

Panshi GIES Case Cluster and its Impact

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Abstract: Geographical Indications Environment & Sustainability (GIES) serves as a crucial vehicle for transforming “lucid waters and lush mountains” into “invaluable assets”, thereby advancing ecological value realization and rural revitalization in a coordinated manner. Located in the transitional zone from Changbai Mountains to the Songhuajiang-Nenjiang Plain, Panshi City in Jilin Province possesses unique natural resource endowments. Built on institute–local collaboration and driven by new quality productive forces, Panshi initiated its GIES practice with the Lanjia Village Rice case on permanent basic farmland protection and sustainable development. Building on this foundation, the city has progressively established a diversified GIES case cluster encompassing rice, fruits, fisheries, and other agricultural products. This development model has effectively promoted the coordinated advancement of ecological conservation, industrial upgrading, and farmers’ income growth. This paper systematically reviews the development trajectory, core measures, and implementation outcomes of the Panshi GIES case cluster. Furthermore, it synthesizes insights and lessons from the perspectives of resource utilization and technological empowerment, aiming to provide practical references for promoting the ecological value realization of high-quality geographical indication products and advancing rural revitalization.

Keywords: GIES; resource endowment; Panshi GIES case cluster; implementation outcomes; practical insights

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1 Introduction

Against the background of global agricultural sustainability development and rural transformation, a central question is how region-specific ecological resources can be translated into distinctive, market-competitive agricultural products, while also promoting synergy between ecological protection and economic development^[1,2]. As an innovative platform integrating regional ecological resources, specialty industries, and local cultural connotations, GIES has become an important instrument for promoting green agricultural

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transformation, operationalizing the theory of “lucid waters and lush mountains are invaluable assets”, and advancing rural revitalization^[3]. Panshi City, located in the hilly and semi-mountainous transitional zone between the Changbai Mountains and the Songnen Plain, possesses a highly distinctive natural endowment. This endowment includes its location within the 42°N–43°N “golden rice belt” globally scarce black soil resources, a unique “natural water network” formed by 2,410 ponds and reservoirs, and diversified low-mountain and hilly landforms. Together, these features provide favorable natural conditions for the production of high-quality agricultural products. For a long period, however, despite its rich ecological asset base, Panshi struggled to convert its ecological advantages into economic benefits. On the one hand, the strengths of its agricultural products were often asserted only verbally, lacking rigorous scientific evidence and thus limiting their differentiated market competitiveness. On the other hand, conventional extensive farming and breeding practices were inefficient, hindering the effective conversion of ecological advantages into higher economic returns and preventing the full release of ecological dividends. In addition, weak brand influence meant that many high-quality local products remained obscure and under-recognized in the market, often sold only as low-value raw materials, leaving farmers trapped in a pattern of “higher output without higher income”.

To tackle these constraints, the Panshi Government actively embraced the theory of “lucid waters and lush mountains are invaluable assets” and strengthened collaboration with research institutions, including the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR, CAS) and Jilin University, to provide scientific support for local development. Building on its distinctive geographical endowment and sound ecological foundation, Panshi made the transformation of ecological advantages into industrial and economic gains a central strategic priority. Beginning with the Lanjia Village Rice permanent basic farmland case, the city progressively expanded into multiple ecological industry domains, including fruit cultivation and fisheries. This process subsequently led to the development of 4 cases: Panshi Chinese Cherry Apple, Panshi Qiantang Fish, Panshi Large Corylus, and Panshi Qiantang Rice. Together, these cases formed a cluster of high-quality geographical product cases, thereby creating the “Panshi model” of GIES practice with strong regional demonstration value and international influence^[4]. The Panshi model is built around a core operational mechanism characterized by “government guidance, scientific support, leading enterprise participation, farmer engagement, and brand-based value enhancement”. Through standardized production, brand-oriented operation, ecological management, and whole-chain industrial extension, the model has achieved simultaneous improvement in ecological conservation and economic returns for geographical-indication products. It has not only substantially raised the market prices of case products, thus increasing annual income by nearly 1.5 billion CNY, but has also transformed local production practices, enabling black-soil resources to support environmentally sustainable grain production and turning landscape resources into engines of local prosperity^[5]. To amplify the demonstrative value of this experience and facilitate broader application of the model, this paper systematically reviews the development trajectory, core measures, and comprehensive benefits of the Panshi GIES cases and distills transferable insights for agricultural transformation and sustainable development in similarly resource-rich regions.

