

Circular bioeconomy-driven regenerative landscape stewardship - Implications for human resource development and strategic HR Management – a review

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Abstract

This article proposes an ecosystem-centred interpretation of landscape stewardship that treats rural, urban, peri-urban, semi-rural and rural territories as connected social-ecological-infrastructure systems rather than as separate policy sectors or tourism products. The argument is that circular bioeconomy-based regeneration is not only a technical agenda of composting, soil conservation, bioenergy, by-product valorisation, water reuse or urban greening. It is a capability transition that depends on human resource development (HRD), strategic human resource management (HRM), multiskilling, occupational health, knowledge governance and place-based leadership. The framework links regenerative organic agriculture, soil-life focused soil conservation and management, urban agriculture, ecological remediation of degraded ecosystems and ecotones, regenerative rural tourism, renewable-energy mixes, landscape observatories and ecomuseums with the Azienda Agricola Model as a practical territorial template for integrating production, hospitality, heritage, education, circular flows and ecosystem stewardship. The distinction between sustainable and regenerative practice is central: sustainability primarily seeks to reduce harm, whereas regeneration seeks verified improvements in ecosystem function, climate resilience, community wellbeing and local economic vitality. The HR implication is that organisations and destinations require T-shaped, place-based, multiskilled workers and managers who can connect soil health, water retention, biodiversity, visitor interpretation, closed-loop resource management, green finance and adaptive monitoring. This study therefore proposes special competent architecture, implementation roadmap and indicator set for regenerative landscape stewardship as an HRD and strategic HRM challenge.

Keywords: *circular bioeconomy; regenerative landscape stewardship; regenerative rural tourism; Azienda Agricola Model; green cities; urban agriculture; human resource development; strategic HRM; multiskilling; landscape observatories; ecomuseums; climate-resilient development.*

Introduction

Landscape as a living socio-ecological system

Landscape is not only scenery, countryside or a heritage asset. It is the territorial expression of soil processes, water cycles, biodiversity, food and energy systems, settlement patterns, cultural memory, labour relations, visitor behaviour, governance and technolo-

gical infrastructure. This interpretation is consistent with the European Landscape Convention tradition, which recognises the value of all landscapes, including natural, rural, urban, peri-urban, outstanding, and degraded landscapes (Council of Europe, 2000, 2024; UNISCAPE/IFLA Europe, 2026). The practical implication is that rural development, green cities and the urban-peri-urban-semi-rural-rurale ecological tran-

sition should be planned as one gradient. A vineyard, farm, wetland, city park, green roof, peri-urban food belt, ecomuseum route or tourism destination is never ecologically isolated. It depends on catchments, habitats, local labour markets, logistics, mobility, waste and biomass flows, social trust and the capacity of institutions to learn. The challenge is therefore to shift from sectoral projects to regenerative stewardship units that are able to manage ecological functions and human capabilities at the same scale (Cash et al., 2006; Cumming et al., 2006; Kreidlmayer et al., 2026). Climate change makes this shift urgent. Heat waves, drought, intense rainfall, floods, wildfire risk, soil erosion, pest pressure and biodiversity loss directly affect all types of landscapes. The IPCC emphasises that climate-resilient development requires integrated action across ecosystems, infrastructure, livelihoods, institutions and equity (IPCC, 2022, 2023). Recent urban and agricultural evidence reinforces the same point: cities need green-blue infrastructure and nature-based solutions, while farms and rural destinations need soil health, water retention, diversified production, heat-safety systems and local adaptation capacity (UN-Habitat, 2024, 2025; UNEP, 2024b; FAO and WMO, 2026).

From sustainable to regenerative: the conceptual distinction

The distinction between sustainable and regenerative approaches should not be reduced to marketing language. Sustainability is necessary but insufficient when

it is limited to reducing negative impacts, meeting minimum standards, improving efficiency or compensating for damage. Regeneration asks a stronger question: does the intervention increase the capacity of the landscape and its communities to renew themselves? In tourism, Bellato, Frantzeskaki and Nygaard (2023) and Bellato and Pollock (2025) warn that regenerative tourism is often simplified into the slogan of leaving a place better than it was found; the more demanding interpretation requires place-sourced governance, systems thinking, living-system relationships and transformation of the tourism logic itself. Regenerative stewardship therefore must be evidence-based. It can easily become greenwashing (or regenerative washing) when circular or nature-positive claims are made without ecological baselines, local participation, worker protection or transparent reporting. Landscape observatories, ecomuseums and living labs are important because they create an evidence space where ecological data, local knowledge, cultural narratives and HRD needs can be interpreted together (Marti, 2024; Ternell, 2024; Badia and Donato, 2023) (Table 1).

