

# Collaborative Life Protection Plan for the Lower Lhasa River Valley Area in China Based on Animal Release Behaviors

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## ABSTRACT

Due to the harsh conditions in the Qinghai-Tibetan Plateau in China, indigenous people have deep compassion on lives. Therefore, animal release has become a traditional activity praying for blessings. However, irrational release behaviors have become increasingly common—they blindly pursue the number and species of animals to be released while ignoring their adaptability to the release habitats, creating a vicious cycle of “release–capture–sell” and raising people’s and human-nature conflicts. This study focuses on the lower Lhasa River valley in south-central Tibet in China and proposed a collaborative life protection plan with respect of local culture. Through in-depth analysis of the needs of different stakeholders, this study established a new cooperative relationship, where the Tibetan Farmers’ and Herdsmen’s Economic Cooperatives would function as the core to standardize the trading process and promote scientific animal release. Based on the habitat suitability evaluation, this study developed release process optimization, habitat planning for released species, and ecological restoration planning to build the landscape structure of “vegetation–sacred place–life release spots” for environmental sustainability. This collaborative life protection plan contributes to establishing a healthier, harmonious, equal, and loving values on life and interpersonal relationships, thereby bringing about more profound social, economic, and environmental benefits.

## KEYWORDS

Lhasa River;  
Animal Release Behaviors;  
Collaborative Conservation;  
Ecological Restoration;  
Tibet

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## HIGHLIGHTS

- Establishes a new cooperative relationship centered on the Tibetan Farmers’ and Herdsmen’s Economic Cooperatives to break the vicious cycle of “release–capture–sell”
- Evaluates habitat suitability integrating natural environmental indicators and release behavior indicators
- Proposes spatio-temporal ecological restoration planning based on the cultural value of life release and the required habitats of the animals

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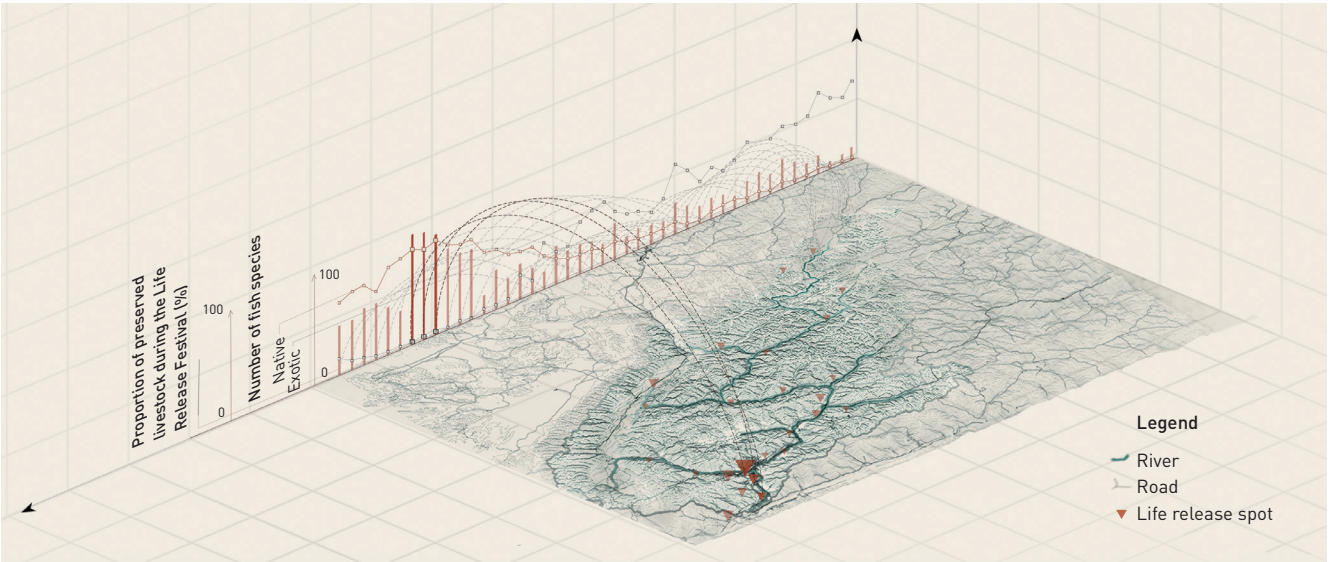
# 1 Background

Due to the harsh living conditions in the Qinghai-Tibetan Plateau in China, indigenous people believe in the Buddhist idea of “like mother sentient beings”<sup>①</sup> and have deep compassion on lives.<sup>[1][2]</sup> As a result, animal release has become a traditional activity praying for blessings. However, irrational release behaviors have become increasingly common—they blindly pursue the number and species of animals to be released while ignoring their adaptability to the release habitats. People purchased local species such as yaks, sheep, chickens, fish, and loaches in traditional life release behaviors. As Tibetans now have a richer and better life, they can buy non-native captive animals from different places to free them. Hoping to accumulate more merits, people often purchase animals in bulk, which results in excessive release and undermines the local ecological environment. At the same time, many released animals are re-captured and sold, forming a vicious cycle of “release–capture–sell” and raising conflicts among different stakeholders. Therefore, there is an urgent need to conduct in-depth analyses of life release behaviors, and to strengthen the regulation and supervision of such behaviors to avoid irreversible environmental, social, and economic damages.