2 Geographic Diversity of Panshi

Panshi City is located in south-central Jilin Province, in the hilly and semi-mountainous transitional zone between the Changbai Mountains and the Songnen Plain. Situated between 42°N and 43°N, it lies in the typical black-soil region of Northeast China, one of the world’s four major black-soil belts, specifically in the Changbai Mountain-Liaodong hilly area. The city is characterized by undulating hills, interlaced valleys, and winding streams. It has 83

mountain peaks rising above 500 m, 145 rivers and streams, and 2,410 ponds and reservoirs larger than 248 m²^[6,7], making Panshi the county-level city with the largest number of ponds and reservoirs in China. The region is richly endowed with high-quality black soil, forest and mineral resources, abundant wild fauna and flora, and diverse agricultural products.

The area experiences a humid temperate monsoon climate with 4 distinct seasons: dry and windy springs, hot and rainy summers, cool and clear autumns, and long, cold winters. The annual mean temperature is approximately 4.6–5.2 °C, and the annual accumulated temperature reaches 2,700–2,850 °C. Mean annual precipitation is about 699.6 mm, more than 60% of which falls between June and August. Annual sunshine duration is 2,491.2 h, and the frost-free period lasts approximately 125–130 d. These climatic conditions provide a favorable basis for the formation of high-quality geographical products.

In terms of topography, the city is dominated by low mountains, hills, and river-valley plains. Elevation is generally higher in the central and northeastern parts and lower in the southern and northern parts, forming a ridge-like terrain pattern. Elevation ranges from 230 to 1,049 m, and slopes are mostly between 5° and 25°. Soil types are diverse. The core agricultural areas are dominated by black-soil categories such as meadow soil and dark brown forest soil, whereas low-mountain and hilly zones such as Futai Town are characterized by gray-brown soil, albic soil, and alluvial soil. These soils are rich in organic matter and contain relatively high nitrogen and carbon contents, while heavy-metal concentrations remain far below the national risk-screening thresholds for agricultural land. Such fertile and clean soils provide favorable conditions for the cultivation of high-quality agricultural products.

Panshi is also rich in water resources. Its long-term mean total water resources amount to 893 million m³, including 112 million m³ of groundwater and 781 million m³ of surface water. The Huifa River and Yinma River systems traverse the city, while reservoirs and ponds are widely distributed across the landscape, thus forming a dense pond-and-reservoir network. Most waters in the region meet China's Class I or Class II standards, exceeding the quality requirements for both drinking water and aquaculture. This not only secures abundant water for irrigation and aquaculture but also supports a distinctive aquatic ecosystem. In addition, the city enjoys generally good air quality and lacks major polluting industries, providing a strong environmental foundation for the green production of high-quality geographical products.

3 Development Trajectory of the Panshi GIES Cases

The Panshi GIES initiative began with the Lanjia Village Rice case and progressively evolved into a diversified portfolio of cases spanning aquatic environments and low-mountain and hilly landscapes. Through technology-driven upgrading, brand building, cultural integration, and policy support, Panshi has formed an integrated agro-ecological development pattern combining rice production in paddy fields, fisheries in ponds, fruit cultivation on mountain slopes, and grain production on upland hills. The spatial distribution of the cases is shown in Figure 1.

3.1 Initial Exploratory Phase: Lanjia Village Rice Permanent Basic Farmland Case (Earliest Practice)

As the first GIES case in Panshi, the Lanjia Village Rice permanent basic farmland case was established in Lanjia Village, Niuxin Town. Irrigation water in this area is sourced from the Lanjia Reservoir, and the water-quality indicators are superior to the sanitary standards for urban water supply and domestic drinking water. These distinctive ecological conditions provide a sound basis for the production of premium rice. In 2020, researchers including Professor LIU Chuang and Professor FU Jingyong from IGSNRR, CAS, conducted social

