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Research on the Transformation and Innovation of Minority Ecological Wisdom in Contemporary Rural Ecological Governance — Taking the Man Yuan Village of the Dai Ethnic Group at the Border of Yunnan Province as an Example

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Abstract: The ecological wisdom accumulated by ethnic minorities in adapting to specific environments is a precious "local knowledge", containing unique insights for solving contemporary ecological problems. This study aims to explore how this "local" ecological wisdom, through scientific exploration, refinement, verification and reconfiguration, can be transformed into universally applicable "universal value" and operational ecological governance solutions. The paper first clarifies the connotations and characteristics of "local knowledge" and "ecological wisdom", and then constructs a knowledge transformation theoretical model consisting of four links: "knowledge exploration and systematic organization", "scientific verification and mechanism explanation", "modern transformation and innovative reconfiguration", and "institutional integration and universal promotion".Based on this, the system proposes four practical paths for this transformation model in rural ecological governance: adaptive restoration technologies based on traditional ecological cognition, a collaborative governance system that integrates traditional taboos with modern regulations, the construction of endogenous governance capabilities by empowering local entities, and the development of green livelihood industries that highlight ecological cultural values.Finally, taking the practice of Man Yuan Village in Meng Han Town, Yunnan Province as an example, this study deeply analyzes how the "local knowledge" of the Dai ethnic group successfully transformed into a replicable and promotable ecological governance model. This research aims to provide a "local knowledge"-oriented approach to solving the current challenges in modern ecological governance, and to offer theoretical basis and practical models for rural ecological revitalization.

Keywords: Local knowledge; Ecological wisdom; Ecological governance

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1. Introduction

The contemporary world is confronted with severe ecological crises such as the sharp decline in biodiversity, climate change, and water and soil pollution. The mainstream ecological governance model, based on Western modern science,

has achieved certain results in specific fields, but its "technological supremacy" and "one-size-fits-all" engineering thinking has repeatedly encountered setbacks, especially in complex and regionally distinctive rural social and cultural environments, where problems such as "incompatibility", high costs, and lack of sustainability often arise. This prompts us to reflect on the philosophical foundation and practical path of ecological governance, and to seek more diverse sources of wisdom [1].

In this context, the "local knowledge" from the interdisciplinary perspective of anthropology and ecology has gained increasing attention. The so-called "local knowledge" does not merely refer to its local significance; rather, it refers to a set of knowledge systems and practical norms that are generated, passed down, and verified in specific geographical, cultural, and social contexts [2]. In today's world where modern scientific discourse holds a dominant position, these kinds of knowledge are often regarded as "pre-scientific" or even "superstitious", and their inherent scientificity and rationality have not been fully recognized and respected [3].

This paper aims to construct a theoretical model for knowledge transformation, systematically expounding the transformation process and innovation path. By combining the construction case of Man Yuan Village in the Dai ethnic area along the border of Yunnan Province, this paper provides empirical support for this theoretical assumption, with the expectation of promoting the transformation of ecological governance from a single reliance on technology to a paradigm of diverse knowledge integration.

2. Theoretical Foundation: The Transformation Logic from "Local Knowledge" to "Universal Value"

Transforming the ecological wisdom of ethnic minorities from "local knowledge" to "universal value" is not a simple "borrowing" process, but rather a "knowledge reproduction" process that requires meticulous planning and systematic operation. This process consists of four interrelated and sequentially progressive stages.

2.1. Knowledge Mining and Systematic Organization: From "Dispersion" to "Integration"

The ecological wisdom of ethnic minorities initially existed in a diffuse and non-systematic form. The first step in the transformation is to conduct in-depth "ethnic ecology" field research, using methods such as participatory observation, in-depth interviews, and oral history, to comprehensively collect, record, and organize the ecological knowledge scattered in the memories and behaviors of elderly people, ritual experts, and production experts in the community. This step is the foundation for achieving dialogue with science. The goal of this stage is to complete the transformation of knowledge from "implicit to explicit" and from "fragmentary to systematic", laying a solid data foundation for subsequent scientific analysis.

2.2. Scientific Verification and Mechanism Explanation: From "Knowing What It Is" to "Understanding Why It Is So"

Local knowledge often stems from long-term trial and error as well as accumulated experience. People "know what it is" but may not "know why it is so". Therefore, the second step is to apply modern scientific methods to verify its effectiveness and reveal the underlying ecological mechanisms [4].

