SCALE DISPARITIES AS A BARRIER TO REGENERATIVE RURAL TOURISM: THE CASE OF BORSOD-ABAÚJ-ZEMPLÉN COUNTY, HUNGARY

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Regenerative rural tourism is increasingly proposed as a pathway for restoring ecosystems, strengthening communities and retaining value in rural regions, yet its implementation is constrained by mismatches between the scale of local enterprises and the ecological, technological, financial and institutional scales at which regeneration must operate. This article applies a right-scaling perspective to Borsod-Abaúj-Zemplén County (BAZ), one of Hungary's most socio-economically disadvantaged and demographically shrinking regions. Official statistics and recent regional research show persistent population loss, settlement fragmentation, lower economic performance, high concentrations of disadvantaged settlements and pronounced social vulnerability. These conditions can make regenerative tourism difficult to finance and staff, but they also make it especially relevant as part of a wider place-based development strategy. The paper identifies eight locally salient scale disparities and proposes minimum viable regenerative destination units, cooperative circular-bioeconomy platforms, landscape observatories, inclusive skills systems, long-term finance and 'smart shrinkage' measures that connect tourism with landscape stewardship, local services and population retention.
Keywords: regenerative rural tourism; scale disparities; Borsod-Abaúj-Zemplén; rural depopulation
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1. INTRODUCTION

Rural tourism is often presented as a locally embedded alternative to mass tourism. Regenerative tourism goes further: it seeks not only to reduce harm but to restore ecosystems, strengthen communities, conserve cultural landscapes and retain value

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locally. Rural destinations therefore need to be understood as coupled social-ecological systems linking accommodation, food, agriculture, water, biodiversity, heritage, mobility, energy, waste, skills and governance (Bellato et al., 2023[1]; Dredge, 2022[2]). Circular-bioeconomy approaches reinforce this logic by keeping biological resources and by-products in productive local cycles (Rinn et al., 2023[3]; Rodríguez et al., 2020[4]).

The central difficulty is scale. Ecological processes do not stop at farm or municipal boundaries, while circular infrastructure, climate adaptation and monitoring often exceed the capacity of a single micro-enterprise. Scale mismatch occurs when governance does not correspond to the level at which ecosystem processes, risks or resource flows operate (Cash et al., 2006[5]; Cumming et al., 2006[6]). This article identifies eight recurrent disparities: attraction versus landscape scale; short projects versus long restoration horizons; micro-enterprises versus capital-intensive infrastructure; fragmented biomass versus efficient processing volumes; marketing versus measurable performance; community aspirations versus limited skills; municipal mandates versus cross-boundary risks; and local experience versus destination-level monitoring.

Borsod-Abaúj-Zemplén County (BAZ) in north-eastern Hungary is an instructive case. It combines exceptional wine, heritage, nature and rural-tourism assets with persistent demographic loss, peripheral settlement structures, poverty and uneven labour-market conditions. KSH data indicate 604,493 residents at the beginning of 2026 compared with 753,497 in 2001, a decline of almost one fifth; the 2022 census synthesis described BAZ as Hungary's weakest county in population retention between the two latest censuses (HCSO, 2024a[7], 2026a[8]). The key question is therefore not whether tourism can 'save' shrinking villages, but when it can reinforce a wider regenerative rural economy.

The aim of this article is to reinterpret scale disparities as a practical barrier to regenerative rural tourism in BAZ and to identify right-scaling responses that are compatible with the county's socio-economic realities. The analysis combines the conceptual framework of regenerative rural tourism and the Azienda Agricola model with official Hungarian statistical and policy sources and recent research on rural shrinkage, poverty, small villages and tourism-led rural change. The paper focuses particularly on population decline, settlement fragmentation, human-capital limitations, uneven access to finance and the risk that tourism-led valorisation benefits external investors more than resident communities.

2. CONCEPTUAL FRAMEWORK: REGENERATION, RURAL SHRINKAGE AND SCALE

2.1 From sustainability to regenerative rural tourism

Conventional sustainable tourism typically focuses on impact reduction and resource efficiency. Regenerative tourism adds a stronger place-based objective: measurable improvement in ecological and social capacity over time, including soils, water, bio-

diversity, local value chains, community participation, skills and cultural continuity (Bellato & Pollock, 2025[9]; Jęczmyk et al., 2024[10]). In rural areas the visitor economy is inseparable from the condition of working landscapes: wine tourism depends on resilient vineyards, gastronomy on viable local production, and nature or heritage tourism on functioning ecosystems and inhabited cultural landscapes.