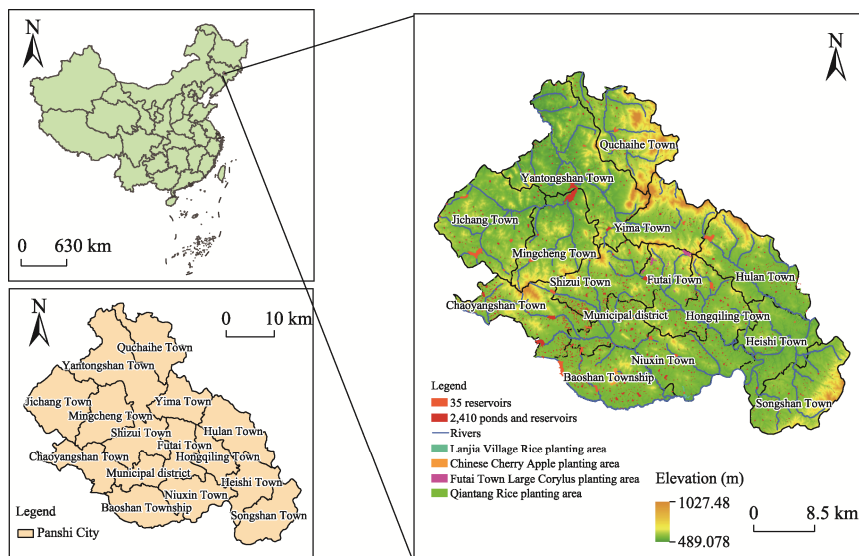


Figure 1 Spatial distribution map of the Panshi GIES case cluster

surveys and systematic investigations of the local natural environment, including soil physicochemical properties, water quality, climatic conditions, and rice quality (Figure 2). Their analyses showed that Lanjia Village Rice performed well in key quality indicators such as chalkiness rate and gel consistency. In September 2021, at the China International Fair for Trade in Services (CIFTIS), former FAO Deputy Director-General HE Changchui and CAS Academician TONG Qingxi presented a plaque to the Lanjia Village Rice case (Figure 3), officially designating it as the first GIES demonstration case in Panshi and the third GIES case in China^[8,9].



Figure 2 During her first visit to Lanjia Village, Professor LIU Chuang held a discussion with the Village Head (1 December 2020)



Figure 3 Plaque-awarding ceremony for the Lanjia Village Rice case at the 2021 CIFTIS, Beijing, September 2021. Former FAO Deputy Director-General HE Changchui and CAS Academician TONG Qingxi presented the plaque, which was received by WANG Pingping, then Mayor of Panshi City

3.2 Diversification Expansion Phase: Coordinated Development across Multiple Product Categories and Regions

The success of the Lanjia Village Rice permanent basic farmland case provided Panshi with a replicable pathway for the systematic exploration of other region-specific specialty products. Since 2021, leveraging collaboration with research institutes, Panshi has strategically deployed GIES cases across low-mountain and hilly zones, aquatic environments, and returning-farmland-to-forest areas based on interregional differences in resource endowments. As a result, 4 representative cases (Panshi Chinese Cherry Apple, Panshi Qiantang Fish, Panshi Large Corylus, and Panshi Qiantang Rice) were subsequently

developed, forming a development pattern characterized by product diversification and cross-regional coordination.

The Panshi Chinese Cherry Apple Baoshan low-mountain and hilly case was unveiled in October 2022. The case area is located in low-mountain and hilly zones such as Beiguokui Village in Baoshan Township. This area features a mild climate, abundant sunlight, and soils dominated by loamy black soil and chernozem associated with sand and gravel. Heavy-metal concentrations are below national standards, while soil layers are deep, well aerated, and drained, providing favorable conditions for root development and nutrient accumulation in fruit trees^[10]. Chinese Cherry Apple, an excellent cultivated variety within the genus *Malus* of the Rosaceae family, has been grown in Baoshan Township for several decades^[11]. Building on both cultivar and regional advantages, this case promoted environmentally friendly practices such as ecological weeding to protect the mountain ecosystem, while also drawing on local history and culture to build the distinctive brand of “the No. 1 village of red fruits in Northeast China” (Figure 4).



