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Integrating Local Conservation Efforts with SDG15 in the Aba Prefecture China

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ABSTRACT

Biodiversity is a critical component for sustainable human development. The recently concluded Sixteenth Conference of Parties to the Convention on Biological Diversity 2024 highlighted the need for whole of society mobilization to address the global biodiversity crisis by translating international conservation commitments into effective local actions. A study to understand the linkages between ecological conservation measures in Aba Tibetan and Qiang Autonomous Prefecture and the United Nations Sustainable Development Goal (SDG) 15 target 15.5, was undertaken, using the content analysis method that reviewed international conventions, national policies, and local government measures and practices. The study revealed that there was a strong link with between Aba's conservation strategies and SDG 15 particularly target 15.5 in reducing natural habitat degradation, curbing biodiversity loss, and protecting endangered species. The Aba Prefecture has established 25 nature reserves, that are regulated by stringent wetland protection measures, and comprehensive legal frameworks for biodiversity conservation which is in line with SDG 15. The findings further show that that the Aba Prefecture's efforts in ecosystem conservation, species protection, and sustainable resource utilization can be used to help meet SDG 15 target 15.5. The study also identified steps to help localize SDG aspirations and goals, by strengthening long-term data monitoring and local herder participation. These insights can be used to support other initiatives and measures in other similar biodiversity-rich regions seeking to implement global conservation goals at the local level, particularly in ecologically sensitive mountainous areas.

Keywords: Aba Prefecture; SDG15; SDG15 Target15.5; Biodiversity; Ruoergai; Ecological Conservation

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1. Introduction

Biodiversity as a whole is critical to human and environmental life support and for maintaining the sustainable development of human society. The implementation of biodiversity conservation has become a major global concern, at the same time, biodiversity conservation, sustainable development, and climate change are also hot topics of international attention[1]. The Sixteenth Conference of Parties to the Convention on Biological Diversity 2024 (CBD COP 16) reiterated concerns related to the state of the world's biodiversity, and emphasized on the role of local communities[2], that is their innovation, practices and traditional knowledge to support the implementation of the Convention as well as the Kunming-Montreal Biodiversity Framework.

The multistakeholder approach is important as reports have indicated global biodiversity is declining at an unprecedented rate in human history, with currently about 1 million species of animals and plants facing the threat of extinction[3]. This is more so for mountain ecosystems, that cover 27% of the Earth's land surface and support about 25% of terrestrial biodiversity but are currently undergoing accelerated changes[4].

Climate change is becoming an increasingly serious driver of biodiversity loss and ecosystem degradation[5], and the CBD COP 16 has also highlighted the need "to identify and maximize potential synergies between biodiversity and climate actions"[2]. Understanding the impact and risks of climate change and development is crucial to help meet the targets set in SDG 15 target 15.5 (SDGs) is crucial, especially in the Hindu Kush Himalayan (HKH) region, where the rate of warming is nearly three times the global average[5].

Aba Tibetan and Qiang Autonomous Prefecture (hereinafter referred to as Aba Prefecture) is located in the northwest of Sichuan Province, on the southeastern edge of the Qinghai-Tibet Plateau, which belongs to the Hindu Kush Himalayan (HKH) region□Aba Prefecture has a diverse ecosystem including snow-capped mountains, forests, grasslands, and wetlands. The region is recognized as one of the richest in high-altitude species diversity in the world and is an important genetic reservoir[6]. The Ruoergai Plateau in this region has the largest and most concentrated plateau wetland system in China and is an important water source for the Yangtze and Yellow Rivers[7].

Furthermore, the Wolong Nature Reserve in this area is crucial for biodiversity conservation, and is focused on the protection of giant pandas and other species[8]. The Aba Prefecture plays a key role in ecological functions such as water conservation, soil conservation, climate regulation and biodiversity protection, and is important for maintaining the ecological security of the region and even the country[9].

In recent years, Aba Prefecture has focused on the implementation of key ecological projects such as forest, grassland, wetland protection and restoration, and soil and water erosion control, which have effectively safeguarded ecological security and biodiversity[10]. However, despite the government's efforts, Aba Prefecture still faces serious ecological challenges in recent years, and studies have shown that the region faces threats from ecological degradation and biodiversity loss[11]. For example, grassland degradation, shrinking wetlands, and soil erosion are still serious problems that threaten the ecological security and biodiversity of the region[12].

The Ruoergai County and Aba County have both experienced ecological degradation, in which the grassland in Ruoergai County is very sandy, and according to the statistics, the sandy land area in the county reaches 8.03×104 hm2 , accounting for 7.8% of the total area of the county[10]. Studies have also shown that due to the impact of climate change such as global warming, regional evapotranspiration increase, and human activities such as overgrazing, ditching, and so forth, the ecology of the wetland of Ruoergai has also significantly deteriorated[13, 14].