The multifunctional Azienda Agricola model links primary production, processing, hospitality, gastronomy, direct sales, education, heritage and landscape stewardship (Némethy et al., 2016[11]). It can diversify income and reduce seasonality, but some functions - wastewater reuse, renewable-energy balancing, by-product valorisation, ecological corridors, visitor mobility and monitoring - usually require collective organization such as cooperatives or public-private partnerships (Fig 1). Regeneration is therefore not synonymous with small scale; the appropriate scale is the one at which ecological, technological, market and governance functions can be maintained credibly.

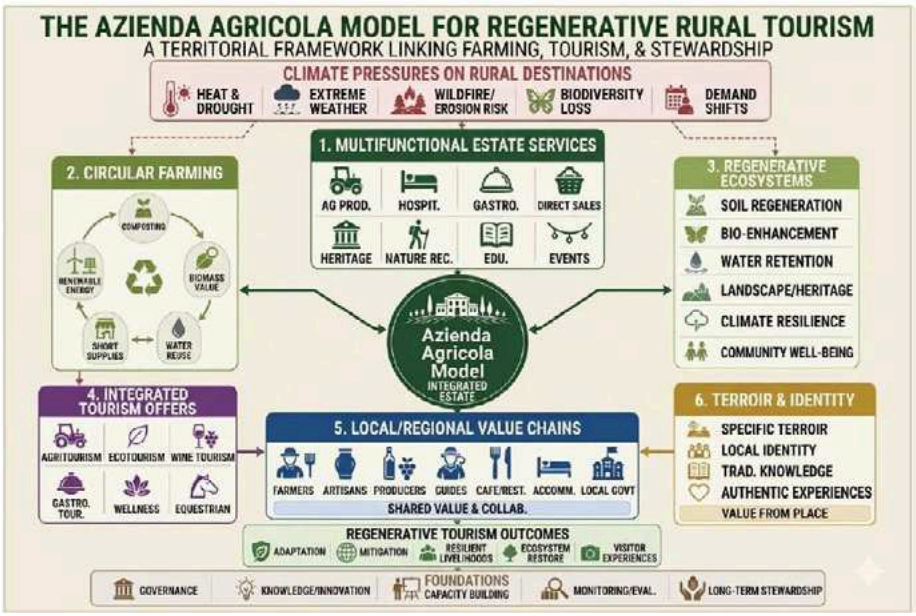


Figure 1. The Azienda Agricola model: a regenerative territorial framework integrating agriculture, tourism, place-based value, circular resource flows, networked value chains and climate-resilient territorial stewardship.

Source: Authors' own elaboration based on Némethy et al. 2016 and Kreidlmayer & Némethy, 2026[12].

2.2 Rural depopulation as a cross-scale development problem

Population shrinkage compounds scale problems because fewer residents must sustain spatially dispersed services, infrastructure and cultural landscapes. The OECD identifies rural depopulation, weak competitiveness and persistent urban-rural dis-

parities as key Hungarian challenges and notes that 109 of 197 districts are disadvantaged (OECD, 2024[13]). Its recent work on shrinking regions recommends 'smart shrinkage': protecting accessibility, connectivity and quality of life even where growth cannot realistically be restored (OECD, 2025[14]). Hungarian research likewise links peripherality with migration loss, ageing and functional decline in small settlements (Pénzes et al., 2015[15]; Tóth, 2023[16]).

Tourism can diversify rural economies, but it is not automatically inclusive. Hungarian research describes 'split realities' in which successful visitor economies and property valorisation coexist with weak resident participation and gentrification (Nemes et al., 2025[17]). The Erdőbénye case in Tokaj-Hegyalja similarly shows that amenity migration, second homes and wine tourism can revitalise a village while altering ownership and social composition (Orbán & Kovács, 2025[18]). Regeneration must therefore be assessed through local value capture and community agency, not visitor growth alone.