Figure 4 Investigation by Professor LIU Chuang and the then Municipal Leader YU Jiqun in Beiguokui Village

The Panshi Qiantang Fish summer angling and winter fishing case built on Panshi’s abundant pond-and-reservoir resources and focuses on ecological aquaculture and the preservation of fishing culture. Its major products include high-quality bighead carp, common carp, crucian carp, and bluntnout bream^[6]. Panshi has 2,410 reservoirs and ponds larger than 248 m², and the water quality meets China’s Class I surface-water standard. Building on the fishing culture of the Songhua River Basin, the case has developed distinctive activities such as recreational summer angling and winter fishing festivals. Since its official unveiling in July 2022, it has continued to host annual winter-fishing cultural events and has participated in the GIES New Year Fair every year (Figure 5).



Figure 5 Winter fishing cultural festival and the GIES New Year Fair

The Panshi Large *Corylus Futai* low-mountain and hilly case is located in areas of Futai Town where cropland has been converted back to forest, with a total area of 230 ha. The area falls within a humid temperate monsoon climate zone and is dominated by weakly acidic gray-brown soil, albic soil, and alluvial soil. These soils are loose, fertile, and well aerated while retaining moisture effectively, thus providing excellent ecological conditions for large corylus growth and quality development. The case was officially unveiled in October 2022^[12,13] (Figure 6). Using an integrated model of “ecological cultivation+three-dimensional management+rural income enhancement”, it has developed into a

complete industrial chain and has become a model for integrating ecological restoration under the returning-farmland-to-forest program with specialty-industry development in low-mountain and hilly areas.

The Panshi Qiantang Rice permanent basic farmland case has built on the experience of the Lanjia Village Rice case and further leveraged Panshi's "thousand-pond" water-resource advantage to develop the regional public brand of "Panshi Qiantang Rice". This case expanded the development

system from a local pilot centered on Lanjia Village to citywide promotion, thereby establishing a new pattern of large-scale, standardized, and brand-oriented development^[14,15]. The case was unveiled in July 2022 (Figure 7). By adopting a model of "Qiantang Association + cooperatives + farmers", the case has integrated industrial resources and promoted the upgrading of the rice industry from single-stage cultivation to value addition across the entire value chain, thereby enhancing regional agricultural quality and efficiency and supporting rural revitalization.



Figure 6 Unveiling ceremony for the Panshi Large Corylus case (October 2022)



Figure 7 Unveiling ceremony for the Panshi Qiantang Rice case (July 2022)

4 Benefits and Impacts of the Panshi GIES Cases

4.1 Social Benefits: Ensuring Stable Household Incomes, Improving Livelihoods, and Fostering Harmonious Rural Communities

By building diversified benefit-sharing mechanisms, the Panshi GIES cases have effectively protected villagers' interests, supported the implementation of the rural revitalization strategy, and generated substantial social benefits (Table 1)^[16,17].

Table 1 Statistics of beneficiary benefits of Panshi City GIES cases

Item	2020	2022	2025
Direct employees in case management and marketing (person)	0	1,000 (+)	5,000 (+)
Returnee entrepreneurs (person)	1,346	6,888	10,477
Farmer households benefiting from cases (household)	0	5,000 (+)	13,500 (+)
Per capita income increase for farmers driven by cases (CNY /person)	0	2,000 (+)	5,000 (+)
Rural sanitary toilet renovation (household)	0	1,081	7,000 (+)
Cultural and tourism visitors (10,000 persons)	24	70	220
Comprehensive income from culture and tourism (100 million CNY)	0.64	2.60	20.00
Output value of case products (100 million CNY)	2.30	4.80	15.00
Comprehensive income of case products + culture and tourism (100 million CNY)	2.94	7.40	35.00
GDP of Panshi City (100 million CNY)	132.90	136.70	155.30
Proportion of case product output value in city's GDP (%)	1.73	3.51	9.66
Proportion of (case products + culture & tourism) output value in city's GDP (%)	2.21	5.41	22.54

(1) Broadening employment channels and increasing household income

The GIES cases have broadened employment channels and promoted local, nearby employment. From 2022 to 2025, the number of people directly employed in the core GIES cases increased from 1,000 to 5,000, while the number of returnee entrepreneurs rose from