The ecological environment of Ruoergai wetland has also deteriorated significantly due to climate change such as global warming and increased regional evapotranspiration, as well as human activities such as overgrazing and ditching. Over the past 30 years, the Ruoergai alpine peat swamp wetland has degraded turning into a desert in the northwest and a meadow in the southeast[15]. These challenges not only affect the health of the local ecosystem, but also pose a potential threat to the sustainable development of the region.

In September 2015, Transforming Our World: the 2030 Agenda for Sustainable Development was adopted at the United Nations Summit on Sustainable Development, an agenda whose Sustainable Development Goals (SDGs) are aimed at eradicating poverty, protecting the planet and ensuring prosperity for all[16]. This agenda is the successor and upgrade of the UN Millennium Development Goals (MDGs),

which covers 17 Sustainable Development Goals (SDGs) and 169 sub-goals[17].

Among them, Sustainable Development Goal 15 (SDG15) aims to protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt the loss of biodiversity, especially its sub-goal 15.5 which calls for "urgent and significant action to reduce the degradation of natural habitats and halt the loss of biodiversity". by 2020, and to protect and prevent the extinction of threatened species[16]. This for a biodiversity hotspot such as Aba Prefecture, SDG15 target 15.5 is particularly important. This target is not only related to the conservation of Aba's rich species resources, but also involves the maintenance of the region's unique ecosystems, which is crucial to ensuring regional ecological security and sustainable development.

Existing studies have shown that the adoption of the Sustainable Development Goals (SDGs) cannot only rely on social and economic development, and it is crucial to incorporate the ecological environment into sustainable development decision-making[18]. However, most of the studies have been carried out at the global or national scales, and there is insufficient attention paid to regional studies, which makes it difficult to provide a basis for the adoption or implementation of SDGs on a regional scale[18]. For ecologically fragile areas such as Aba Prefecture, there is a lack of in-depth case studies to explore how to effectively implement SDG 15.5 at the local level, and this research gap needs to be filled.

Thus the main objective of the study that underlies the this paper, is to identify actions needed to conserve biodiversity to help Aba Tibetan and Qiang Autonomous Region achieve SDG15 target 15.5, which required nderstanding the importance of ecological conservation measures in the context of SDG15 target 15.5. This also included determining interventions that are both scientifically based and culturally appropriate to the local context, as briefly outlined herein.

2. Materials and Methods

2.1. Overview of the Study Area

Aba Tibetan and Qiang Autonomous Prefecture (hereinafter referred to as Aba Prefecture) is located in the northwestern part of Sichuan Province (**Figure 1**), on the southeastern edge of the Qinghai-Tibetan Plateau, at 100°30′–104°27′E, 30°35′–34°19′N, with a total area of 84,200 km^2, an average elevation of 3,500–4,000 m, with half of it being in highland areas and half in mountainous valleys. Aba Prefecture faces the plateau monsoon climate, divided into alpine, mountain plains, alpine valleys, three climate types, the average temperature is low, the winter is long, the average annual temperature of −4 16.2 ℃, belongs to the Northwest Sichuan alpine region, the precipitation is low, the average annual rainfall of 679.2 mm, sunshine is sufficient, due to the complex topography, complex geological structure, large vertical temperature difference, incomplete soil development and poor soil fertility, the vegetation cover of the study area is low[6, 19]. In the National Ecologically Fragile Areas Protection Plan Outline, the area is listed as an ecologically fragile area of the southwestern mountainous area where agriculture and animal husbandry are intertwined.

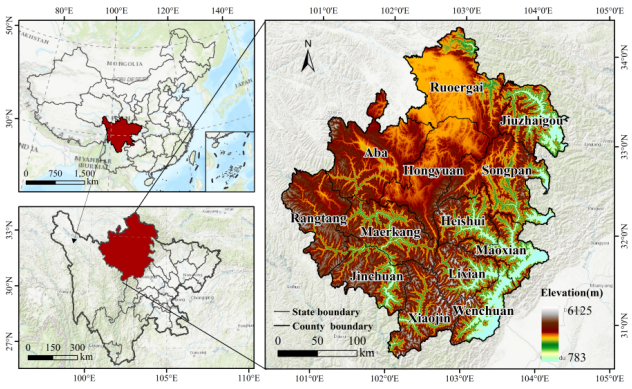

Figure 1. Study area.