# 2 Problems and Challenges

This study focuses on the lower Lhasa River valley area in south-central Tibet in China, with the Chengguan District of Lhasa and its surrounding areas as the main study site, an area of large

population, rich culture and customs, as well as developed industry, agriculture, and animal husbandry. However, it is one of the most severe desertification areas of the Qinghai-Tibetan Plateau in China with a prevalence of irrational life release behavior. Currently, animal release mainly happens in the Lhalu Wetland, Lhasa River Basin, and surrounding cultural places (such as temples), among which the Lhalu Wetland has the largest amount of animals being released (Figs. 1, 2). Irrational animal release brings about spreads of exotic species<sup>[3]</sup>, biodiversity reduction, and community structure destruction in the lower Lhasa River valley area. For example, the competitive and prolific exotic fish species have threat the native ones. Life-release grazing has emerged with the sheep releasing behavior during the festivals and gradually become one of the most widely practiced forms of release—the residents treat the livestock as family members and take care of them until their natural death. In addition, as there are few short-term profits of reforestation on barren mountains and lands, most farmers and herdsmen choose to artificially plant grasses to convert barren lands into pastures (by sowing grass seeds) for grazing to increase income as well as conducting life-release grazing. The grazing, animal release, and land use conversion pressed the carrying capacity of the ecosystem, turning the area into a source of sand and dust storm which seriously threatened the local agricultural and livestock production. Through GIS analysis (Fig. 3), the current land use types in the study area mainly include cultivated land, grassland, and bare soil; most severe desertification concentrates around Lhasa City, mainly caused by wind and water erosion. Targeted ecological restoration strategies are supposed responding to the



① Like mother sentient beings: treating sentient beings as parents, from the *The Great Treatise on the Stages of the Path to Enlightenment* by Tsongkhapa.

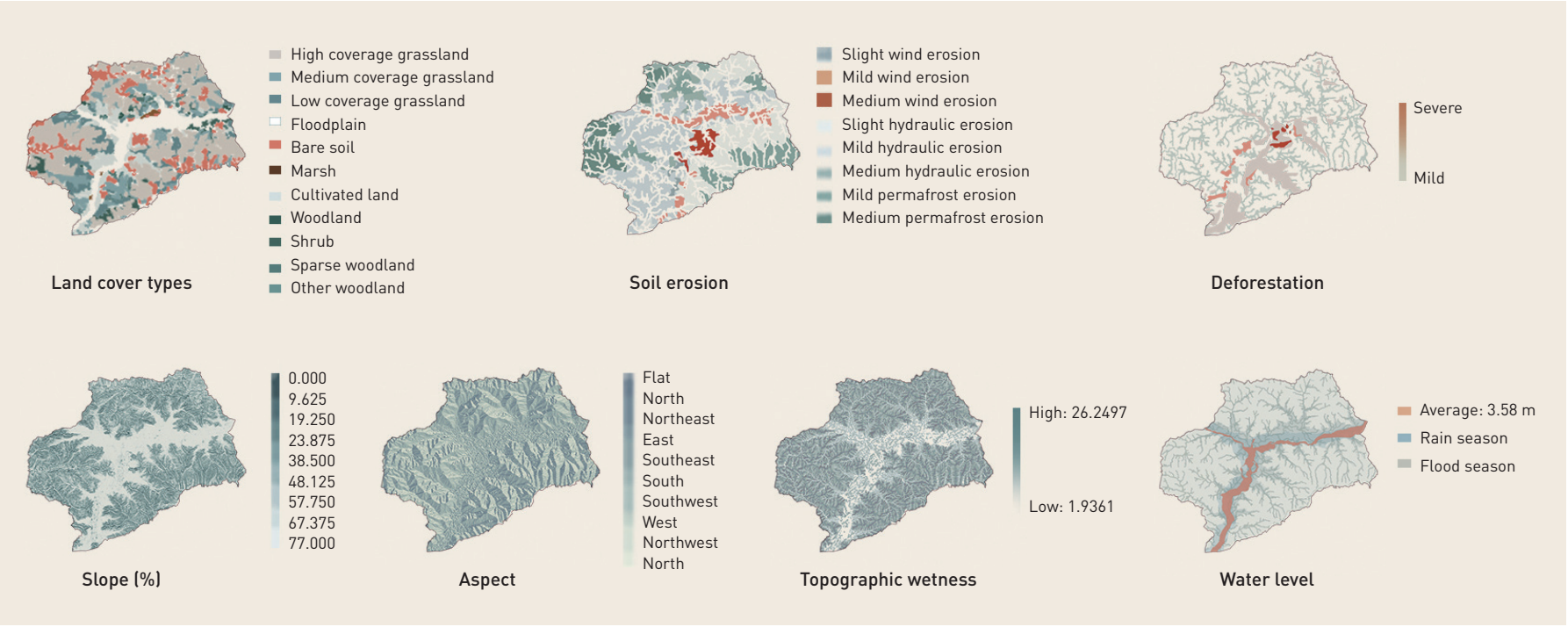
1. Life release situation of the lower Lhasa River valley area [Source: Ref. [3]; data source: Geospatial Data Cloud and Resource and Environmental Science and Data Center]