2.3. Modern Transformation and Innovative Reconstruction: From "Traditional Paradigm" to "Modern Solution"

Knowledge that has been scientifically verified still requires "creative transformation" and "innovative development" in order to adapt to the technological conditions, institutional environment and social demands of modern society. In terms of technological innovation, the core principles of traditional wisdom should be retained, but modern materials and technologies should be adopted for optimization [5]. In terms of value reconfiguration, the philosophical ideas in traditional

ecological wisdom, such as “harmony between heaven and man” and “all things have souls”, should be excavated and restructured into ecological civilization values that transcend specific ethnicities and regions and have universal significance, such as “life community”, “ecological ethics”, and “sustainable development”, providing Eastern wisdom for global ecological civilization construction.

This stage is the “innovative” core of knowledge transformation. It is no longer a simple replication but a re-creation based on the traditional core, thereby giving it new vitality.

2.4. Institutionalized Integration and Universal Promotion: From “Local Practice” to “Public Product”

Ultimately, the transformed and innovative knowledge outcomes need to be incorporated into higher-level institutional designs and policy frameworks in order to realize their universal value. Firstly, they should be integrated into planning and policies. The verified and restructured ecological technologies and management models should be written into the ecological protection and restoration plans for counties or river basins, as well as the implementation plans for rural revitalization, and receive financial and policy support. Secondly, a knowledge-sharing platform should be established. A case repository and best practice guidelines should be created, and they should be promoted to other regions with similar ecological geographical conditions through training, exchanges, and demonstration projects. Finally, they should contribute to global ecological governance. The successful governance cases in China based on the ecological wisdom of ethnic minorities (such as the Hani terraces, the Dai rice-fish-duck system, etc.) should be presented as exemplary “nature-based solutions” and promoted to the international community, contributing Chinese wisdom and Chinese solutions to global ecological security [6].

Through this logical chain of the four steps, the ecological wisdom of ethnic minorities has undergone a magnificent transformation from a concrete, context-specific “local knowledge” to a separable, disseminable, and applicable “universal value” and an “ecological governance public good”.

3. Practical Approach: The Specific Application of Transformation and Innovation in Rural Ecological Governance

Based on the above transformation logic, four key practical paths can be developed in rural ecological governance.

3.1. Technical Approach: Develop adaptive restoration technologies based on traditional ecological knowledge

By integrating scientifically verified traditional ecological cognition with modern ecological engineering technologies, we develop ecological restoration techniques that are more cost-effective, more adaptable, and better in terms of landscape coordination. First, the modern expansion of the “Holy Mountain and Holy Lake” model. The protection concept of “natural sanctuaries” behind the “worship of holy mountains and holy lakes” is applied to the delineation of ecological red lines in rural areas and the identification of priority areas for biodiversity protection. In ecological restoration, local native species are given priority, and planting is carried out in accordance with the structure of natural communities, which is a modern manifestation of traditional wisdom. Second, the engineering enhancement of integrated water conservancy wisdom [7]. For instance, the fair and precise water resource allocation concept embodied in the Dai people’s water-dividing wooden tally system can be integrated with modern water-saving irrigation facilities and intelligent water volume monitoring systems, so as to realize refined management of water resources.Thirdly, the ecological engineering transformation of complex agricultural systems. Traditional integrated farming systems such as the rice-fish-duck system shall be designed and promoted as complete ecological engineering projects. By accurately calculating their input-output ratio, pest and disease control efficiency, and carbon sequestration function, these systems can be developed into a model for sustainable agricultural development.

3.2. Institutional Approach: Establish a collaborative governance system integrating traditional taboos and modern regulations

Through a collaborative governance system integrating traditional taboos and modern regulations, we aim to achieve a positive interaction between "village regulations" and national laws, and to establish a new rural ecological governance pattern that is both tough and flexible, and integrates emotions, reason and law. On one hand, we will connect the ecologicalization and legalization of village regulations. We will guide villagers when formulating or revising village regulations to specifically and clearly define the provisions in traditional taboos that have universal ecological value (such as prohibiting the felling of water source forests and prohibiting fishing during certain periods), and ensure that they do not conflict with national laws and regulations. At the same time, we will establish an enforcement supervision mechanism consisting of the village committee, local elders, and villagers' representatives [8]. On the other hand, we will establish an ecological credit system. We will quantify the behaviors of villagers in complying with ecological regulations and participating in ecological protection as "ecological credits", and link them with incentive measures such as village-level collective economic dividends, preferential credit loans, and commendation and selection for excellence. This will transform the soft cultural constraints into hard institutional incentives.