2.2. Research Method

This study used the content analysis method, where related international conventions, national policies and local rules and regulations, documents, projects, and reports were the primary references for analyzed by identifying keywords, ideas and concepts. Content analysis is a research methodology used to systematically analyze data such as text, images or audio to obtain information about a particular topic or phenomenon, which is applicable in a variety of fields such as social sciences, communication, psychology and education[20]. Content analysis helps to systematically convert large amounts of text into highly organized and concise summaries of key findings, the process of analysis reduces the amount of text collected, identifies and groups categories and seeks some understanding of it[21].

The method facilitated the assessment of existing conservation measures in Aba and explored their connection with SDG15 target 15.5. The primary aim of the method was to identify existing measures that can be linked to strategies of SDG15 target 15.5 in the Aba Prefecture, which is intended to also serve as reference for the sustainable development in similar ecologically fragile areas. The results of the study is intended to support existing regional policies and the implementation of biodiversity conservation measures, thereby supporting the global sustainable development agenda.

2.2.1. Research Design

Following Krippendorff's content analysis method [22], this study divided the units of analysis into three levels: policy documents and reports as the sampling units, paragraphs containing biodiversity conservation measures as the recording units, and the sections describing policy implementation as the context units.In accordance with Krippendorff's systematic sampling criteria, the following documents were selected:

a) Relevance: Directly related to biodiversity conservation and SDG15 target 15.5

b) Representativeness: Covering the international, national and local administrative levels

c) Completeness: All documents were available in full text

d) Time range: 1992 to 2024

The documents analyzed included the Convention on Biological Diversity (1992), the 2030 Agenda for Sustainable Development (2015), and the Kunming-Montreal Global Biodiversity Framework (2022); the national policy document China's National Biodiversity Conservation Strategy and Action Plan (2011–2030); related local documents and reportsas well as regulations such as the Regulations on Ecological Environmental Protection in Aba Tibetan and Qiang Autonomous Prefecture, the Progress Report on the Management of Grassland Sanding in Ruoergai County, the Sichuan Ruoergai Wetland National Nature Reserve Project, and the Provincial Sand Control Project, as well as other related ecological projects reports.

Based on the requirements of SDG15 target 15.5, a coding framework with three main categories was developed: Habitat Protection (HAB), Biodiversity Conservation (BIO), and Implementation Measures (IMP). Each category had specific sub-categories, such as A1: Measures to reduce habitat degradation and A2: Habitat quality improvement under HAB; B1: Species conservation and B2: Genetic diversity protection under BIO; C1: Policy tools and C2: Implementation mechanisms under IMP. Each text unit was coded on a scale of 0–3, After the initial coding, the data was cross checked by an independent coder, according to the established coding framework based on Krippendorff's method. The comparison between the initial coding and independent coding results yielded reliability scores as shown in **Table 1**, exceeded the acceptable threshold of 0.80 [22], indicating a high degree of reliability in the coding process.

The systematic coding and analysis of the document content identified the key themes, successful cases, and implementation challenges in Aba's biodiversity conservation policies and measures and assessed their correspondence with the requirements of SDG15 target 15.5. Based on the qualitative analysis, recommendations were provided to further improve the biodiversity conservation work in Aba.

3. Results and Analysis

3.1. Aba's International Commitments on Biodiversity Conservation

3.1.1. The 2030 Agenda for Sustainable Development

In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, which put forward 17 Sustainable Development Goals (SDGs). Among them, SDG15 aims to protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss. Specifically, Goal 15.5 calls for "urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, conserve and prevent the extinction of endangered species" [20].

This agenda provides a broad framework and direction for countries around the world to develop national and local biodiversity conservation strategies.

As a signatory to the 2030 Agenda for Sustainable Development, China attaches great importance to and actively implements the SDG15-related goals. The Aba region is the habitat of a variety of endangered and endemic species, and rare animals such as giant pandas (Ailuropoda

Table 1. Content Analysis Coding Framework and Cross-check Results.

Categories and Sub-Categories		Krippendorff's α
Habitat Protection (HAB)	Protection measures (HAB-A1)	0.85
	Restoration actions (HAB-A2)	0.83
Biodiversity Conservation (BIO)	Species conservation (BIO-B1)	0.88
	Genetic resources (BIO-B2)	0.81
Implementation Measures (IMP)	Policy tools (IMP-C1)	0.84
	Implementation systems	0.82
Overall		0.812

melanoleuca), snow leopards (Panthera uncia), and black-necked cranes (Grus nigricollis). According to the International 2024 IUCN Red List[23] (**Table 2**), the giant panda (Ailuropoda melanoleuca) and snow leopard (Panthera uncia) are vulnerable species, and the survival of these species is threatened by habitat loss and anthropogenic disturbance.