6,888 to 10,477. Industrial development also contributed to stable growth in both newly created urban jobs and transferred rural labor employment. Regular technical training programs were organized, effectively improving the employability and production skills of rural residents. Meanwhile, the scope of beneficiaries expanded steadily. The number of beneficiary households increased from 5,000 in 2022 to 13,500 in 2025. Through mechanisms such as “cooperatives + farmers + contract farming”, farmers obtained multiple sources of income, including land-transfer rent, wage earnings, and product dividends. Over the same period, average per capita income gains among participating farmers increased from 2,000 to 5,000 CNY, while collective village income grew substantially, allowing villagers to share more fully in the benefits of industrial development.

(2) Improving infrastructure and enhancing quality of life

Taking advantage of GIES-related development opportunities, core villages such as Lanjia Village advanced rural construction projects, including road surfacing, sewage treatment, landscaping, and village beautification. New rural roads and cultural facilities were constructed, and a citywide campaign for rural household toilet upgrading was implemented. Between 2020 and 2025, more than 7,000 households completed toilet retrofits, significantly improving local living and production conditions (Figure 8).



Figure 8 Comparison before and after rural toilet renovation in Lanjia Village (2020,2023)

(3) Integrating industrial development with the inheritance of regional culture

Building on GIES industries as a platform, Panshi deeply explored region-specific cultures such as winter fishing and traditional farming, and organized related festive activities in conjunction with industrial development. Relevant themed events have been held twice annually, helping transform villagers from passive onlookers into active co-builders. At the same time, industry-led cultural and tourism integration has accelerated. Annual visitor numbers in the region increased from 240,000 in 2020 to 2.2 million in 2025, while comprehensive cultural-tourism revenue rose from 64 million to 2 billion CNY. Overall, these changes created a favorable development pattern characterized by industrial prosperity, rising farmer incomes, and improved village conditions. The combined output value of GIES products and tourism accounted for 2.21% of the city’s total GDP in 2020, rising to 5.41% in 2022 and reaching 22.54% in 2025.

(4) Establishing a long-term chief-expert responsibility system and expanding public science outreach to villagers

To support the creation of sustainable-development cases for high-quality geographical products in Panshi, IGSNRR, CAS implemented a long-term chief-expert responsibility system. Under this mechanism, Professor LIU Chuang, Professor CHEN Shengbo, Professor SONG Xianfang, Professor FU Jingying, and Dr. ZHOU Yu were each assigned to lead one GIES case, thereby forming a research implementation mechanism characterized by “one expert for one case, full-process responsibility, and long-term follow-up”. This arrangement overcame the fragmentation associated with short-term research collaboration and provided organizational guarantees and technical support for both brand creation and sustainable industrial development of high-quality geographical products. It also offers a useful reference for scientific organization and institutional innovation in comparable regions.

At the same time, led by Professor LIU Chuang, 2 science communication events under the Capacity Building Workshop on Big Data Applications in 100 Universities/Towns program were organized in Panshi, effectively bridging the “last mile” linking scientific research, science communication, and rural implementation. On 14 January 2022, the 37th session, themed “Practicing the Two Mountains Theory and Advancing Technology-Enabled Development”, was held in Baoshan Township, Panshi. As the first event of this program to

be organized in a rural setting, it delivered on-site science communication on geographical big data, habitat conservation for high-quality geographical products, and digital agriculture to more than 60 grassroots cadres and villagers. It also included policy consultation and on-site discussion, while simultaneously reaching more than 300 villagers online through live streaming. On 31 January 2026, the 46th session, themed “Advancing Ecological Development through Science and Technology and Promoting Open Cooperation through GIES” was held in Panshi. It focused on specialty geographical products such as Qiantang Fish and Qiantang Rice through public lectures, standards interpretation, and discussions on industrial development. Together, these two events brought geographical big-data technologies, ecological protection concepts, and scientific production standards directly to villagers, improving scientific literacy and ecological awareness, strengthening standardized production capabilities, and fostering brand-oriented development thinking. In doing so, they helped transform scientific knowledge into a driver of industrial income growth and consolidated the social and knowledge foundations for the sustainable development of high-quality geographical products.