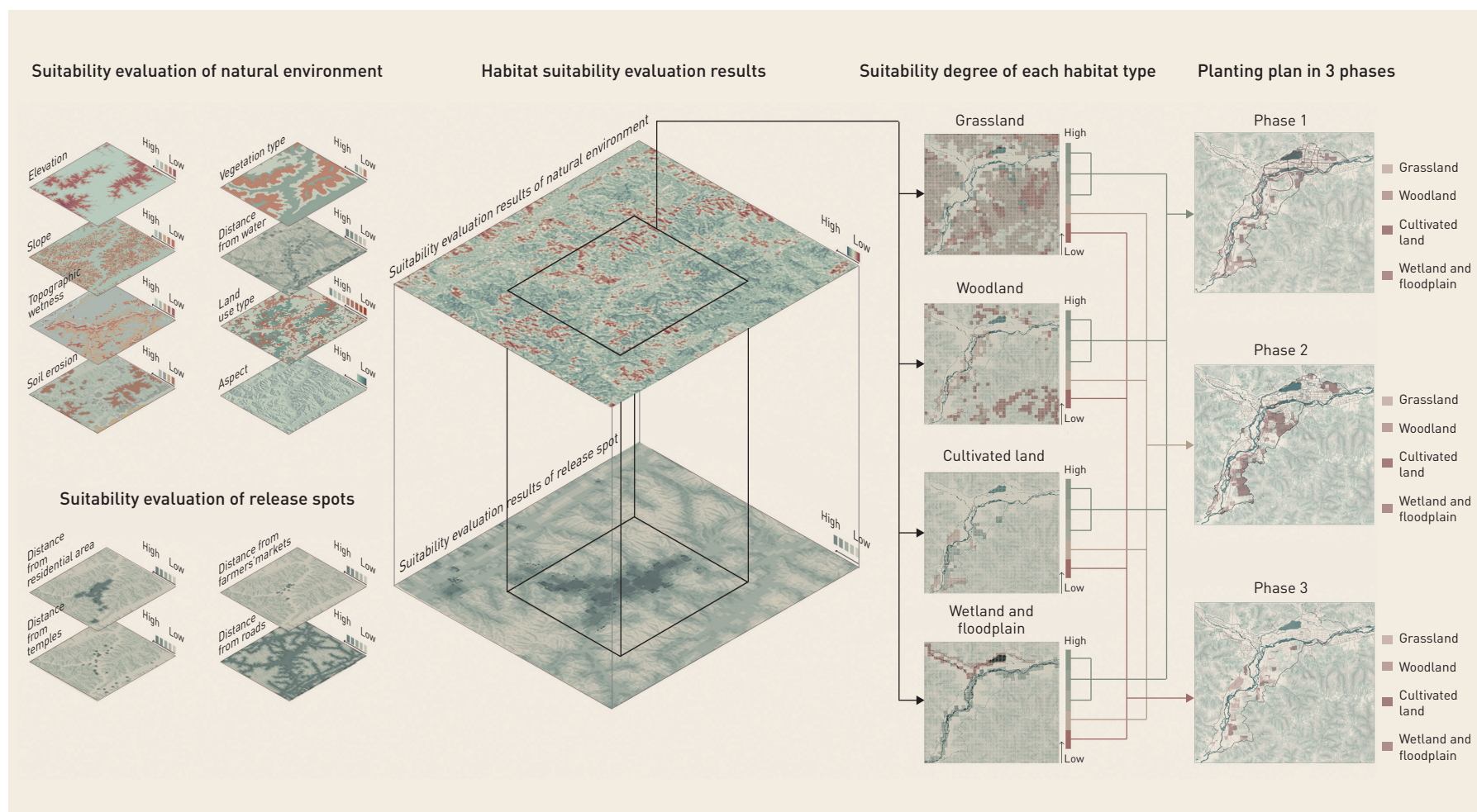
various degrees of desertification.

Animal release brings challenges for ecological restoration planning and practice. Firstly, the deep-rooted traditional thoughts and the lack of ecological knowledge make it difficult for local residents to accept the idea of scientific release. Except for life-release grazing, most releasers little care about those animals' survival after release, resulting in large number of deaths. Therefore, it is necessary to define the suitable growth environment of the released animals and analyze the animal-environment interactions for sustainable ecological restoration. Secondly, the sandstorm control is a long-term initiative that requires reasonable release behavior and continuous support from the residents, because this may causing the decrease of the grassland and lower the grazing income. Thus, how to encourage farmers and herdsmen to participate in the ecological restoration while guaranteeing their income is a major challenge. On the basis of respecting and protecting the local culture, this study aims to alleviate the people's and human-nature conflicts through the proposed collaborative life protection project with a full consideration of regional characteristics.

2. Life release situation of the main study site (Data source: Geospatial Data Cloud and Resource and Environmental Science and Data Center)
3. GIS analysis of of the main study site (Data source: Geospatial Data Cloud and Resource and Environmental Science and Data Center)







4. Habitat suitability evaluation (Data source: Geospatial Data Cloud and Resource and Environmental Science and Data Center)

