conservation regulations. A local manager remarked, "Tourism brings economic benefits but strains conservation, especially in core zones". This dual designation highlighted the difficulty in balancing biodiversity conservation with sustainable development through geotourism. However, interviewees stated that

these issues are not yet visible—which highlights the importance of early monitoring to prevent these issues from occurring.

3. Resources and Communication: Several interviewees mentioned the severe lack of funding for the BR, which greatly minimizes the activities able to be conducted. Due to the lack of funding, the BR is unable to partake in or effectively support conservation or ecotourism efforts, and is currently focused on bringing the various communities within the BR together and sharing information. Despite their inability to conduct activities, this information-sharing platform has proved to be vital for connecting the various information within the wider Mount Hakusan area, and has been of benefit to the UGGp through the shared participation of staff members. "Every year we hold this information sharing discussion online, and every time we are commended for creating this opportunity. We may not be able to do a lot—but our biggest skill is connecting everyone in this large area together" said a BR staff member.

The evolving governance structures of Japanese Geoparks, as noted by Fujii and Ito [4], underscore the complexity of aligning conservation priorities with geotourism development. Meanwhile, the MH-BRs governance focuses on biodiversity conservation through habitat protection programs, sustainable forestry practices, and collaborative management with local communities. Similarly, Zhu et al. [22] demonstrate the necessity of balancing socioeconomic benefits with eco-environmental goals, offering valuable insights for managing the impacts of geotourism on conservation efforts at Mount Hakusan. Furthermore, Polman [23] points out the unequal representation of geodiversity in UNESCO Global Geoparks, highlighting the need for strategic focus to ensure the comprehensive conservation of both biodiversity and geoheritage. This is particularly relevant for Mount Hakusan, where balancing biological and geological conservation within the BR and UGGp frameworks remains an ongoing challenge. Moreover, similar conflicts over resource allocation are reported in other dual-designated sites, underscoring the need for balanced management that supports both biodiversity and geodiversity. For instance, Frys and Nienaber [24] discuss tensions between regional development and conservation in the Bliesgau Biosphere Reserve, emphasizing the importance of stakeholder collaboration. Similarly, Maikhuri et al. [25] highlight challenges in the Nanda Devi Biosphere Reserve, where local resource use has clashed with conservation efforts. Additionally, Martin et al. [26] examine the dynamics of conflict and cooperation in the transboundary Virunga Massif, showcasing the complexities of managing shared ecosystems. These examples demonstrate the necessity of integrated approaches that align ecological protection with local development goals in dual-designated areas, underscoring the need for balanced management that supports both biodiversity and geodiversity. Flexible strategies that address these complex dynamics are essential for maximizing the effectiveness of dual designations.

4.3. Impact of Dual Designations on Tourism and Sustainable Practices

Ecotourism and geotourism, both influenced by the dual designations of Mount Hakusan, have yet to play a significant role in fostering sustainable development in the region. However, current movements indicate future change, and several key aspects were identified:

1. Potential Growth of Ecotourism: The promotion of Mount Hakusan as both a BR and a UGGp has not directly led to the growth of ecotourism in the area. Following the COVID-19 pandemic, tourist numbers are only just returning to normal [27]. However, there is growing interest in utilizing the designations for future tourism prospects, as seen through numerous subsidies earned by the area. Also, local tourist groups are diversifying into slower, more nature-based initiatives such as slow tourism, and nature guiding. Some interviewees mentioned an apparent rise in tourism, but a

comparison with pre-COVID tourist numbers suggests this may simply reflect a post-pandemic rebound rather than genuine growth.

2. Sustainability in Tourism Practices: To mitigate the environmental impacts of increased tourism, the management bodies of both the BR and the UGGp must collaborate on developing sustainable tourism practices. Currently, the UGGp and BR have limited official monitoring systems. They receive visitor data from cooperating organizations, and the status of conservation efforts of invasive species—but little monitoring is being undertaken to assess damages. However, educational material is provided in the form of pamphlets and signs for visitors, focused on the importance of preserving both biodiversity and geological heritage. One government official shared, "Improving the economy through tourism is important, but not if the cost is damaging nature. We need to monitor the situation better to find a balance between tourism and conservation".
3. Challenges in Visitor Management: Despite these initiatives, there were concerns regarding the long-term sustainability of ecotourism, particularly in regard to hiking Mt. Hakusan. Interviewees pointed out that as tourism continues to grow, visitor behavior can become more difficult to manage, particularly in sensitive areas of the MH-BR. Despite educational campaigns and clear rules, some visitors disregard environmental guidelines, which raised concerns about the cumulative impact of increased foot traffic on both biodiversity and geosites. Forty percent% of stakeholders voiced concerns about the increased pressure on local resources due to the rise in visitor numbers, but also believed that the low capacity of the villages would not allow tourism to grow too high. While they acknowledged the economic benefits, several emphasized the need for more sustainable tourism practices. A community representative noted, "We want to preserve our way of life, but with the growing number of visitors, we risk damaging the environment and losing what makes our region unique".