Circular bioeconomy as the operational engine of regeneration

The circular bioeconomy combines biological resources, circular material flows, and low-carbon innovation. In landscape stewardship it means using organic residues, biomass, process water, food waste, manure, pruning material, reeds, forestry residues and

Table 1. *Sustainability and regeneration as complementary but different management logics*

DIMENSION	SUSTAINABLE ORIENTATION	REGENERATIVE ORIENTATION
Primary aim	Reduce harm, increase efficiency and comply with standards.	Create measurable net improvement in ecosystem function, community wellbeing and resilience.
View of landscape	Resource base or destination asset to be conserved.	Living social-ecological system with reciprocal relations among people, land, water, culture and economy.
Circularity	Waste reduction and recycling where feasible.	Closed-loop, safety-gated resource systems that retain value locally and regenerate soil, water and livelihoods.
Tourism logic	Lower-impact visitor products.	Visitor experience as a co-produced contribution to stewardship, interpretation, restoration finance and local identity.
HR implication	Environmental training as an add-on.	HRD and strategic HRM as core operating systems for capability building, multiskilling, safety, participation and adaptive learning.
Verification	Input and compliance indicators.	Additionality indicators: soil organic matter, habitat integrity, water retention, circular material flows, local procurement, fair work, community benefit and heritage integrity.

urban organic streams as resources in a safety-gated cascade: prevention and reduction first, then reuse, bioactive recovery, feed or material routes where safe, compost, vermicompost, biochar, anaerobic digestion, renewable heat and power, and only then authorised disposal. This hierarchy is important because circularity is not automatically regenerative; biomass extraction or poorly managed by-product use can damage soil fertility, biodiversity or food security (UNEP, 2024a; Food and Land Use Coalition, 2023; Rehberger et al., 2023). Agricultural and food by-products are central to this project. Winery and vineyard residues illustrate the opportunity: grape pomace, skins, seeds, stems, lees, vinasse, prunings and process waters can support bioactive compounds, cosmetics, animal feed, soil improvers, biochar, vermicompost, water treatment and bioenergy, but only when feedstock variability, contaminants, moisture, storage, regulatory status and market feasibility are managed (Némethy et al., 2016; Kreidlmayer et al., 2026; Pena-Portillo et al., 2024). This points to a broader principle: valorisation must be designed as a regional system, not as isolated laboratory extraction or farm-level improvisation. Zero-waste policy is therefore both technical and organisational. It requires source separation, local logistics, shared infrastructure, quality control, LCA/TEA assessment, public-private procurement, community acceptance and skills. UNEPs Global Resources Outlook 2024 and Food Waste Index Report 2024 underline the wider systemic rationale: material use and food waste remain major drivers of the triple planetary crisis, so resource efficiency must be linked to changes in consumption, production and governance (UNEP, 2024a, 2024c).

Regenerative agriculture, urban agriculture and ecosystem remediation

Regenerative organic agriculture is a core land-use practice within the proposed framework. Its common practices include cover crops, reduced disturbance, organic amendments, crop rotation, agroforestry, crop-livestock integration, biodiversity strips, water retention and reduced reliance on synthetic inputs. The evidence base is not uniform across contexts, but recent reviews show consistent potential for soil health, biodiversity, water regulation and climate resilience when practices are adapted to local agroecological conditions and monitored over time (Giffard et al., 2022; Rehberger et al., 2023; EU CAP Network, 2024; Calderone et al., 2025). Urban agriculture and peri-urban agriculture extend this logic