### 3 Design Strategies

#### 3.1 Habitat Suitability Evaluation

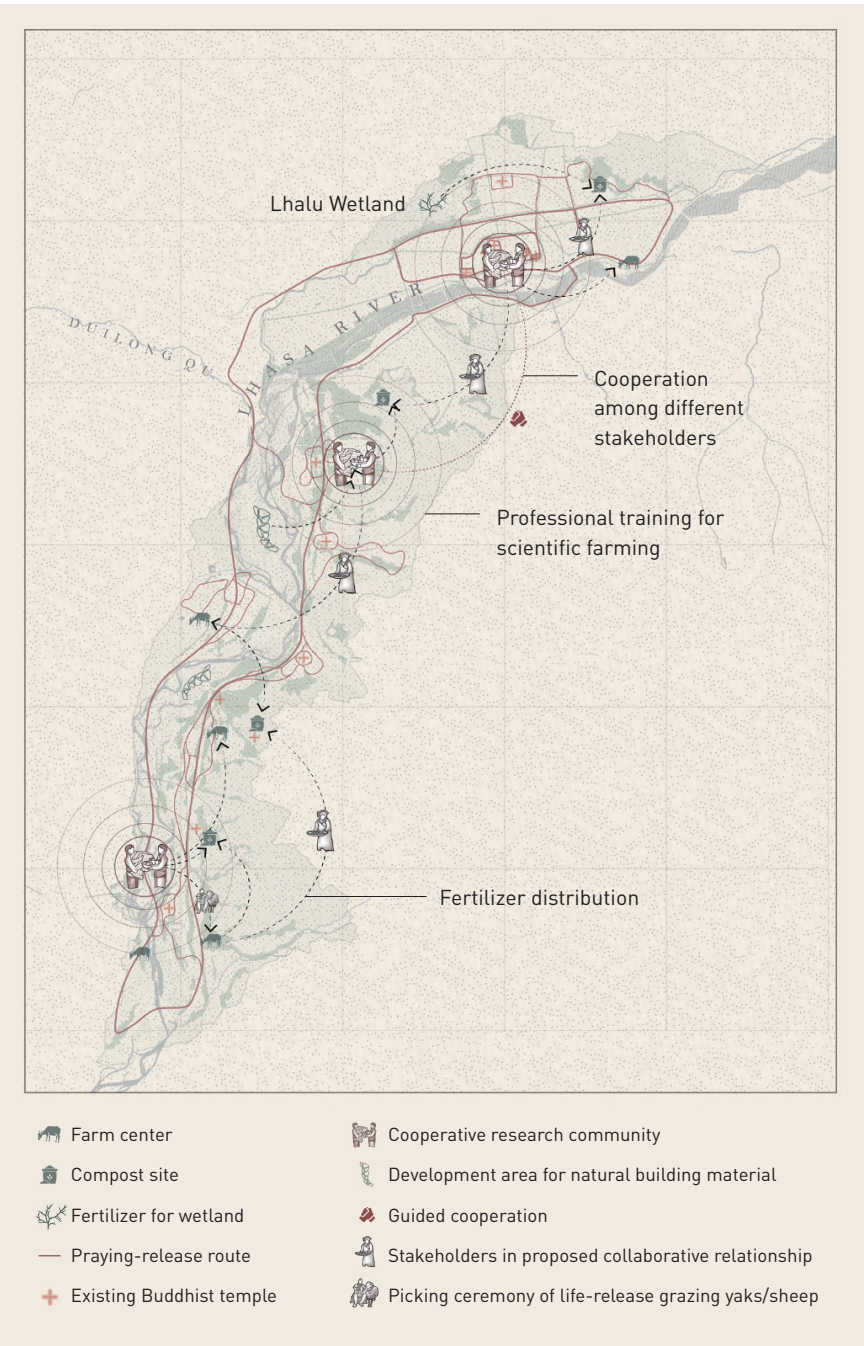
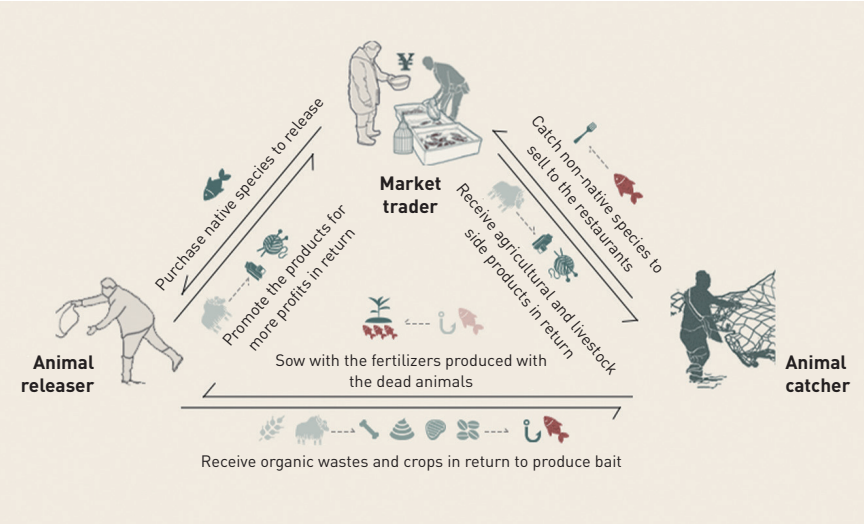
To address the above issues, this study focuses on the habitat restoration associated with release behaviors. Habitat is a key resource for animals' survival, reproduction, and development of their communities. Understanding of potential suitable habitats for creatures and their qualities through habitat suitability evaluation is important for effective habitat conservation and management.<sup>[4][5]</sup> The research team conducted the evaluation with GIS, by superposition analysis with equivalent weight coefficients of the natural environment and release behavior indicators (Fig. 4). The natural environment indicators include elevation, slope, aspect, topographic wetness, soil erosion, vegetation type, land use type, and distance from water. The degree of suitability of the site can be examined through superposition analysis. The release behavior indicators include the distances from the release spot to the residential

area, temples, farmers' markets, and roads. The superposition analysis exhibits the suitable locations for release, and the closer the combined distance from the above four kinds of places, the more suitable the area is for releasing animals. The research team identifies four typical suitable habitats for by the released animals, namely grassland habitat, woodland habitat, cultivated land habitat, and wetland and floodplain habitat, and applies the suitability analysis to obtain the current suitability degree of each.

#### 3.2 Release Process Optimization

To break the vicious cycle of "release-capture-sell," it is necessary to clarify the interests and beliefs of all parties involved, choose reasonable substitutes, and promote alternative release behaviors. In Tibet, there is a tradition to plant trees at the barren land near cultural places and worship them as sacred trees of cultural symbols, which can be fully utilized as the releasers are unwilling to turn the grassland into forest. This project identifies





afforestation areas under the premise of guaranteeing the releasers' grazing grassland area, and to create opportunities to encourage active engagement to tree-planting activities; then, to guide catchers and sellers to change the targets of being caught and sold (e.g., exotic fish species), to obtain economic benefits not at the cost of ecological damage.

Understanding the needs of various stakeholders, the authors researched the public management situation in Tibet, where Tibetan Farmers' and Herdsmen's Economic Cooperatives (Cooperatives hereafter) was established aiming to provide theoretical research, consulting services, skills training, and social promotion out of the importance of development.<sup>[6][7]</sup> In addition, enterprises, markets for agricultural and livestock products, cultural places, and attractions can effectively help with the resource flow between different stakeholders and places.