3. BORSOD-ABAÚJ-ZEMPLÉN AS A TERRITORIAL STRESS TEST

3.1 Demographic shrinkage and settlement fragmentation

BAZ is Hungary's second largest county by area and has an exceptionally fragmented settlement network. On 1 January 2025 it contained 358 settlements, of which 320 were villages; the county's total resident population was 610,927 (HCSO, 2025a[19]). KSH's settlement-size data also reveal a dense layer of very small communities, while the national list of the 50 smallest settlements includes numerous BAZ villages such as Debréte, Perecse, Keresztéte, Teresztenye, Tornabarakony, Tornakápolna, Sima, Litka, Gagyapáti, Becskeháza, Varbóc, Égerszög and Arka (HCSO, 2025b[20]). This is not simply a demographic curiosity. Very small population bases raise per-capita costs for transport, local services, energy systems, waste collection, cultural institutions and project administration, while reducing the number of people available to organise tourism enterprises, associations and volunteer activities.
Long-term change confirms the structural nature of decline. BAZ fell from 753,497 residents in 2001 to 604,493 in 2026, approximately 19.8 per cent (HCSO, 2026a), and the census synthesis reported the country's weakest population retention performance (HCSO, 2024a). Shrinkage is uneven: some villages age and lose young adults, while others combine deprivation with younger age structures. Different demographic mechanisms require different responses, including employment, housing, education, transport, health access, childcare and digital connectivity.

3.2 Economic disadvantage, poverty and human-capital constraints

The county's economic position remains substantially below the national average. KSH reported 2024 GDP per capita of HUF 5.342 million in BAZ, equivalent to only 62.7 per cent of the national average; the county ranked sixteenth among the nineteen counties plus Budapest on this indicator (HCSO, 2025c[21]). Labour-market conditions

have improved markedly compared with the early 2010s, but unemployment remains more volatile and structurally higher than in many western and central counties, reflecting the continuing importance of peripheral labour markets and the uneven distribution of higher-productivity employment (HCSO, 2026b[22]).
Territorial disadvantage is also visible in official classifications. In 2025 KSH recorded 221 beneficiary settlements and 14 beneficiary districts in BAZ (HCSO, 2025d[23]). In 2024 the county also had Hungary's highest rate of cumulatively disadvantaged minors, 174.7 per 1,000 (HCSO, 2025e[24]). A 2026 survey found that low education, Roma ethnicity, rural residence and greater distance from Miskolc were associated with higher income-poverty vulnerability (Siposné Nándori et al., 2026). Regenerative tourism must therefore connect training, ownership and benefit sharing to disadvantaged communities without romanticising marginality.

3.3 Strong tourism assets but uneven capacity to convert them into local value

BAZ combines disadvantage with rich territorial assets: Tokaj-Hegyalja, the Zemplén Mountains, Aggtelek karst, river corridors, historic towns, castles, religious sites, local foods and crafts. The county's TOP Plus portfolio already includes active-tourism networks along the Tisza and in Western Borsod, the Bükk, Cserehát, Bodrogköz, Hegyalja and Hernád corridor (Borsod-Abaúj-Zemplén County Government, 2026). The challenge is to turn these networks into durable local capacity through local supply chains, restoration, year-round jobs, maintenance and shared governance.

Table 1.
Selected structural indicators relevant to regenerative rural tourism in BAZ County

Indicator	Recent evidence	Implication for regenerative tourism
Population	604,493 residents at 1 January 2026; down from 753,497 in 2001 (about -19.8%).	Shrinking labour and tax base; pressure on service provision and local organisational capacity.
Settlement structure	358 settlements in 2025, including 320 villages; many extremely small settlements.	High transaction and infrastructure costs; need for inter-municipal and micro-regional solutions.
Beneficiary areas	221 beneficiary settlements and 14 beneficiary districts in 2025.	Investment capacity is weak precisely where collective regeneration is most needed.
GDP per capita	HUF 5.342 million in 2024, 62.7% of the national average.	Low local purchasing power and limited self-financing capacity for green and circular infrastructure.
Child disadvantage	174.7 cumulatively disadvantaged minors per 1,000 minors in 2024, highest county value.	Tourism policy must integrate inclusion, education and benefit sharing, not only place marketing.
Tourism-development base	County-wide active-tourism projects in the Tisza, Bükk, Cserehát, Bodrogköz, Hegyalja and Hernád areas.	Existing network investments can become a platform for right-scaled regenerative destination management.

Source: authors' compilation based on the sources indicated in the text.