Both ecotourism and geotourism can generate economic benefits while supporting conservation, but they also present challenges in balancing tourism growth with environmental protection. For instance, Alexander and Whitehouse [28] discuss the complexities of achieving sustainable tourism that balances economic development with environmental protection. As tourism increases, managing visitor impacts becomes more complex, requiring careful strategies to ensure sustainability. Marion and Reid [29] emphasize the necessity of effective visitor impact management in protected areas to maintain ecological integrity. Implementing sustainable practices, such as monitoring visitor behavior and limiting access to sensitive areas, is essential for preserving biodiversity and geological integrity [30]. Buckley highlights that while ecotourism offers potential benefits, it also presents challenges that require continuous management to ensure sustainability [31]. Challenges have been observed in other dual-designated sites, such as Jeju Island (South Korea, BR, and UGGp), where over-tourism has strained local ecosystems [10], and Aso UGGp (Japan), which encountered rural depopulation issues despite tourism growth, leading to labor shortages [32]. These cases highlight the need for balanced tourism policies that integrate conservation, local community interests, and sustainable development. Ecotourism at Mount Hakusan has yet to fully realize its potential in fostering sustainable regional development. Ginting et al. [33] emphasize the importance of public facilities in enhancing geotourism experiences, providing a model that could be adapted to Mount Hakusan's dual designations. Additionally, Patil [34] underscores ecotourism's transformative role in promoting sustainability, aligning with Mount Hakusan's objectives of integrating conservation with economic growth. However, as Dasan et al. [35] highlight in their study on post-COVID-19 ecotourism challenges, addressing visitor behavior and resource strain will be critical to ensuring long-term sustainability.

4.4. Role of Education and Research in Dual Designations

Education plays a key role in both the BR and UGGp. The UGGp is actively promoting education to local students, residents, visitors, and higher education throughout the area. There has been particular interest from higher education facilities in the dual designation area, with university programs having been conducted in the area for over 8 years, in addition to the use of the area for ecological, geological, and cultural research. Below, we identify key aspects of the area:

1. Educational Opportunities for Youth: The dual designations have led to the establishment of various educational programs aimed at local youth, particularly university students. The strong educational focus of the UGGp was incorporated into the Hakusan City curriculum for primary and middle schools, and the dual designation status is mentioned strongly in schools in that area. All educational programs focus on the connection between natural and cultural heritage in the area, and the area is often used as a field for learning about BRs and UGGps at the same time. University participation has led to rare initiatives incorporating youth into fixing community issues. This incorporation has created an ideal environment for cross-generational knowledge exchange, and has increased the involvement of youth in areas otherwise facing an aging population. 55% of interviewees (Table 3) mentioned the importance of youth in the BR and UGGp, and how educational activities facilitate youth participation.
2. Education Opportunities for Visitors: Utilizing the UNESCO brand, the area has been able to sell its local culture as a place for learning about sustainability. The HT-UGGp has created learning tours aimed at students, which also utilize the MH-BR area to learn about cultural and natural heritage. The several museums existing in the overlapping area also focus on the cultural, natural, and geological aspects of the area—synergizing well with both the MH-BR and HT-UGGp, and creating learning opportunities for visitors. Furthermore, nature-based tourism initiatives have grown, utilizing the strong image of both designations.
3. Research Synergies and Conflicts: Mount Hakusan has become a hub for interdisciplinary research. Ecological studies are most prominent, with Mt. Hakusan having been a popular research destination for botanists and ecologists for decades. Geological research has predominantly been on fossils and volcanism of Mt. Hakusan, with other geological areas receiving little research attention. Cultural research is by far the least conducted, especially in regards to the connection between culture and the environment, and intangible cultural heritage. Both the MH-BR and HT-UGGp provide annual subsidies to further encourage interdisciplinary research, in addition to cooperation with universities and research facilities. The MH-BR provides annual subsidies of up to 400,000 yen for nature-based studies, including disciplines such as ecological, cultural, and geological. The HT-UGGp provides annual subsidies of up to 100,000 yen, but the subsidy has focused mainly on geological, geographical, and meteorological research. This can be affixed to the UGGp criteria requiring the publication of frequent geological science studies. While the research priorities of the BR and UGGp differ—with the BR focusing on broader ecological and cultural aspects and the UGGp emphasizing geological sciences—better communication and coordination between them can create opportunities for a more integrated, interdisciplinary research approach. Furthermore, of the research being conducted in the area, very little of it reaches international audiences due to the often area-specific topics, such as local flora and fauna. The biological, cultural, and geological diversity of the area could be better understood through greater international publication.