into cities. They can support food security, local livelihoods, community cohesion, environmental education, stormwater retention, heat reduction, circular nutrient recovery and biodiversity when planned as part of green-blue infrastructure rather than as isolated gardens. Recent urban research stresses that benefits depend on scale, governance, soil and water quality, waste-safety rules, land tenure and integration with wider food-system planning (Dorr et al., 2023; UNEP, 2024d; UN-Habitat, 2025). Ecological remediation of degraded ecosystems and ecotones should be treated as a high-priority stewardship function. Ecotones-for example riverbanks, forest edges, vineyard-natural habitat boundaries, wetland-agricultural transitions and urban-rural interfaces - often contain high biodiversity and high conflict. They are sensitive to fragmentation, invasive species, nutrient runoff, trampling, heat and hydrological disturbance. Regenerative management should therefore restore habitat integrity, connectivity, native vegetation, soil structure, water retention and disturbance buffers while also managing visitor access and local livelihoods (IUCN, 2020; FAO et al., 2021; UN-Habitat, 2024).

The Azienda Agricola Model as a territorial template

The Azienda Agricola Model is a strong practical anchor because it does not treat agriculture, tourism, by-product use, heritage, marketing and local planning as separate silos. The original concept of oenotourism formulation links organic viticulture, ecological cycles, terroir, wine routes, cultural heritage, traditional crafts, gastronomy, on-site sales, training and landscape conservation into a micro-regional development model (Némethy et al., 2016). Later applications extend the model to multi-functional agriculture more generally, including renewable energy, zero waste, wastewater treatment, by products as feed or medicinal raw material, small-scale animal husbandry, local products, accommodation, educational services and cultural landscape management (Némethy et al., 2022; Némethy, 2026). Its importance for regenerative landscape stewardship lies in four points:

1. Place-based: value comes from terroir, ecology, local identity and living heritage rather than generic production.
2. Circular: residues, biomass, wastewater and service flows can become inputs for soil, energy, materials, education and tourism.
3. Multifunctional: production, hospitality, interpreta-

tion, restoration and direct sales support each other.

4. Networked: farms, artisans, municipalities, restaurants, accommodation providers, guides, protected areas, ecomuseums and universities form a shared value chain. This makes the model especially relevant for climate-resilient rural tourism and for peri-urban food belts that need to connect production, visitors, local procurement and landscape stewardship.

HRD/HRM nexus: the people system behind regenerative stewardship

Figure 2. extends the logic of the Azienda Agricola Model by focusing specifically on HRD and strategic HRM as the operating system through which regenerative intentions become organisational practice. The central HRD proposition is that regenerative landscape stewardship is a people-capability problem before it is a technology problem. Composting units, renewable energy systems, biochar facilities, nature-based solutions, precision irrigation, ecomuseum routes or observatory dashboards will fail if people do not know

how to operate them, interpret them, maintain them to visitors, use the data in decisions and share benefits fairly. Strategic HRM therefore becomes a stewardship function: it aligns recruitment, job design, training, performance management, occupational health, rewards and partnership governance with landscape outcomes (Renwick et al., 2013; Dumont et al., 2017; Amrutha and Geetha, 2020; ILO, 2025). This also changes the meaning of human resource development. HRD is not merely employee training. In regenerative landscape projects it includes capacity building for farmers, tourism operators, municipal staff, protected-area managers, guides, maintenance workers, artisans, community associations, schools and residents. It must build shared literacy in ecosystem function, circular flows, climate risks, cultural heritage and visitor behaviour. It also needs to create pathways for disadvantaged areas to retain youth, attract green skills and convert local knowledge into viable livelihoods (Cedefop, 2023, 2025; OECD, 2025; IRENA and ILO, 2024).

The Azienda Agricola Model for Regenerative Rural Tourism under Climate Change

An integrated territorial framework linking agriculture, tourism and ecosystem stewardship