Therefore, this study proposes that the release process optimization should take Cooperatives as the core, combining with spatial and temporal programs to promote the exchange of substances and achieve multilateral benefits in trade (Figs. 5, 6). Cooperatives would provide resources such as management experience and sales channels; bridge farmers, agricultural bases, and markets; and take the responsibility for educating and training. Taking fish release as an example, Cooperatives can train the residents for the identification of exotic species and enhance their awareness of the impact of them, and guide releasers to selectively buy native species; organize sellers to promote the releasers' daily agricultural and fishery products for more profits; and provide professional publicity and training for catchers to scientifically set cages and net traps for long-term and high-intensity fishing of exotic species, thus minimizing the threat to native species. Considering that there will be tourists and worshipers participating in animal release, it is suggested to directly sell the caught exotic fish to the tourism food market; other part of the fish could be turned into fertilizers be used in plantation industry under the supervision of the Cooperatives. Also, the wastes produced by the releasers from animal husbandry (e.g., animal bones, goat's oil, chicken's blood) can be made into bait for catching the fish. In this chain, there is still a need for mental force to inspire and guide the residents' behavior. The Monlam Prayer Festival (the 4th to 25th of the first month of the Tibetan calendar) and the Labrang Monastery

5. Proposed collaborative relationship
6. Release process optimization



Life Release Festival (the 8th of the first month of the Tibetan calendar) are important festivals in the region, when people have opportunities to re-understand the “circle of life” and promote the trading and tourism; the weather during this period is also suitable for the growth and reproduction of fish and cultivation of seedlings. Therefore, this study proposes to enhance the stocking of native fish species and consolidating the key species’ population structure during the festivals. For example, the increasing number of the native species, pointed nudibranch (*Oxygymnocypris stewarti*), can crowd out exotic species and prey on whelkfish (*Pseudorasbora parva*).

### 3.3 Habitat Planning for Released Species

Taking the geographical characteristics of the site into account, this study proposes an ecological restoration spatial strategy based on the cultural value of the animal release and the environment required by the released animals during their growth, forming a landscape structure of “vegetation–sacred place–life release spot” (sacred place is referring to cultural place) (Fig. 7). For instance, many residents, especially middle-aged and elderly people, regard keeping released yaks or sheep as a reverence for life. Generally, these animals are tied with colorful cloth on their horns and spray-painted with the mark of “animal release” to live with the family.<sup>②</sup> However, the average lifespan of yaks and sheep is only 12 years, after which, out of a belief in blessing of life and peaceful reincarnation, the owner will turn the dead yaks or sheep into fertilizers, so as to continue their life as new seedlings growing. The pastures needed for their growth, the roads, canals, and nodes (e.g., Cooperatives) on the pilgrimage of the releasers heading for the cultural places, and the desertification areas that would be treated with the fertilizer are all essential environments in the planning.

### 3.4 Ecological Restoration Planning

The ecological restoration planning focuses on ecologically vulnerable areas, i.e., the sandstorm source areas. Based on the land use type and desertification degree of the site, this research delineates four main ecological restoration areas: 1) the Lhalu Wetland and its side and central floodplain; 2) the wind and sand source area on the river terrace and alluvial fan; 3) the barren land around religious site; and 4) the windbreak at the cultivated land and grassland. The planting strategies (Fig. 8) are proposed in 3 phases: ground cover planting, shrub planting, and upper tree planting. In the ground cover planting stage, sand barriers will be implemented to prevent quicksand, broken ones will be regularly



7. Habitat planning for released species

② Relative contents could be found in the first episode of the documentary *The Third Pole—Life Partners*.

removed and replaced. And all the sand barriers are planned to be alternated every 3 or 4 years. When the protection forests mature, they can be logged at intervals of individuals or rows for the construction of the buildings for science popularization; and new seedlings will be replanted promptly to maintain the integrity

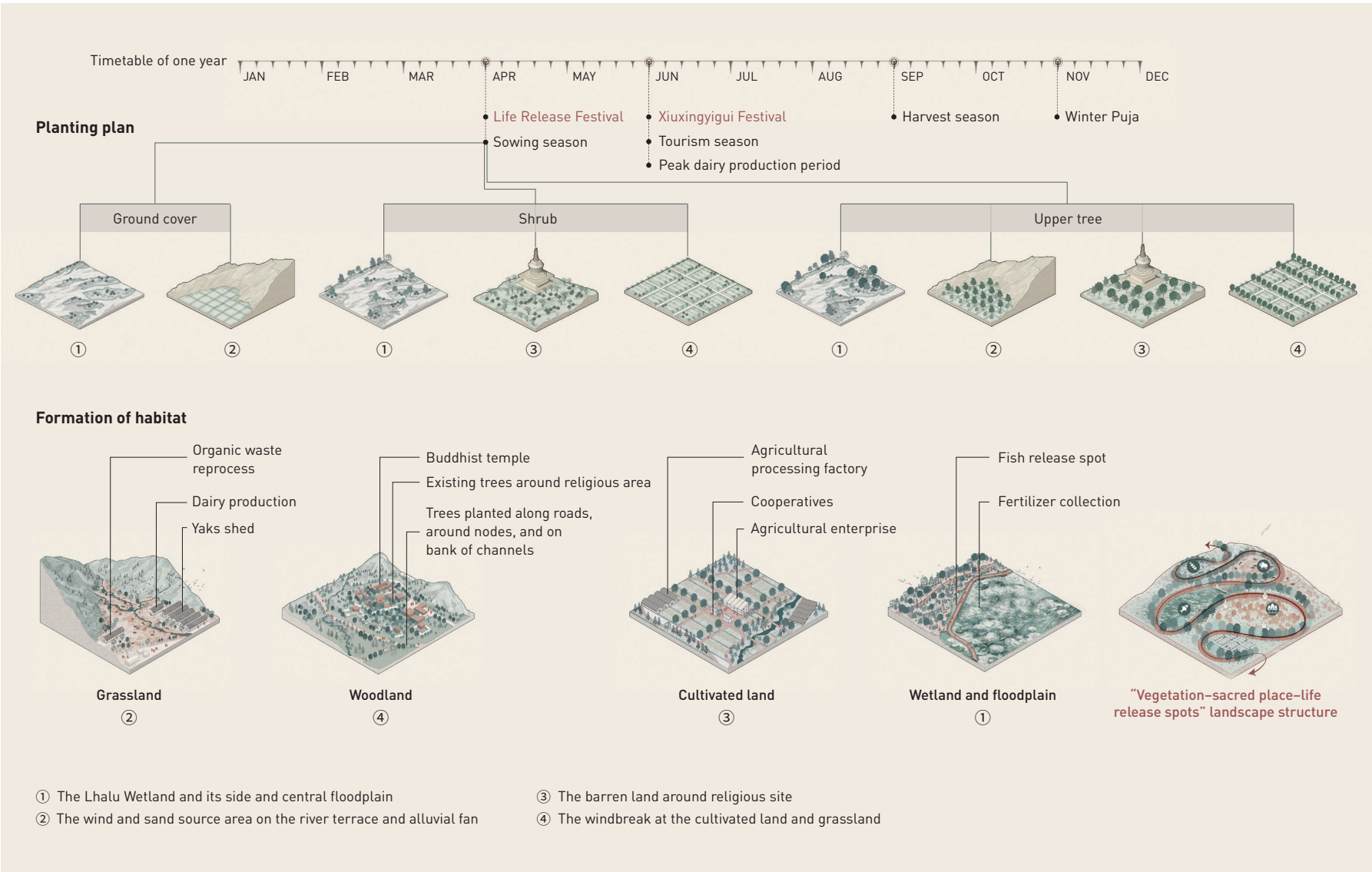
of the forest belt, especially where the survival rate is less than 80%. The fruits of the economic forests can be traded to increase the income. In addition, trees will be planted along the roads, nodes, and canals connecting the cultural places to complete the landscape structure of “vegetation–sacred place–life release spot.”