Table 2. 2024 IUCN Red List of Aba Prefecture.

Species	Status
Ailuropoda melanoleuca	VU
Panthera uncia	VU
Cordyceps sinensis	VU
Fritillaria cirrhosa	VU
Rhinopithecus roxellana	EN
Grus nigricollis	NT
Pantholops hodgsonii	NT

Source: 2024 IUCN Red List official website.

The Ruoergai wetland in the region is identified as the first large plateau swamp wetland in China, and the largest and best-preserved plateau peat bog in the world, which is a typical representative of the alpine wetland ecosystem in the Qinghai-Tibet Plateau[24]. However, due to human activities such as drainage and long-term overgrazing, the marsh wetland has been altered to different degrees, and the wetland area has been shrinking dramatically over the years, the ecological environment is extremely fragile, and it is facing an unprecedented ecological crisis[11, 25].Thus, the Aba region is one of the priority areas for the implementation of SDG 15.5, and the integration of SDG 15.5 to achieve biodiversity conservation and restoration is essential to maintain the ecological security of the local and neighboring areas. SDG 15.5 is an important reference point for government stakeholders to develop measures, including wetland and species diversity conservation, prevention of grassland desertification, etc., to contribute to the achievement of the 2030 biodiversity targets at the local level.

3.1.2. Convention on Biological Diversity (CBD)

In recent decades, as ecosystems continue to deteriorate and the rate of species loss is increasing, the importance of conserving species and preserving their habitats has been further recognized, which led the United Nations to adopt the Convention on Biological Diversity (CBD) in 1992[26]. The Convention emphasizes the significant reduction of biodiversity due to certain human activities, the restoration and rehabilitation of degraded ecosystems, and the recovery of endangered species, which includes the development and implementation of plans or other management strategies[26]. In 2020, Conference of Parties (COP)15 further adopted the "Post-2020 Global Biodiversity Framework", which sets out an ambitious long-term vision for biodiversity to 2050, which was reviewed at the recently concluded COP 16 in November 2024 further reiterating the need to synergize both biodiversity conservation and climate action[27]. The Chinese Government has attached great importance to fulfilling its obligations under the Convention on Biological Diversity and had set up the China Compliance Coordination Group, comprising 20 departments. In order to curb the trend of biodiversity loss, China has formulated and enacted more than 20 laws and regulations on biodiversity protection[28]. China has formulated and implemented a series of biodiversity conservation policies and actions in accordance with the requirements of the Convention and national conditions.

Among them, China's National Biodiversity Conservation Strategy and Action Plan (2011–2030) is an important initiative for the fulfillment of the Convention, providing direct or indirect guidance for biodiversity conservation in the Aba Prefecture region of Sichuan. The formulation and

implementation of this document reflects the efforts of the Chinese Government to integrate the principles and requirements of the Convention on Biological Diversity with national and local realities, and is of great significance for the scientific conservation of the unique and fragile ecosystems in the Aba Prefecture area and for the maintenance of regional biodiversity security, and strongly supports China's commitment to the Convention on Biological Diversity and the fulfillment of its international obligations.

3.1.3. The Kunming-Montreal Global Biodiversity Framework (KMGBF)

The Kunming-Montreal Global Biodiversity Framework 2030 (KMGBF2030) is action- and results-oriented, drawing on the experience and outcomes of the Strategic Plan for Biodiversity 2011–2020 and other relevant multilateral environmental agreements, and sets out an ambitious plan to transform society's relationship with biodiversity by 2030 and to ensure a shared vision of living in harmony with nature by 2050 [28].

This framework not only sets a new roadmap for realizing the global vision of living in harmony with nature by 2050, but also points the way for future global biodiversity governance. At the same time, the KMGBF2030 framework is closely related to Sustainable Development Sub-goal 15.5, and the linkages are as summarized in **Table 3**.

Table 3. Relationship between the Kunming-Montreal Global Biodiversity Framework 2030 and SDG 15 target 15.5.

KMGBF2030 Frame		Relationship to SDG 15 Target 15.5
Section G. Global goals for 2050	Goal A	Directly supports SDG 15 target 15.5 by aiming to maintain ecosystem integrity, halt species extinction, and maintain genetic diversity
	Goal B	Indirectly supports SDG 15 target 15.5 through sustainable use and management of biodiversity
Section H. Global targets for 2030	Target 1	Supports protection of natural habitats through spatial planning to bring the loss of areas of high biodiversity importance close to zero
	Target 2	Directly supports SDG 15 target 15.5 through effective restoration of degraded ecosystems
	Target 3	Directly supports protection of natural habitats and threatened species through expansion of protected areas systems
	Target 4	Directly addresses SDG 15 target 15.5 by ensuring management actions to halt human induced extinction of known threatened species