4.2 Ecological Benefits: Strengthening the Regional Ecological Barrier and Enhancing Ecosystem Services

The Panshi GIES cases have been guided by the principle of “ecological priority and green development”, using habitat protection as the foundation for specialty-industry development and enabling a virtuous cycle between ecological conservation and industrial growth. These efforts have strengthened the regional ecological security barrier and generated significant ecological benefits^[6,8,10,12,14]. At the soil-protection level, rice-based cases such as Qiantang Rice and Lanjia Village Rice have promoted innovative practices including “high rice stubble retention and incorporation” combined with biological pest control. This has been complemented by the release of *Trichogramma* wasps for biological insect management, reducing pollution risks at the source. According to relevant statistics, by 2025 the area under ecological rice cultivation had exceeded 4,000 ha, basically achieving full coverage of ecological planting in the relevant production zones. In mountain ecosystems, the large *corylus* case in Futai Town and the Chinese Cherry Apple case in Baoshan Township have promoted under-forest three-dimensional planting and ecological weeding technologies. By 2025, large *corylus* cultivation had expanded to 700 ha and Chinese Cherry Apple to 1,200 ha, effectively increasing vegetation cover in low-mountain and hilly areas and helping curb soil erosion. With regard to water-resource protection, the Qiantang Fish case in Jichang Town has strictly delineated protection zones for pond and reservoir water sources and prohibited polluting enterprises. It has also promoted ecological models such as “fish-grass symbiosis” and integrated rice-fish farming to improve water quality through ecological aquaculture. By 2025, fish production had reached 2,000 t, while ecological aquaculture practices also contributed to the recovery of aquatic species such as otters, thereby reinforcing regional biodiversity conservation. In addition, between 2022 and 2025, Panshi established 11 institutional arrangements for product traceability and built a three-dimensional monitoring network covering soils, water quality, and meteorological conditions. This system enables near-real-time environmental monitoring and precise management, while providing scientific support for optimizing ecological production systems and issuing pollution warnings (Figure 9). Collectively, these measures enhanced ecosystem services such as carbon sequestration, soil and water conservation, and biodiversity protection^[18].

4.3 Economic Benefits: Activating the Value of Ecological Resources and Promoting Regional Economic Transformation and Upgrading

The Panshi GIES case cluster has effectively transformed the city’s ecological endowment into economic momentum, promoting regional agricultural upgrading and improving both ecological-resource value and industrial performance. First, the output value of

geographical-indication products increased steadily. Supported by technology-driven upgrading and brand development, the output values of the core GIES categories, such as rice, fruit, fish, and corylus, rose steadily from 2022 onward. By 2025, the output value of rice had reached 500 million CNY, fruit 400 million CNY, fish 300 million CNY, and large corylus 300 million CNY. The economic gains of all major categories improved significantly, while certified products such as Qiantang Fish, Chinese Cherry Apple, and Large Corylus obtained clear brand premiums and sold at higher prices after certification, further strengthening brand value^[6,14]. Second, both



Figure 9 FAO representatives visited the GIES ground station system of the Lanjia Village Rice case (September 2024)

industrial scale and the industrial chain expanded simultaneously. The total output value of GIES-related industries increased markedly, from 480 million in 2022 to 1.5 billion CNY in 2025. At the same time, core categories such as Qiantang Fish, Chinese Cherry Apple, and Large Corylus achieved large-scale cultivation. Lanjia Village established a rice deep-processing plant with a daily processing capacity of 30 t, with a fully automated production line that mechanized the entire processing workflow (Figure 10). This promoted upgrading across the entire agricultural industrial chain and deeper integration of the primary, secondary, and tertiary sectors. Meanwhile, online and offline marketing channels were fully developed, and total marketing revenue increased from 150 million to 630 million CNY, with the market reach continuing to broaden^[19]. Third, the cases stimulated wider regional economic growth. From 2020 to 2025, Panshi's GDP increased from 13.29 billion to 15.53 billion CNY, while the structure of the three industrial sectors continued to improve. The gross output value of agriculture, forestry, animal husbandry, and fisheries, together with the output value of agro-processing industries, maintained stable growth. Lanjia Village was designated as a provincial-level demonstration village for the One Village One Priority Product Initiative, and village collective income increased substantially. More broadly, regional agriculture has begun to shift from conventional farming toward a smart full-chain model, strengthening the internal drivers of rural industrial development^[20].