3.3. Main Path: Empowering the Endogenous Governance Capacity Building of Local Entities

The sustainability of ecological governance fundamentally lies in the autonomy of local communities. The transformation process must be an empowerment process. On one hand, efforts should be focused on cultivating "local experts" and "ecological guardians". Recognize and authorize those elders and experts who are familiar with local ecological knowledge, and let them serve as technical advisors, supervisors or trainers in ecological projects, passing on their knowledge to the younger generation and foreign technicians. On the other hand, actively promote villagers' participation in planning and joint management. Throughout the entire process of planning, design, implementation and monitoring of rural ecological projects, ensure the full participation of villagers. Adopt the "community-led development" model, allowing villagers to decide for themselves how to utilize and protect their natural resources, while government and technical personnel play the role of collaborators (assistants).

3.4. Industry Path: Develop green livelihood industries that showcase the ecological cultural value

Combine ecological protection with economic development, and enable "green mountains and clear waters" to be transformed into "gold and silver mountains" through the empowerment of ecological culture. On one hand, brandize ecological cultural products. For agricultural products (such as organic rice, forest-under-product) and handicrafts (such as plant-dyed fabrics, ecological pottery) that follow ecological wisdom in production, conduct cultural narrative packaging, apply for geographical indication products or ecological product certifications, create high-end brands, and achieve value appreciation. On the other hand, enhance the depth experience of cultural ecological tourism. Design ecological tourism products centered around the experience of "local knowledge".

4. Knowledge Transformation and Innovation Practices in the Dai Village of Man Yuan in the Border Area of Yunnan Province

4.1. Case Background

Man Yuan Village is a Dai ethnic village in Menghan Town, Xishuangbanna, Yunnan Province. At one time, in pursuit of economic benefits, large-scale rubber plantations were cultivated, which led to a decrease in water resources, soil degradation, and a decline in biodiversity. Under the background of the rural revitalization strategy, in the process of modernization construction, this village has embarked on a transformation path based on the ecological wisdom of its own ethnic group, perfectly interpreting the modern transformation and innovation of "local knowledge".

4.2. Analysis of the Transformation Process from "Local Knowledge" to "Universal Value"

Firstly, there is knowledge extraction and systematization. This study systematically reviewed the entire set of local knowledge systems of the Dai people in Man Yuan Village, including the belief that "there is water only when there is forest", the "Dragon Forest" (temple god forest) belief, the rice-fish-duck system, and the traditional layout of the village. Then, scientific verification and mechanism explanation were carried out. Through observation and monitoring, it was confirmed that the soil water-holding capacity and species diversity of the "Dragon Forest" were significantly higher than those of rubber plantations. This scientifically explained its "water conservation" function. At the same time, the "rice-fish-duck system" was studied, and its economic benefits (three harvests per field) were quantified, and the ecological mechanism was clarified that ducks can loosen the soil and fish can feed on pests and weeds, thereby reducing the use of pesticides. The traditional stilt-style buildings and village layout were analyzed, and it was confirmed that they have good ventilation, moisture-proof, and earthquake-resistant properties, and are highly harmonious with the natural environment.

4.3. Case Insights

The success of Man Yuan Village lies in the fact that it did not merely engage in nostalgic protection of traditional knowledge, but instead completed a complete chain of knowledge transformation and innovation.It successfully deconstructed the cultural shell of the local knowledge of the Dai ethnic group, extracted the ecological core from it, verified its value through scientific methods, and explained its significance. It then combined modern technology and systems for reconstruction, ultimately forming a replicable and promotable ecological governance and development model. This not only solved the ecological and economic problems of the village, but also elevated its experience from a "local case" to a valuable asset with "universal implications".

5. Conclusion and Outlook

This study demonstrates the possibility and feasibility of transforming the ecological wisdom of ethnic minorities, as "local knowledge", into "universal value" in contemporary rural ecological governance. This article provides a new paradigm for rural ecological governance: shifting from "blood transfusion-style" governance that relies on external technological input to "hematopoiesis-style" governance that stimulates internal driving forces. The case of Man Yuan Village proves that those local ecological wisdom that were once regarded as "backward" can not only effectively address local ecological problems but also provide an Eastern, intelligent "Chinese solution" for addressing global ecological crises through scientific refinement and innovative transformation.

Looking to the future, further research in this field needs to continue in the following areas: Firstly, developing more refined methods for evaluating the ecological value of local knowledge; Secondly, exploring the potential of digital technologies (such as GIS, big data) in the management and application of local knowledge; Thirdly, establishing an intellectual property protection and benefit-sharing mechanism based on ecological wisdom for the governance model. Ultimately, we aim to drive a profound "cognitive revolution", allowing the diverse ecological wisdom of humanity to shine even more brightly in the grand cause of building a "community of life between humans and nature".

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