The decisive issue is whether these investments generate durable local capacity. Tourism infrastructure can increase accessibility and visibility, but regenerative outcomes require local supply chains, ecological restoration, year-round jobs, skills, maintenance budgets and governance mechanisms that survive the funding period. In very

small villages, a renovated visitor facility without resident enterprise capacity may create an attractive node but weak local multipliers. Conversely, even a modest visitor flow can be valuable if it supports local food production, landscape maintenance, guiding, heritage interpretation, crafts, care services and youth employment. The relevant performance measure is therefore not maximum visitor volume, but regenerative value retained per visitor, per hectare and per resident community.

4. EIGHT SCALE DISPARITIES CONSTRAINING REGENERATIVE RURAL TOURISM IN BAZ

These scale disparities are interconnected because regenerative rural tourism functions as a socio-ecological system in which ecological processes, infrastructure, finance, material flows, governance, labour, social inclusion and monitoring operate across different but overlapping spatial, temporal and institutional scales (Fig. 2). A constraint in one dimension therefore propagates to others, meaning that lasting regeneration depends on coordinated solutions that align these scales rather than addressing each disparity in isolation.

4.1 Attraction scale versus landscape and watershed scale

Tourism is marketed through discrete attractions - a winery, guesthouse, cave, castle, trail or festival - whereas the ecological processes sustaining these assets operate across landscapes and catchments. Vineyard erosion, flood risk, drought, biodiversity connectivity, water quality and scenic integrity cannot be managed by individual tourism providers. In Tokaj-Hegyalja and the Bodrog corridor, for example, water retention, vineyard soil management, riparian habitats and settlement drainage are interconnected. The regenerative unit must therefore be larger than the individual attraction and, in some cases, larger than the municipality.

4.2 Micro-enterprise finance versus infrastructure scale

Many rural tourism businesses are family-run micro-enterprises with limited borrowing capacity, yet regenerative systems may require electric mobility, wastewater treatment, renewable-energy integration, cold storage, by-product processing, digital booking systems, accessible public spaces and climate-proof infrastructure. Expecting each business to internalise these costs creates a structural barrier. Shared infrastructure, cooperative ownership and public-private investment are therefore not optional add-ons but core enabling conditions.

4.3 Fragmented material flows versus circular-bioeconomy thresholds

Circular bioeconomy is attractive in BAZ because vineyards, orchards, forestry, livestock, food services and settlements generate diverse organic residues. However, small and intermittent material streams may not justify stand-alone composting, biochar, biogas or extraction technologies. Transporting low-value biomass too far can

also eliminate environmental benefits. Right-scaling requires local flow mapping, aggregation points and technology choices matched to actual feedstock volumes, quality, seasonality and ecological limits rather than to fashionable technology narratives.

4.4 Short funding cycles versus long regenerative time horizons



Figure 2. Eight interconnected scale disparities constraining regenerative tourism development in BAZ county.
Source: Authors' own elaboration

Rural development projects are commonly financed in three- to seven-year programming cycles, while soil restoration, agroforestry, habitat recovery, community trust

and demographic stabilisation may take decades. This temporal disparity encourages visible capital projects rather than slow institutional and ecological work. Regenerative tourism needs maintenance finance, staged investment and monitoring agreements that continue after project closure.

4.5 Demographic and labour scale versus the skills required for regeneration

Shrinking villages may simultaneously lack hospitality workers, technicians, agronomists, ecologists, project managers, language skills and digital competences. The problem is not simply a shortage of labour but a mismatch between specialised tasks and a dispersed population. Training organised settlement by settlement will often be inefficient. Micro-regional training pools, shared experts, mobile advisory teams and partnerships with the University of Tokaj, University of Miskolc, vocational institutions and civil organisations can create a viable skills scale.

4.6 Municipal jurisdiction versus functional rural regions

Administrative boundaries do not correspond neatly to tourism routes, ecological corridors, river basins or labour markets. BAZ also borders Slovakia, adding a cross-border dimension to landscape, heritage and mobility systems. Municipal competition for projects can fragment investment and branding. Cooperative destination governance should therefore be organised around functional territories while preserving municipal accountability and local identity.

4.7 Tourism valorisation versus social inclusion and housing

Successful rural tourism can raise property values, attract second-home owners and stimulate entrepreneurship, but it can also displace residents or shift decision-making towards external investors. Hungarian evidence on gastro-tourism and the Erdőbénye case warns that tourism-led renewal may produce social ‘split realities’ if local residents do not share in ownership and value capture (Nemes et al., 2025; Orbán & Kovács, 2025). In disadvantaged BAZ villages, regenerative tourism should therefore include affordable housing safeguards, local procurement, cooperative equity, community enterprises and transparent benefit-sharing rules.