Figure 10 Production lines for Panshi rice and Chinese Cherry Apple products

4.4 International Influence: Offering a China-Based Solution for Sustainable Development

Built around 5 flagship “Panshi Qiantang” geographical-indication products, i.e., Lanjia Village Rice, Chinese Cherry Apple, Qiantang Fish, Large Corylus, and Qiantang Rice, the cluster of Panshi GIES has developed a diversified portfolio of cases across mountain, water, forest, and farmland settings. These systematic efforts not only demonstrate the achievements of China's eco-agriculture, but also provide a practical and transferable model

for comparable regions worldwide. Panshi has continuously promoted the exchange and dissemination of GIES practices through exhibitions, seminars, and related activities. Between 2020 and 2025, the city participated in 19 exhibitions and organized 29 related seminars. Through platforms such as the International Science and Technology Conference on Green Development, the CIFTIS, and the GIES New Year Fair, it expanded the visibility of both its brands and its development model. In 2024, the Food and Agriculture Organization of the United Nations (FAO) held a parallel session in Panshi on the use of GIES-related technologies to support the sustainable development of specialty agricultural products (Figures 11,12). Participants spoke highly of Panshi's practical experience, particularly its effective coordination among government support, scientific application, and farmer participation. The case was subsequently included in the FAO Asia-Pacific OCOF knowledge-sharing platform as a "good practice" for wider dissemination^[21,22]. In 2025, the "Panshi Qiantang" product series was exhibited at the first FAO Global Exhibition of Specialty Agricultural Products in Rome, Italy, marking an important step toward international visibility and market outreach. The case therefore offers a practical example from China for advancing the FAO's Four Betters goals and the broader global agenda of agricultural sustainability and rural transformation.



Figure 11 FAO officials visiting Lanjia Village, Niuxin Town, Panshi, Jilin Province (September 2024)



Figure 12 Group photograph after FAO officials visited Beiguokui Village, Baoshan Township, Panshi, Jilin Province (September 2024)

5 Insights from the Panshi GIES Cases

(1) Open science as the foundation of branding Panshi's high-quality geographical products. Science and technology are key to overcoming the disconnect between ecological and economic advantages and constitute the core engine for high-quality GIES development. Guided by new quality productive forces, Panshi deepened collaboration between IGSNRR, CAS and local government to establish a technical support system covering production, processing, and circulation. On the production side, experts jointly formulated standardized protocols for 5 major product categories, established 11 experimental and demonstration bases and 811 ha of organic production bases, and introduced smart technologies such as IoT monitoring systems and UAV-based plant protection to enable near-real-time monitoring and

precise regulation of soil, water, and meteorological conditions. On the standards side, the city developed the “Panshi Qiantang” group standards and established a “one product, one code” traceability system for full-process visual traceability. On the processing side, deep-processing lines were built and more than 30 processed products were developed, promoting industrial upgrading. The integration of science and technology across the value chain has enabled a shift from primary products to higher-value-added products. The key insight for comparable regions is to use new quality productive forces as a guide for innovation-driven development, deepen the integration of innovation and industrial chains, and make science- and technology-enabled upgrading a central driver of ecological value realization.

(2) Precisely identifying the resource potential of “lucid waters and lush mountains” to strengthen the basis for realizing the value of ecological products. The key to converting ecological resources into development value lies in accurately identifying local advantages and closely aligning distinctive ecological conditions with product attributes, rather than pursuing broad-brush, homogeneous development. Taking advantage of the distinctive mountain, water, and black-soil resources of the Changbai transitional zone, Panshi scientifically identified the core advantages of its products and substantiated them with data, thereby overcoming the long-standing difficulty of clearly articulating and demonstrating ecological advantages. In this way, Panshi developed a system of 5 core geographical-indication products and turned “lucid waters and lush mountains” into sources of value that can be quantified, translated into market value, and command price premiums. This indicates that only by accurately identifying region-specific ecological distinctiveness can regions build a sound scientific basis for realizing the value of ecological products and truly transform ecological resources into development advantages.