The KMGBF2030 framework not only continues the core concepts of Sustainable Development Sub-goal 15.5, but also further refines and expands the goals. Goal A directly corresponds to the requirements of Sustainable Development Sub-goal 15.5 to protect endangered species and halt biodiversity loss and sets a long-term target to 2050. Goal 1 emphasizes the importance of spatial planning in biodiversity conservation, which supports the goal of reducing the degradation of natural habitats in sustainable development sub-goal 15.5. Goals 2 and 3 directly support the conservation of natural habitats and endangered species through the effective restoration of degraded ecosystems and the expansion of protected area systems. Goal 4, on the other hand, fully corresponds to the core elements of Sustainable Development sub-goal 15.5 and provides more detailed guidance for action, including in situ and translocated conservation, sustainable management practices, and management of human-wildlife relationships.

In this context, to further contribute to the implementation of the framework, China is revising China's Biodiversity Conservation Strategy and Action Plan (2011–2030), mobilizing the entire government and society to participate in the process and take action to achieve the framework's goals, and China plans to further optimize the layout of protected areas and strengthen the protection of national parks and high-altitude peat wetlands [29]. Aba Preliminary formed a wetland protection system with wetland nature reserves as the main body and national and provincial wetland parks as support. Currently, 25 nature reserves focusing on forest ecology, inland wetlands, and wildlife have been established in Aba Prefecture, accounting for 15% of the total number of nature reserves in Sichuan Province (**Table 4**).

Table 4. Construction status of regional nature reserves in Aba Prefecture.

Study Area	Nature Reserves	National	Provincial Level	The Total Area
Aba Prefecture	25	6	10	277.72
Sichuan Province	166	32	66	824.77

Source: Fan Mengying 2021 [6].

3.2. National Policies and Guidance for Achieving SDG 15 Target15.5 in Aba Region

In order to implement the provisions of the Convention on Biological Diversity (CBD), further strengthen biodiversity conservation, and effectively respond to new issues and challenges facing biodiversity conservation, the Ministry of Environmental Protection (MEP), together with more than 20 departments and organizations, formulated China's National Biodiversity Conservation Strategy and Action Plan (2011–2030). The plan outlines the overall objectives, strategic tasks and priority actions for biodiversity conservation in China over the next 20 years [30]. The plan identifies three biodiversity conservation priority areas that are closely related to the achievement of Sustainable Development Sub target 15.5 in the Aba region, emphasizing the strategic tasks for biodiversity conservation in the region (**Table 5**).

Firstly, priority area 2, "Integrate biodiversity conservation into sectoral and regional planning and promote sustainable use", is critical in guiding biodiversity conservation in Aba Prefecture. Action 4 would require the Sichuan Provincial Government to develop a regional biodiversity conservation strategy and action plan, and Aba Prefecture, as one of the most important ecological regions in Sichuan, should be guided by the provincial strategy and action plan for biodiversity conservation, especially the conservation of wetland and grassland ecosystems on the Ruoergai Plateau, which is integrated into the overall framework of biodiversity conservation in the province.

Action 4.4 would require for the development of a strategy and action plan for biodiversity conservation in the Yellow River Basin, as the Aba Prefecture is the main area of the upper reaches of the main stream of the Yellow River that flows through Sichuan Province, involving four counties (Aba, Ruoergai, Hongyuan, and Songpan counties) [8], and is an important ecological barrier, and the development and implementation of the Yellow River Basin Biodiversity Conservation Plan will have a guiding significance. It can provide significant guidance for the protection of wetlands, grasslands and other important ecosystems in Aba Prefecture.

Secondly, Priority Area 4, "Strengthening in situ conservation of biodiversity", has bearing on the biodiversity conservation efforts in Aba Prefecture. This includes coordinating the implementation of improved planning for national-level nature reserves, and strengthening the protection of priority biodiversity conservation areas, especially for species endemic to the alpine region of the Tibetan Plateau, such as the black-necked crane and Cordyceps sinensis.

The Ruoergai wetland is the main breeding habitat of the black-necked crane and is a key area for ecological protection and development in the Yellow River Basin [31], and the Ruoergai County is one of the richest areas for Cordyceps sinensis in Sichuan Province [32]. Based on the Priority Area 2, the Aba Prefecture could further focus on the protection of flagship species such as the black-necked crane and the ecosystems of the plateau grassland wetlands and explore the sustainable utilization of the plateau's endemic medicinal resources.This would also help introduce measures to standardize development of nature reserves to improve management quality, and for enhanced biodiversity conservation outside nature reserves, such as the implementation of a project to ban grazing and return pasture to grass. This would also be in line withPriority Area 5, "Scientifically carry out relocation biodiversity conservation", which would require the continued implementation of rescue projects for rare and endangered wildlife and plants and provides guidance for the conservation of endangered species in Aba Prefecture.