4.8 Local narratives versus verifiable regenerative performance

The word ‘regenerative’ can scale faster than ecological improvement. Destinations may adopt attractive branding without demonstrating changes in soil, water, biodiversity, waste, energy, local employment or community well-being. This is especially risky where public funds are used to overcome disadvantages. Claims should be linked to a transparent indicator system and independently auditable baseline data. Monitoring is not merely a scientific exercise; it is an anti-greenwashing and trust-building function.

5. RIGHT-SCALING SOLUTIONS FOR BAZ

5.1 Define minimum viable regenerative destination units

The first practical step is to define the smallest territorial unit capable of maintaining the required ecological processes, resource flows, visitor mobility, skills and governance. In BAZ this may be a wine district, valley, river corridor, protected-area buffer, cluster of small villages or active-tourism network rather than a single settlement. The unit should be defined functionally: where water and biodiversity can be managed, where residues can be aggregated efficiently, where visitors can move with low emissions, where local products can be supplied reliably, and where monitoring data can support decisions. The objective is not administrative enlargement but functional cooperation.

5.2 Build cooperative destination platforms and shared services

Cooperatives and destination clusters can pool functions that are too costly for individual firms: booking and marketing, procurement, storage, equipment, waste collection, renewable-energy management, transport, training and professional advisory services. Local governments, small businesses, national-park actors, wineries, farmers, heritage organisations and civil society should participate with clearly defined voting rights and benefit-sharing rules. Existing county active-tourism investments provide a physical network that could be complemented by an institutional network for regenerative management (Borsod-Abaúj-Zemplén County Government, 2026[25]).

5.3 Create circular-bioeconomy hubs at realistic thresholds

Rather than installing identical technologies in every village, BAZ should develop a hierarchy of circular solutions. Household and farm composting can remain local; shared composting, biochar or biomass preparation may serve village clusters; more complex processing should be located where feedstock volumes, transport distances, technical staff and markets justify it. Vine and wine residues in Tokaj-Hegyalja, forestry residues in mountain areas, food waste from hospitality and manure from livestock or equestrian activities can be mapped together. Material-flow analysis should precede investment so that circularity reduces costs and emissions instead of creating underused infrastructure.

5.4 Establish a BAZ regenerative landscape observatory

A county or sub-regional landscape observatory could integrate demographic, tourism, soil, water, biodiversity, climate, land-use, heritage, mobility, energy and business data into a shared decision-support system. This would reduce the knowledge-scale mismatch faced by small municipalities and firms. The observatory should

support climate-risk maps, carrying-capacity assessment, visitor-flow analysis, by-product mapping, local procurement metrics and annual regeneration indicators. Universities and research institutions could provide methodological continuity, while municipalities and communities contribute local knowledge. A public dashboard would also make regenerative claims verifiable.

5.5 Link tourism directly to population retention and everyday services

Depopulation cannot be addressed by tourism promotion alone. Regenerative tourism should be integrated with year-round employment, housing, childcare, health access, public transport, digital connectivity and education. Multi-functional community buildings, mobile services, remote-work facilities, local food hubs and flexible transport can serve residents and visitors simultaneously. This reflects 'smart shrinkage': maintaining accessibility, dignity and local agency even where rapid population growth is unrealistic (OECD, 2025).

5.6 Invest in inclusive human capital and local ownership

Training should extend beyond hospitality to regenerative agriculture, guiding, ecological monitoring, digital commerce, languages, maintenance, food processing and project management. Because education and spatial remoteness are major dimensions of vulnerability in BAZ (Siposné Nándori et al., 2026[26]), training should be linked to real jobs, apprenticeships, social enterprises and ownership opportunities, with programmes co-designed with local communities.

5.7 Use blended, long-term and outcome-based finance

Regenerative outcomes contain public-good components that visitor spending alone cannot finance. Wetland restoration, biodiversity corridors, heritage conservation, public transport and monitoring justify blended finance combining EU and municipal funds, private investment, cooperative shares, ecosystem-service payments and carefully designed visitor contributions. Funding should reward ecological additionality, local value retention, maintenance commitments and social outcomes rather than capital expenditure alone.