Based on habitat suitability evaluation results, the study identifies the locations for scientific release of yaks, sheep, and fish; Cooperatives; fish trails, rotational grazing routes, and praying routes; sites for the remains of released yaks and sheep burial, composite, and wetland manure extraction; appropriate development areas for natural building materials on the floodplain; and ecological forest corridors. All the locations are highlighted in the release process optimization, habitat planning

of the released species, and ecological restoration planning. Thus, people’s release behaviors would be guided by the Cooperatives, and the habitats where the released animals survive and migrate can be restored (Fig. 9).

In aquatic habitats, the release of native fish larvae in wetlands and the catching of invasive species on the floodplain may interact. The releasers can get rid of the previous rough way of transportation and use oxygen-filled bags to release suitable native fish species, while the catchers can fish those causing damage to the local ecology and let the released fish larvae survive better. Thereby, the previous opposite relationship between the releasers and the catchers can be transformed to a more positive relationship of cooperation to achieve mutual benefits while

8. Temporal planting strategy: to form the landscape structure of “vegetation–sacred place–life release spots”







protecting the habitat (Fig. 10). In terrestrial habitats, after the burial ceremony of released animals, residents can tie colorful strips of cloth from the horns of yaks or sheep branches for memorial, reinforce the idea that the trees near the cultural places are sacred trees, and promote voluntary reforestation by farmers and herders (Fig. 11). In the future, the prosperous operation of the Cooperatives and the improvement of the ecological environment will vividly illustrate the significance of scientific life release and conservation on this land. Cultural and recreational activities in natural areas and attractions during the

festivals will also contribute to more rational individual life release behaviors (Fig. 12).

## 4 Discussion

This study focuses on the vicious cycle of “release–capture–sell” in the life release activities and the needs of the creatures, habitats, and stakeholders. It aims to correct the current unreasonable trading, standardize the trading process, transform the industry chain into one that takes the derivatives of life release as the main trading items, and promotes scientific animal release.

In addition, relying on the concept of life preservation and habitat suitability evaluation, this study implements ecological restoration to specific grassland habitat, woodland habitat, cultivated land habitat, and wetland and floodplain habitat, creating suitable habitats for the released creatures. At the same time, the research team emphasizes the continuous attention to the long-term changes of the site, and proposes habitat restoration planning in phases to ensure its sustainable development.

The planning strategies proposed in this study emphasizes the harmonious symbiosis between various stakeholders and

9. Master plan

10. The designed “catch and release” balance under collaborative life protection plan

11. After the burying of yaks and sheep, the seedling growth becomes a symbol of rebirth.





the released creatures and promotes the life release to be an indispensable and positive part of the indigenous culture through a series of public cultural activities. This collaborative life protection plan contributes to establishing a healthier, harmonious, equal, and loving values on life and interpersonal relationships, while promoting the development of the local community and cultural heritage, thereby bringing about more profound social, economic, and environmental benefits.

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12. Life release behavior and ecological restoration under the collaborative life protection plan



# 基于放生行为的 中国拉萨河下游河谷地区生命保护协作计划

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## 摘要

西藏高寒环境下恶劣的生存条件，使得藏区人民心怀悲悯、戒杀护生。因此，动物放生成为具有祈福性质的传统活动。然而，因忽视生物生活习性、盲目追求放生数量和放生种类的不合理放生行为日渐增多，同时滋生了一条恶性循环的“放生－捕捉－出售”产业链，进而造成该地区人与人之间、人与自然之间的矛盾日趋尖锐。本研究聚焦于中国西藏中南部拉萨河下游河谷地区，在尊重与保护当地文化的基础上，提出生命保护协作计划。研究通过深入分析产业链各利益方的交易和信仰需求，以农牧民合作社作为基础建立新型合作关系，规范交易流程，引导合理放生；并基于生境适宜性评价，进行放生过程优化、放生物种规划和生态修复规划，构建“植被－圣地－放生点”的景观结构，寻求生态环境的可持续发展。本研究所倡导的生命保护协作模式将有助于为人们树立更为健康、和谐、平等和互爱的生命价值观和人际关系观，从而为当地发展带来更深远的社会、经济和环境效益。

## 关键词

拉萨河；  
放生行为；  
协作护生；  
生态修复；  
西藏

## 收稿时间

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## 文章亮点

- 建立以农牧民合作社为核心的新型合作关系，打破“放生－捕捉－出售”的恶性循环
- 结合自然环境因子及放生行为因子两方面进行生境适宜性评价
- 基于动物放生的文化价值和放生生物的生存环境所需进行生态修复的时空序列规划