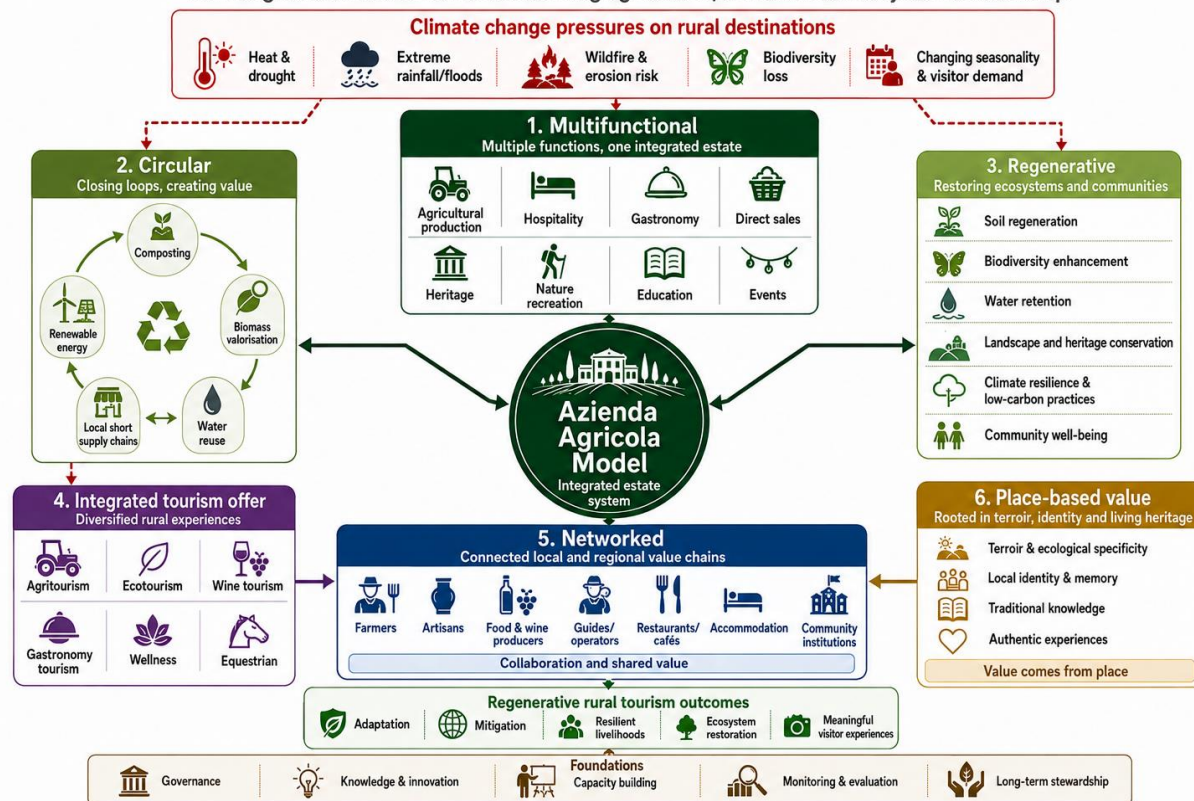
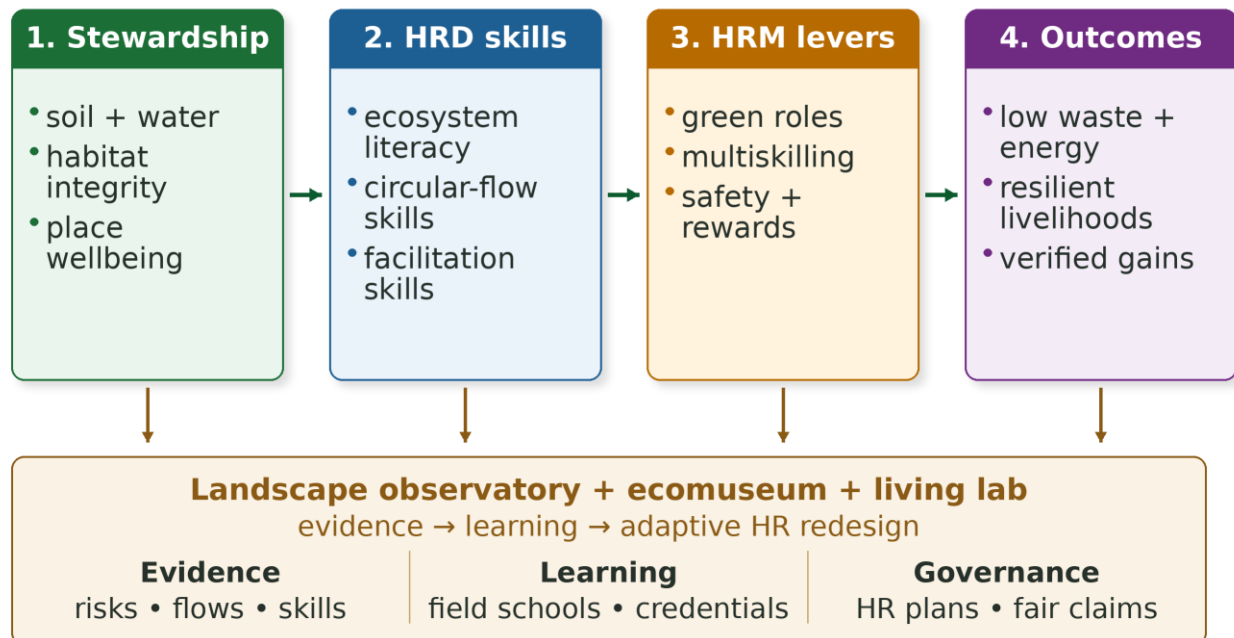