3.3. Correspondence between Conservation Practices in Aba Prefecture and SDG15 Target15.5

3.3.1. Laws and Regulations on Ecological Environmental Protection in Aba Prefecture

The government of Aba Prefecture has actively responded to the call to address the challenges posed by ecosystem and environmental protection, and Aba Prefecture pro-

mulgated the Regulations on Ecological Environmental Protection of the Aba Tibetan and Qiang Autonomous Prefecture in 2010[33], and there is a close link between this regulation and Sustainable Development Sub-goal 15.5 (**Table 6**).

Table 5. Conservation areas and actions related to SDG15 target 15.5 in Aba Prefecture in the China Biodiversity Conservation Strategy and Action Plan 2011–2030.

NO.	"China National Biodiversity Conservation Strategy and Action Plan (2011–2030)"		
	Priority Areas for Biodiversity Conservation	**Action**	**Specific Actions**
1	Priority Area 2: Integrate biodiversity conservation into sectoral and regional planning and promote sustainable use	Action 4: Integrate biodiversity conservation into departmental and regional plans and programs	Action 4.3 Provincial governments should formulate biodiversity conservation strategies and action plans in their respective regions.
			Action 4.4: Develop a strategy and action plan for watershed biodiversity conservation.
2	Priority Area 4: Strengthening in situ conservation of biodiversity	Action 12: Coordinate the implementation and improvement of the national nature reserve plan	Action 12.1 Coordinate the implementation of nature reserve development plans and establish an information management system.
			Action 12.2 Strengthen the construction of nature reserves in priority areas for biodiversity conservation, optimize spatial layout, and improve the connectivity and overall conservation capacity among nature reserves.
		Action 13: Strengthen the protection of priority areas for biodiversity conservation	Action 13.4: In the high-altitude cold areas of the Qinghai-Tibet Plateau, focus on protecting Cordyceps sinensis and high-altitude cold desert animals such as Tibetan antelopes, Tibetan wild donkeys, Tibetan gazelles, snow leopards, blue sheep, argali, and black-necked cranes.
		Action 14: Carry out standardized construction of nature reserves and improve the management quality of nature reserves	Action 14.2 focuses on national nature reserves, improves management facilities, strengthens supervision measures, and carries out standardized construction.
		Action 15: Strengthen the protection of biodiversity outside nature reserves	Action 15.6: Continue to implement the grazing land restoration project, and strengthen the protection of grassland ecosystems by restricting overgrazing and other activities through measures such as grazing bans and closures, rotational grazing, etc.
3	Priority Area 5: Scientifically Conducting Ex-situ Conservation of Biodiversity	Action 19: Strengthen the rewilding of artificial populations and the restoration of wild populations	Action 19.1 continues to implement rescue projects for rare and endangered wild animals and plants such as tigers, Tibetan antelopes, Przewalski's gazelles, Chinese alligators, gibbons, cycads, and orchids.

Table 6. Correspondence between the Regulations on Ecological Environment Protection in Aba Tibetan and Qiang Autonomous Prefecture and SDG15 target15.5.

Sections of the Regulation	Regulatory Provisions	Relationship to SDG15 Target15.5
Chapter II. Protection of the natural ecosystem	Including forests, grasslands, greenlands, upland wetlands, natural World Heritage sites and biodiversity conservation	Directly corresponds to the requirements of SDG15 target15.5 to reduce degradation of natural habitats and conserve biodiversity
Chapter III. Ecological and environmental protection for economic and social development and the development of important resources	Ecological protection involving the development of agriculture, industry, transportation, urban and rural construction, hydropower resources, mineral resources and tourism resources	Support the objective of SDG15 target15.5to integrate biodiversity values into national and local planning
Chapter IV. Ecological restoration and governance	Provides for planning and implementation requirements for ecological restoration and management	Consistent with the objective of restoring degraded ecosystems in SDG15 target15.5
Chapter V. Legal liability	Establishes penalties for violations of the regulations	Provides legal security for the realization of SDG15 target15.5

First, chapter II of the regulations, "Natural ecological environment protection", directly corresponds to the core requirements of sustainable development sub-goal 15.5 to reduce the degradation of natural habitats and conserve biodiversity. This chapter details conservation measures for forests, grasslands, greenlands, plateau wetlands, natural World Heritage sites and biodiversity, providing a comprehensive conservation framework for Aba's important ecosystems and biodiversity. These measures will not only help slow down habitat degradation, but also effectively curb biodiversity loss.