编辑 高雨婷，汪默英  
翻译 唐琰，高雨婷，汪默英

## 1 背景

西藏高寒环境下恶劣的生存条件，使得藏区人民心怀悲悯、信奉“如母有情”的思想<sup>①</sup>，戒杀护生<sup>[1][2]</sup>。因此，动物放生成为了具有祈福性质的传统活动。然而，忽视生物生活习性是否适宜当地自然环境、盲

目追求放生数量和放生种类的不合理放生行为也愈发常见。传统的放生对象多为牛、羊、鸡等陆生生物，以及鱼、泥鳅等水生生物。随着藏区生活水平的提高，人们可以从各地购买圈养动物用于放生，加之放生者希望借此实现自我救赎，往往批量采购动物而造成过度放生，给当地的生态环境带来负面影响。同时，为牟取利益，一些人将放生动物再次捕获并出售，形成了“放生－捕捉－出售”的恶性循环，并造成了放生者和捕捉者之间的冲突。因此，亟需对放生行为进行深入分析，加强监管和规范，从而避免对当地自然环境和社会经济造成不可逆转的损失。

① 如母有情：视众生如父母，来源于宗喀巴大师所著《菩提道次第略论》。



## 2 问题与挑战

研究聚焦于中国西藏中南部拉萨河下游河谷地区，以拉萨市城关区及其周边区域为主要研究区域，这里人口聚集，文化风俗丰富，工业、农牧业集中，却也是青藏高原沙漠化最严重的区域之一和不合理放生行为的高发地。目前放生行为主要集中在拉鲁湿地、拉萨河流域和寺庙等文化建筑周边，其中，拉鲁湿地区域放生的动物数量最多（图1，2）。不合理的放生行为易引入大量外来物种<sup>[3]</sup>，破坏拉萨河下游河谷地区的原有物种多样性和群落结构，例如，大量繁殖率高、竞争力强的外来物种会使本地鱼种受到威胁。随着在节庆期间选放生羊等活动的兴起，放牧式放生渐渐成为最广泛的放生方式之一——放生者会将牲畜视作家庭成员，对其精心饲养与看护，直到自然死亡。此外，由于在荒山荒地上造林的短期收益不明显，大部分农牧民选择人工种草将荒地转化为草场进行放牧，以增加经济收入，同时在此进行放牧式放生。不合理的放生行为和盲目将荒地转变为草场的行为加剧了生态系统的承载力压力，导致该区域退化为风沙源地，严重威胁当地农牧业生产。通过对场地进行GIS分析可知（图3），研究区域内的现状土地利用类型主要包括农田、草地及裸露的土壤；土地荒漠化情况较严重的区域主要集中在拉萨市周边区域，以风力侵蚀和水力侵蚀为主，亟需进一步结合土壤荒漠化程度采取相应的生态修复策略。

放生行为为生态修复规划与实践带来了相应的挑战。首先，根深蒂固的传统观念及生态学知识的匮乏使科学放生理念的普及变得尤为困难。除了放牧式放生，大部分放生者很少关注放生生物后续的生存情况，造成许多动物放生即亡。因而，在生态修复的过程中需要明确放生生物所需要的生存环境，分析生存环境和放生生物之间的相互影响，从可持续发展的角度探索生态修复的方法。其次，风沙源地的治理是一个长期举措，需要当地居民的持续参与。依托于合理放生行为的风沙源地治理，意味着草场面积将会变小，相应地可能会造成当地居民放牧所得减少，如何在保障农牧民收入的条件下，鼓励其持续参与到生态修复工作中将成为一大挑战。本研究旨在尊重与保护当地文化的基础上，充分结合地域特点，通过生命保护协作计划缓解人与人之间，以及人与自然之间的矛盾。

## 3 设计策略

### 3.1 生境适宜性评价

为了解决上述问题，研究着眼于放生行为相关的生境改造。生境是物种生存、繁衍及种群发展的关键资源。基于生境适宜性评价可以了解适宜物种生存的空间及其生境质量，对物种的有效保护和栖息地管理具有重要意义。<sup>[4][5]</sup>借助GIS，通过设置自然环境和放生行为的等比权重系数进行叠加分析，可以获取生境适宜性评价结果（图4）。自然环境因子

包括高程、坡度、坡向、土壤湿度、土壤侵蚀程度、地表植被类型、土地利用类型、与水源的距离，通过这8项权重因子可知该场地的适宜性程度。放生行为因子包括放生点与居民区、文化建筑、农贸市场、交通要道的距离，通过这4项权重因子可知场地中适宜进行放生的点位，距上述4种地点的综合距离越近的区域越适合放生。研究团队结合放生生物需要的生境类型，将场地自然生境划分为了牧场区、混交林生态屏障、耕地地区和滩地—湿地，并结合适宜性分析获得了每种生境的现状适宜性程度。

### 3.2 放生过程优化

为了寻找“放生—捕捉—出售”这一恶性循环链条的薄弱点，首先需要明确其中各方的利益和信仰需求，选择合理的代替物和代替行为。放生者虽然非常忌讳将牧用草场改为林地，但在藏区有在文化建筑附近荒地上造林护林的传统，这些树木会被当作具有文化象征属性的神树崇拜，因此可以充分利用这一文化背景引导造林。在保证放生者日常放牧所需草场的前提下确定造林区，创造条件将被动参与植树活动转变为主动要求；其次，引导捕捉者和贩卖者改变“捕捉”和“出售”的对象（如外来鱼种），从而在保护生态环境的前提下获取经济利益。

在了解各方利益需求的基础上，笔者对西藏地区的公共管理建设基础进行了调研。出于对发展的重视，以“理论研究、咨询服务、技能培训、社会宣传”为目标，成立了西藏农牧民专业经济合作社（以下简称“合作社”）。<sup>[6][7]</sup>此外，企业、农畜产品市场、当地文化建筑和旅游景点也均能助力资源和场所在各方之间的有效对接。