5.8 Protect authenticity and prevent tourism-induced exclusion

Regeneration requires living communities, not stage-set villages. Local land-use and housing policy should monitor the effects of second homes and tourism property investment, especially in high-amenity wine and heritage settlements. Support for local tenancy, renovation by resident families, intergenerational transfer, community land or property initiatives and local-enterprise succession can reduce the risk that tourism converts demographic decline into seasonal occupancy. Visitor interpretation should present the region's social complexity and working landscapes rather than an idealised rural image.

Table 2.
Scale disparities and proposed right-scaling responses in BAZ

Scale disparity	BAZ manifestation	Suggested response
Ecological	Attractions managed separately from catchments, vineyards, habitats and corridors.	Landscape/watershed-scale planning; nature-based solutions; shared restoration targets.
Economic	Micro-firms cannot finance major climate and circular infrastructure.	Cooperatives, clusters, public-private investment and shared services.
Material	Residues and by-products dispersed across small producers.	Material-flow mapping, aggregation points & tiered circular-bioeconomy hubs.
Temporal	Short projects versus long ecological and demographic recovery.	Multi-period finance, maintenance reserves and long-term monitoring.
Human capital	Specialist skills scarce in shrinking villages.	Micro-regional training pools, shared experts, university and vocational partnerships.
Governance	Municipal boundaries differ from functional tourism/ecological regions.	Minimum viable regenerative destination units and cross-municipal governance.
Social	Tourism value may accrue to outsiders while residents face exclusion.	Local ownership, affordable housing safeguards, procurement rules and benefit sharing.
Knowledge	Branding outpaces evidence and local data are fragmented.	Landscape observatory, open indicators, baselines and independent verification.

Source: authors' compilation based on the sources indicated in the text.

6. DISCUSSION

BAZ shows why scale disparities are a rural-development issue, not a technical detail. The county's strongest tourism assets depend on landscape-scale cooperation, while many providers operate as micro-enterprises in shrinking settlements. Thus

the places where regenerative tourism could contribute most to diversification and stewardship are often least able to pre-finance, staff and coordinate the necessary systems.

The appropriate response is not indiscriminate scaling-up. Large infrastructure can itself become maladaptive if it exceeds feedstock availability, visitor demand or local management capacity. Right-scaling means using different scales for different functions: household or farm scale for some practices; village-cluster scale for services; landscape or catchment scale for water and biodiversity; county or cross-border scale for data, marketing and selected infrastructure. The minimum viable regenerative destination unit is therefore a flexible governance concept, not a fixed administrative category.

The demographic dimension is equally important. Tourism cannot by itself reverse structural shrinkage and may intensify inequality through property markets or external ownership. A more credible objective is population retention through diversified livelihoods, better everyday services and renewed local agency. Success should therefore be judged by local value retention, year-round work, landscape restoration and community continuity, not simply visitor numbers.

For BAZ, the policy opportunity is to connect active-tourism investment and internationally recognised assets with a stronger social-ecological governance architecture. Tourism, agriculture, nature conservation, social inclusion and demographic policy should be treated as mutually dependent components of territorial resilience rather than as separate sectors.

7. CONCLUSIONS

Scale disparities are a potential barrier to the introduction of regenerative rural tourism because regeneration requires ecological, technological, financial and institutional capacities that often exceed the scale of individual rural enterprises and municipalities. Borsod-Abaúj-Zemplén County makes this problem especially visible. Its severe long-term population decline, fragmented village structure, concentration of beneficiary settlements and districts, lower economic performance and social vulnerability limit the capacity for isolated investment, even though the county possesses exceptional natural, cultural and wine-tourism assets.

The most promising strategy is therefore right-scaling rather than simple growth. Minimum viable regenerative destination units, cooperative destination platforms, realistic circular-bioeconomy hubs, landscape observatories, shared skills systems, inclusive local ownership and long-term finance can convert fragmentation from a liability into a network advantage. Tourism should be tied explicitly to population retention, everyday services and landscape stewardship, while policies should accept that some areas may need smart-shrinkage strategies rather than unrealistic growth targets. Under these conditions, regenerative rural tourism can become more than a niche tourism product: it can function as one component of a place-based regional development model that restores ecosystems, retains value, strengthens communities and helps maintain inhabited cultural landscapes in disadvantaged rural Hungary.

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