Public understanding of biodiversity and geodiversity is crucial for the success of these programs, as it fosters community involvement and stewardship, particularly in regions fac-

ing rapid urbanization and environmental change [36–38]. Catana and Brilha [39] discuss the critical contribution of UGGps in advancing geosciences education, which is reflected in the HT-UGGp's initiatives aimed at local schools and universities. Similarly, the BR plays a key role in fostering biodiversity awareness and promoting sustainable land-use practices, integrating traditional knowledge into conservation strategies. Moreover, Henriques and Brilha [3] emphasize the strategic importance of geoparks in fostering global sustainability understanding, a goal shared by Mount Hakusan's educational programs. Enhanced focus on interdisciplinary research could further enrich the educational impact by exploring the links between biodiversity, geodiversity, and human well-being. Educational programs integrating biodiversity and geological conservation have engaged local communities and visitors, aligning with findings by Marion and Reid [29] who emphasize the role of environmental education in fostering sustainable behaviors among visitors. Approximately 90% of stakeholders emphasized the benefits of such initiatives, citing the synergy between ecology and geology in both education and research. Gray [40] underscores the interconnectedness of biodiversity and geodiversity, pointing out that geological features form the foundation for ecosystems, influencing biodiversity patterns and ecosystem services. However, this interconnectedness is often overlooked in conservation research priorities, which tend to favour biodiversity over geoscientific studies.

5. Conclusions

The dual designations of Mount Hakusan as a UNESCO Biosphere Reserve and Global Geopark present a unique opportunity for integrating biodiversity and geodiversity conservation with sustainable development. This study reveals significant synergies, particularly in promoting cultural heritage, fostering educational opportunities, and enhancing global recognition. However, significant challenges include administrative inefficiencies, resource allocation conflicts, limited public awareness, and low youth engagement, with the UGGp's geotourism-focused initiatives often overshadowing the BR's biodiversity priorities. Addressing these challenges requires adopting an integrated governance approach to align the objectives of the BR and UGGp, fostering collaboration among councils and stakeholders. Additionally, targeted youth programs and intergenerational activities are essential to ensure the sustainability of conservation efforts. Balanced funding strategies and robust monitoring systems to evaluate tourism impacts and conservation outcomes are critical to achieving long-term sustainability.

These findings align with integrated landscape management frameworks, which advocate for harmonizing diverse land uses through participatory governance. The results underscore the relevance of ILM as a framework for addressing the complexities of dual designations. ILM's principles of balancing conservation and development resonate strongly with the findings at Mount Hakusan. For instance, the creation of information-sharing platforms by the MH-BR council demonstrates an ILM-aligned approach, fostering collaboration among diverse stakeholders and promoting shared goals for biodiversity and geodiversity conservation. By integrating geotourism and ecological monitoring, the dual designations exemplify the practical application of ILM in a real-world context. Additionally, the principles of sustainability science, which emphasize interdisciplinary approaches and stakeholder inclusion, are evident in the observed synergies between MH-BR and HT-UGGp initiatives. The challenges identified, such as administrative inefficiencies and resource competition, highlight areas where sustainability science can inform adaptive management strategies to enhance resilience and long-term sustainability. By addressing these issues, Mount Hakusan can enhance its role as a model for harmonizing conservation and development within dual UNESCO designations.

Based on the findings, this study offers the following recommendations for policymakers, managers, and stakeholders:

- Promote awareness of the purpose and benefit of both the BR and UGGp to the local community and key decision-makers, to encourage organic and active participation and support.
- Invest more time in communicating with and networking with local communities in order to hear their voices, and build informed bottom-up management practices.
- Enhance coordination between BR and UGGp key decision-makers to ensure that conservation and development goals are aligned and mutually reinforcing.
- Develop integrated management plans that address both BR and UGGp activities, with clear guidelines for resource allocation and stakeholder involvement.
- Promote interdisciplinary research, keeping in mind the under-researched fields of the area, and budget and/or systematic restraints of each designation.
- Implement sustainable tourism strategies that balance the promotion of geotourism with the protection of fragile ecosystems, including the development of visitor management plans that consider the carrying capacity of the environment.

6. Limitation of the Study and Future Research

While the qualitative approach used in this study provided rich insights, it also had limitations. The absence of direct community surveys limited the ability to capture broader public opinions. Potential biases may have arisen from the selection of stakeholders, as interviewees' perspectives might not fully represent the views of all groups. Future studies could address these limitations by incorporating quantitative surveys and involving a larger sample of community members.

Future research should explore the long-term impacts of dual UNESCO designations on conservation and sustainable development, with a particular focus on comparative analyses of other sites with overlapping BR and UGGp designations. Additionally, further studies could examine the effectiveness of integrated management approaches in addressing the challenges associated with dual designations, providing insights for the development of best practices in this emerging field. Further insight into community awareness and willingness to engage could help to bridge community members with the BR and UGGp activities.

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