由此，建议以合作社为核心，结合时空序列规划，推动物料交换，实现贸易互惠互利（图5，6）。合作社能够提供管理经验和销售渠道等资源，成为连结农户、产业基地和市场的纽带，并发挥教育示范作用。以鱼类放生为例，合作社可以加强有关外来鱼种鉴别和危害的宣传教育，引导放生者从售卖者处有选择地购买本地鱼种进行放生；组织售卖者对放生者日常农牧渔生产活动中的产品进行增值和推广；面向捕捉者进行专业的宣传培训，指导他们合理设置地笼、网簖等，对外来鱼种进行长期高强度捕捞，最大限度地降低对本地鱼种的威胁。考虑到会有外地的游客、信众专程来参加放生活活动，建议将捕捉得来的部分外来鱼类直接作为货源在旅游食品行业中出售；部分将在合作社的加工经营下变为肥料投入种植业中；将放生者在日常畜牧养殖中产生的下脚料（如动物骨头、羊油、鸡血等）制作成捕获外来鱼种所用的饵料。在这个关系链中，还需要挖掘能够激励和主导群众行为的精神元素。传昭大法会（藏历正月初四至二十五日）与拉卜楞寺放生节（藏历正月初八）是当地重要的节日，是人们重新理解“生命轮回”的重要时机，也是促进商贸和旅游发展的契机；期间的气候也适合鱼类的生长繁殖和苗木的播种培育。因此，应充分利用节庆活动加强本地鱼种的增殖放流，并发挥关键物种巩固种群

结构的作用。例如，本土物种尖裸鲤（*Oxygymnocypris stewarti*）种群数量的增加不仅可以与外来鱼种形成有效竞争，还可以对外来鱼种进行捕食，如麦穗鱼（*Pseudorasbora parva*）等。

### 3.3 放生物种生境规划

结合场地的地域特征，基于放生行为的文化价值和放生生物所需的生存环境制定生态修复的空间策略，从而形成“植被—圣地—放生点”（圣地指文化建筑场所）的景观结构（图7）。以牛、羊为例，很多当地居民，特别是中老年人，将饲养一只放生的牛、羊视为对生命的敬畏和尊重。一般情况下，这些动物的角上会被系上彩色布条，身上被喷上“放生”的标记，跟随放生者一起生活<sup>②</sup>。然而，牛、羊的平均寿命只有12年。出于为生命祈福和安然轮回的信仰，主人会将死去的牛、羊化作肥料，使其随着新苗木的成长以另一种方式延续生命。其成长过程中所需的草场，放生者朝圣路途中连通文化建筑的道路、水渠和途经的节点（如合作社等机构），以及待牛、羊化为肥料后施以治理的风沙源地都是需要被纳入规划的重要生存环境。

### 3.4 生态修复规划

生态修复规划的重点是生态环境脆弱的区域，在本研究中即风沙源地。基于场地的土地利用类型和荒漠化程度，将生态修复的区域划分为拉鲁湿地、边滩和中央漫滩，河流阶地风沙源地和冲积扇，宗教场所周边的贫瘠之地，以及农田、牧场处的防风通道。种植策略分为地被种植、灌木种植和上层乔木种植三个阶段。地被种植阶段主要通过设置沙障来固定流沙，并定期补充破损沙障，每隔3~4年对其整体更换。在防护林成材后，可以进行隔株、隔行间伐，用于修建科普校舍，并及时对成活率低于80%的林带补植新苗，以保持林带的完整性；经济果木则可流入消费市场获取收益。此外，在连通文化建筑的道路、节点、水渠边进行乔木补种以完善“植被—圣地—放生点”的景观结构（图8）。

由此，在生境适宜性分析的基础上，分别通过放生过程优化、放生物种生境规划、生态修复规划明确了牛、羊和鱼类的科学放生点、鱼道、放生牛羊遗体安葬点、其他堆肥点、湿地肥料取材点、滩地天然建材适度开发区、农牧民合作社基地、祈福路线、轮牧路线和生态密林廊道的位置。人们的放生行为将受到合作社的指导，放生物种生存、迁徙的生境也将得到修复（图9）。

在水生生境中，可以进行湿地中本土鱼苗增殖放流和滩地中入侵鱼类捕捞的联动。放生者可以改变以往粗暴的运输方式，使用充满氧气的放生袋放生适宜当地生境的鱼类，捕捉者捕捞破坏当地生态的鱼类，使放生鱼苗更好地生存。二者可以转变以往对立的关系，建立积极的合作方式，在护生的同时实现互利共赢（图10）。在陆生生境中，当放生生

物的安葬仪式结束后，居民可以将牛、羊角上的彩色布条系在树枝上，寄托对生命的思念，强化文化建筑附近为神树的观念，促进农牧民积极自愿地植树造林（图11）。未来合作社的蓬勃运营及城市生态环境的改善将生动诠释在这片土地上实践放生护生的意义。在放生节庆时，自然区域和旅游景点中的文化及休闲活动也将引导更合理的个人放生行为（图12）。

## 4 讨论

本研究着眼于西藏地区的“放生—捕捉—出售”恶性循环链，关注生命与生境的需求，旨在通过深入分析各方人群的交易和信仰需求，打破不合理的市场现象，规范交易流程，将其转变为以放生行为衍生物为主要交易对象的产业链，以引导合理放生。

此外，研究还依托护生理念，基于生境适宜性评价，将改善生态环境落实到具体的场地，营造适宜放生生物生存的牧场区、混交林生态屏障、耕地区和滩地—湿地；同时关注场地的长期变化，分阶段开展生境改造，以确保生态环境的可持续发展。

本研究提出的规划策略强调了各利益相关者与放生生物的和谐共生，并且通过一系列公共文化活动推动放生行为成为当地文化中重要的良性组成部分。这种生命保护协作模式有助于为人们树立更为健康、和谐、平等和互爱的生命价值观和人际关系观，推动当地社区的发展和文化遗产，从而带来更深远的社会、经济和环境效益。

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② 相关内容可观看纪录片《第三极》第一集“生命之伴”。

- 图 1. 拉萨河下游河谷地区放生活动现状（来源：参考文献[3]，数据来源：地理空间数据云、资源环境科学与数据中心）  
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