Secondly, Chapter 3 of the regulations, "Ecological and Environmental Protection for Economic and Social Development and Important Resource Development," embodies the concept of integrating biodiversity conservation into local development planning, which supports the goal of integrating biodiversity values into national and local planning, as emphasized in Sustainable Development Sub-goal 15.5. By regulating development activities in agriculture, industry, transportation, urban and rural construction, hydropower resources, mineral resources and tourism resources, the regulations ensure a balance between economic development and ecological protection, providing an important guarantee for sustainable development.

Chapter IV, "Ecological restoration and management", echoes the goal of restoring degraded ecosystems in sub-goal 15.5 of sustainable development. This chapter stipulates the planning and implementation requirements for ecological restoration and management, providing a policy basis for the restoration of damaged ecosystems in Aba Prefecture, which is of great significance to the maintenance and restoration of biodiversity.

Finally, the "Legal Liability" section of Chapter 5 of the regulations provides the necessary legal safeguards for the realization of SDG15 target15.5.. By specifying the penalties for violating the regulations, it ensures the effective implementation of ecological environmental protection measures, thus indirectly supporting the realization of SDG15 target15.5.

3.3.2. Measures for Wetland Protection and Grassland Desertification in Aba Prefecture

Aba Prefecture has taken a series of measures to reduce natural habitat degradation, mainly including wetland protection and restoration, grassland desertification prevention, and forest protection. In terms of wetland protection, Aba Prefecture has successively established wetland nature reserves such as Hongyuan Riganqiao, Aba Manzedang, and Ruoergai Kahaerqiao, with a total area of 677,000 hectares [8]. Taking Ruoergai as an example, it has implemented projects such as the "Sichuan Ruoergai Wetland National Nature Reserve Project" and the "Ruoergai County Grassland Wetland Water Conservation Ecological Protection and Restoration Project." Through measures like gully blocking, grassland restoration, and wetland protection, the ecological functions

of wetlands have been effectively improved. Special protection actions have been carried out for flagship species such as black-necked cranes, including setting up three monitoring points for black-necked cranes in the Ruoergai wetland, using advanced equipment to achieve round-the-clock observation.

In terms of ecological restoration, a series of wetland and grassland ecological restoration projects have been implemented, improving habitat conditions for species. As show as **Table 7**, through the implementation of the "Ruoergai County Grassland Wetland Water Conservation Ecological Protection and Restoration Project," the area of Huahu Lake expanded from 215 hectares to 650 hectares; the number of black-necked cranes recovered from tens of thousands initially to over 300,000; white cranes increased from 210 to 4,500; and crested ibises recovered from 7 when discovered to over 5,000. The number of national first-class protected animals in the reserve also increased from 9 to 17 species. At the same time, to curb biodiversity loss, Aba Prefecture has adopted strategies such as establishing a protected area network, strengthening species protection, ecological restoration, and enhancing law enforcement and supervision.

In terms of grassland desertification prevention and control, the trend of grassland degradation has been curbed through the implementation of projects such as grazing ban, grass-livestock balance, and black soil management. As shown in **Figure 2**, compared with the previous severity of desertification, especially in 2014, in 2019, the desertified area showed negative growth for the first time. By 2023, the desertified area in Ruoer County had dropped to 24,733.33 hectares[34], effectively curbing the trend of desertification, with some areas showing positive changes in sand land types.

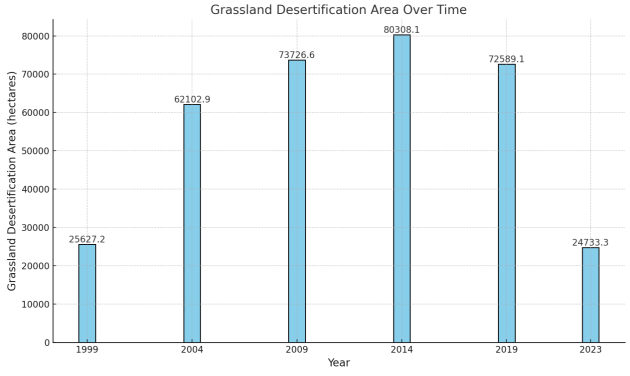

Figure 2. Grassland desrtification area over time in Ruoergai (1999 to 2013).

4. Discussion

The analysis of relevant documents, reports, and literature at the international, national, and local levels, provided useful insight on the key role of ecological conservation measures adopted in Aba Tibetan and Qiang Autonomous Prefecture in translating and implementing SDG15 target15.5. In addition opportunities have also been identified to further strengthen implementation and increase impact.