Figure 1. The Azienda Agricola Model emphasise the holistic approach: multifunctional estates, circular flows, regenerative practices, networked value chains, integrated tourism offers and place-based value all respond to climate pressures such as heat, drought, floods, erosion, biodiversity loss and changing seasonality. Source: own design, developed from Némethy et al., 2016.

Regenerative stewardship through HRD/HRM

Circular bioeconomy • Azienda Agricola model • urban–peri-urban–rural transition



Note: multiskilling adds capacity; certified high-risk tasks remain specialist-led.

Figure 2. Regenerative landscape stewardship and HRD/strategic HRM nexus. The figure shows HRD capabilities and strategic HRM levers as the operating system connecting circular bioeconomy, ecosystem-centred stewardship, landscape observatory data and verified regenerative outcomes. Source: own design.

Strategic HRM implications

A regenerative HRM strategy should be designed around the work that the landscape requires. This means moving from job descriptions based only on departments or seasonal tasks to competence maps based on ecological functions, circular processes, visitor functions and governance responsibilities. Five strategic HRM shifts follow.

- Workforce planning should start with the landscape system: soil restoration, water retention, biodiversity corridors, by-product streams, renewable energy, tourism seasonality, heat-risk periods, local procurement and monitoring tasks.
- Recruitment and onboarding should select for place attachment, learning ability, collaboration, safety awareness and ecological motivation, not only for narrow technical skills.
- Training should combine formal modules, micro-credentials, peer learning, demonstration farms, ecomuseum interpretation, landscape observatory dashboards and supervised field practice.
- Performance management should reward ecological

and social outcomes, including resource recovery, soil and water indicators, biodiversity actions, visitor education quality, local supplier development and worker safety.

- Employee wellbeing should be treated as a climate-resilience indicator. Heat stress, seasonal precarity, chemical exposure, fatigue, emotional labour in hospitality and mental-health pressures need preventive HR systems, not ad hoc responses.

The HRM system also must manage trade-offs. Multiskilling can increase resilience, but it should not become a way to underpay labour, dilute specialist expertise or overload workers. Certified tasks - food safety, pesticide handling, chainsaw work, electrical systems, water-quality compliance, medical herb processing, animal welfare, protected-species management or high-risk restoration works - require clear authority, supervision and legal competence. Regenerative HRM is therefore both flexible and protective.

Key competences for regenerative landscape stewardship

GreenComp provides a useful European reference for

sustainability competences, especially embodying sustainability values, embracing complexity, envisioning sustainable futures and acting for sustainability (Bianchi et al., 2022). ESCOs green skills labelling and the ILO/Cedefop/OECD green-skills agenda help trans-

late this into labour-market language (ESCO, 2022; Cedefop, 2023, 2025; ILO, 2025; OECD, 2025). For regenerative landscape stewardship, these frameworks need a place-based extension. The core competence clusters are listed in Table 2.