(3) Building an enabling system for GIES development through government leadership, technology support, and multi-actor collaboration to ensure effective ecological value transformation. GIES development requires overcoming administrative fragmentation and dispersed resources, making government coordination and leadership essential. Panshi fully integrated GIES development into its broader rural revitalization strategy, with the government playing a central role in overall planning and institutional support. By integrating financial resources, improving infrastructure, and creating platforms for cooperation, the city promoted industrial associations and encouraged collective development among market actors, thereby easing the bottlenecks created by fragmented smallholder operations. The Panshi experience suggests that governments should play a strong coordinating role, strengthen policy support, maintain an orderly development environment, and foster efficient collaboration for GIES development, thus building stronger collective momentum for industrial development.

(4) Strengthening market-oriented mechanisms to sustain the vitality of GIES development. Market access is essential to realizing the value of ecological products, while branding and diversified business models are key to enhancing competitiveness. Panshi established a three-tier brand matrix composed of a regional public brand, enterprise brands, and product brands, balancing product differentiation with cluster-level brand synergies. Through innovative marketing approaches such as the GIES New Year Fair and the Scientist Cloud Tree-Adoption Initiative, the city translated scientific credibility into consumer trust. At the same time, Panshi drew on and integrated distinctive regional resources, including fishing and hunting traditions, farming culture, and mountain heritage, and closely tied these cultural elements to its geographical-indication products. By developing cultural-tourism events such as the “Qiantang Fish Summer Angling and Winter Fishing Cultural Festival” and the “Chinese Cherry Apple Picking Season”, Panshi turned ecological production processes into participatory tourism experiences, thereby integrating geographical products more closely with cultural experience. In this way, it helped shift the industry from merely “selling products” to also “selling experiences” and “selling culture”. The main lesson is that development should be guided by market demand and should integrate brand building with cultural tourism, e-commerce, and other business channels, thereby overcoming geographic

limitations, securing price premiums for quality products, and sustaining industrial vitality.

(5) Improving benefit-sharing mechanisms to ensure that rural households share development gains. The core of rural revitalization lies in ensuring that development outcomes benefit rural households, and GIES development must therefore coordinate ecological, economic, and social benefits. Panshi established an integrated sustainable development mechanism involving government guidance, scientific support, leading enterprises, farmer participation, and brand-driven value enhancement. The government played a strong coordinating role by integrating GIES development into the broader rural revitalization strategy, mobilizing funds, improving infrastructure, and promoting industrial associations to encourage more coordinated development among producers and enterprises. At the same time, mechanisms such as “Qiantang Association + cooperatives + farmers” created close benefit-sharing arrangements, enabling farmers to share in industrial gains through multiple channels, including land transfers, wage income, and shareholding dividends. This effectively strengthened farmer participation and motivation. The key insight is that only when rural households become both participants in and beneficiaries of ecological value realization can GIES development build a strong social foundation. Only then can ecological protection, industrial upgrading, and farmer prosperity reinforce one another in a sustainable way. In this way, the social foundation for rural revitalization can be further strengthened.

6 Conclusion

This paper synthesizes the development achievements, core measures, and transferable insights of the Panshi GIES cases. Building on its distinctive regional ecological endowment and using GIES as a practical framework, Panshi has, through close collaboration between research institutes and local government, mobilized new quality productive forces and explored a path of sustainable agricultural development that coordinates ecological protection with economic growth, thereby developing the demonstrative “Panshi model”. This model rests on the precise identification of regional ecological potential, full-chain technology-enabled upgrading, government institutional support, a three-tier brand matrix, and diversified benefit-sharing mechanisms that allow farmers to share development gains. In this way, it has effectively translated ecological assets into local development gains under the principle that “lucid waters and lush mountains are invaluable assets”^[23]. The Panshi experience has not only substantially increased industrial output and farmer income, but has also been recognized and promoted by FAO as a “good practice”. Looking ahead, further efforts are needed to strengthen the technical system, expand market reach and brand influence, and improve benefit-sharing mechanisms. These efforts will help the GIES model move toward higher-quality and more sustainable development while providing stronger support for comprehensive rural revitalization.

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