4.1. Linkages between Policy Frameworks and SDG15 Target 15.5 at the International and National Levels

At the international level, the 2030 Agenda for Sustainable Development, the Convention on Biological Diversity (CBD), and the Kunming-Montreal Global Biodiversity Framework (KMGBF) provide the overall framework for the development and implementation of national and local biodiversity conservation policies that is relevant to China and provide important directions for conservation actions such as wetland conservation and endangered species rescue in Aba Prefecture, especially in the Ruoergai region. These international conventions and frameworks are highly relevant to SDG 15 target15.5 and point the way for global biodiversity conservation efforts, but further localization and refinement is needed for concrete implementation.

At the national level, China's National Biodiversity Conservation Strategy and Action Plan (2011–2030) list Aba Prefecture as a priority area for biodiversity conservation, identify Ruoergai as a key project area for wetland conservation and restoration, and put forward a series of conservation measures such as protection of endangered species, restoration of degraded wetlands and management of grassland ecosystems conservation measures. These national policies correspond comprehensively to SDG 15.5 and provide guidance for local action, but some of the objectives have not yet been fully implemented.

4.2. Conservation Practices at the Local Level in Aba Prefecture in Connection with SDG 15 Target 15.5

At the local level, to strengthen legal protection, Aba Prefecture has enacted the Regulations on Ecological Envi-

Table 7. Achievements in biodiversity conservation in Ruoergai Wetland.

NO.	Achievements in Biodiversity Conservation in Ruoeragi Wetland	
1	Huahu Lake Area	Expanded from 215 hectares to 650 hectares
2	Black-necked Crane	From tens of thousands at the beginning to more than 300,000 now
3	White crane	From 210 to 4,500
4	Crested Ibis	From 7 when it was discovered, the current population is over 5,000.
5	National Class I protected animal	Increased from 9 to 17

ronmental Protection in Aba Tibetan and Qiang Autonomous Prefecture. The regulations cover all aspects of natural ecological environment protection and ecological environment protection in economic and social development, with special emphasis on the protection of plateau wetlands, World Natural Heritage and biodiversity, and several conservation measures implemented in Aba directly contribute to the realization of SDG15 target 15.5. Among them, the provincial sand control project in Ruoergai region has significantly improved the trend of grassland sandification.

Furthermore, the Sichuan Ruoergai Wetland National Nature Reserve Project and the Grassland Wetland Water Conservation and Ecological Protection and Restoration Project have been implemented in Ruoergai region, and have achieved positive results in restoring wetland health, recovering species populations, and curbing grassland degradation. These measures have significantly reduced the rate of biodiversity loss in Aba Prefecture, but there may be a lack of long-term monitoring data and a need to strengthen the participation of local farmers and herders. At the same time, enforcement of regulations needs to be further strengthened to ensure that conservation measures are effectively implemented.

4.3. Future Opportunities: Strengthening Local Implementation of SDG 15 Target15.5 and KMGBF

The analysis also showed that there are opportunities to expand the guidance, inclusion and implementation of SDG 15 Target 15.5, as well as the KMGBF goals and targets in Aba. There is opportunity to align local targets with global targets, and Aba Prefecture contributing to global solutions. Secondly, long term monitoring at local and global scales can be considered through the implementation of programs at the provincial and local levels, as long-term effects are yet to be observed and the development of analytics to cover both local and global monitoring.

In addition, the participation of local farmers and herdsmen in the implementation of specific projects can be further expanded. These opportunities can strengthen future programs and projects to ensure that Aba can better realize SDG15 target15.5 and contribute to KMGBF.

5. Conclusions

The study found that Aba's conservation strategies are highly consistent with SDG15 target15.5 in reducing natural habitat degradation, curbing biodiversity loss and protecting endangered species. Aba's efforts in ecosystem conservation, species protection and sustainable resource utilization have effectively contributed to the realization of SDG15 target15.5.

The practice of Aba Prefecture shows that the localized implementation of SDG15 target15.5 can be effectively promoted through diversified strategies such as establishing a network of nature reserves, implementing ecological restoration projects, and promoting sustainable resource utilization. At the same time, in the future, opportunities for implementation and scaling up impacts need to be further strengthened, particularly in terms of policy localization, long-term monitoring and local community engagement.

Author Contributions

Conceptualization, L.W.; methodology, L.W., S.A.; software, L.W.; validation, L.W.; formal analysis, L.W.; investigation, L.W.; resources, L.W.; data curation, L.W.; writing—original draft preparation, L.W.; writing—review and editing, L.W.; visualization, L.W.; supervision, S.A.; project administration, L.W.; funding acquisition, S.A. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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