Table 2. *Competence architecture for circular bioeconomy-driven regenerative landscape stewardship.*

COMPETENCE CLUSTER	OBSERVABLE CAPABILITY AND HRD/HRM RELEVANCE
Systems and Earth-system literacy	Understands feedbacks among climate, soil, water, biodiversity, food, energy, settlements, tourism and labour; can identify scale mismatches and unintended consequences.
Landscape ecology and habitat integrity	Recognises ecotones, corridors, habitat fragmentation, invasive species risks, pollinator needs and restoration thresholds; works with specialists on biodiversity-sensitive management.
Regenerative soil and water management	Applies basics of soil organic matter, compost, cover crops, water retention, erosion control, irrigation efficiency, wastewater safety and drought adaptation.
Circular bioeconomy and by-product valorisation	Maps biomass and waste streams; understands cascade use, contamination gates, compost, biochar, biogas, extraction routes, LCA/TEA logic and zero-waste operations.
Renewable energy and energy-mix literacy	Can connect solar, bioenergy, biogas, heat pumps, geothermal, wind or district systems with farm, hospitality and community energy demand while respecting food-biomass trade-offs.
Climate-risk and adaptation competence	Uses local climate scenarios, heat-health plans, flood/drought/wildfire risk mapping and nature-based solutions in operational planning.
Regenerative tourism and interpretation	Turns soil, water, biodiversity, heritage and circular practices into authentic visitor experiences without commodifying community identity or sensitive habitats.
Cultural heritage and ecomuseum practice	Documents tangible and intangible heritage; supports local crafts, gastronomy, memory, routes and participatory learning as socio-economic recovery assets.
Data, GIS and landscape observatory skills	Collects and interprets indicators on soil, water, biodiversity, visitor flows, waste, energy, procurement, labour safety and community benefits.
Community facilitation and conflict mediation	Works with farmers, residents, municipalities, businesses, NGOs and visitors to manage trade-offs, co-design projects and maintain social legitimacy.
Strategic HRM and learning design	Builds competence matrices, job-rotation plans, mentoring, microcredentials, safety systems, fair rewards and regenerative performance indicators.
Green entrepreneurship and finance	Develops viable value propositions, cooperative models, local procurement, ecosystem-service payments, grants, blended finance and transparent benefit sharing.
Regulation, safety and ethics	Understands relevant rules for food, feed, water reuse, waste, cosmetics, plant protection, occupational safety, nature protection, heritage protection and data governance.
Multiskilling and adaptive operations	Combines complementary roles across seasons - for example farm work, visitor interpretation, monitoring and circular operations - while respecting certification boundaries.
Reflective and decolonial learning	Questions power, greenwashing and extractive narratives; respects indigenous, local and traditional knowledge and acknowledges uncertainty in regenerative claims.

The importance and viability of multiskilling

Multiskilling is not simply a labour-saving device. In regenerative landscape stewardship it is a resilience strategy. Rural and peri-urban enterprises are often small, seasonal and network-dependent. They cannot employ a separate specialist for every circular, ecological, tourism, digital and heritage function. At the same time, climate volatility creates irregular work peaks: heat waves change work schedules, drought affects irrigation and visitor safety, heavy rainfall damages trails, and harvest or tourism seasons shift. Multiskilled workers and managers can move across functions, interpret problems earlier and keep value in the territory. The viable model is a T-shaped skill system. Everyone shares a foundation in climate, ecosystem, safety, circularity and place-based values. Each person then develops one or two special skills, such as regenerative soil management, hospitality, guide interpretation, GIS monitoring, composting/biogas operation, heritage documentation, renewable-energy maintenance, local food processing, ecomuseum education or community facilitation. The network as a whole retains deep expertise through universities, protected-area authorities, extension services, certified technicians, cooperatives and public agencies. This creates a practical HRD agenda: com-

petence audits, modular training, job rotation, mentoring, seasonal learning calendars, microcredentials, peer-to-peer farm visits, living-lab experimentation and recognition of prior local knowledge. It also improves inclusion. Disadvantaged rural areas can use ecomuseums, observatories and regenerative tourism to create roles for youth, women, older workers, artisans, smallholders and people with place-specific knowledge who may not fit conventional high-specialisation labour markets (Badia and Donato, 2023; Némethy et al., 2020; UNESCO, 2022).

Landscape observatories and ecomuseums as HRD infrastructure

Landscape observatories are not only technical monitoring institutions. They can become strategic HRD infrastructure because they turn dispersed environmental and socio-economic signals into shared learning. Ternell (2024) describes observatories as data stores, monitoring tools, collaboration platforms and catalysts for innovation; the Catalan model also shows how observatories can connect public authorities, research bodies, NGOs, professionals and citizens around landscape policy and public awareness (Marti, 2024; Observatori del Paisatge de Catalunya, 2026). A regenerative observatory should track at least

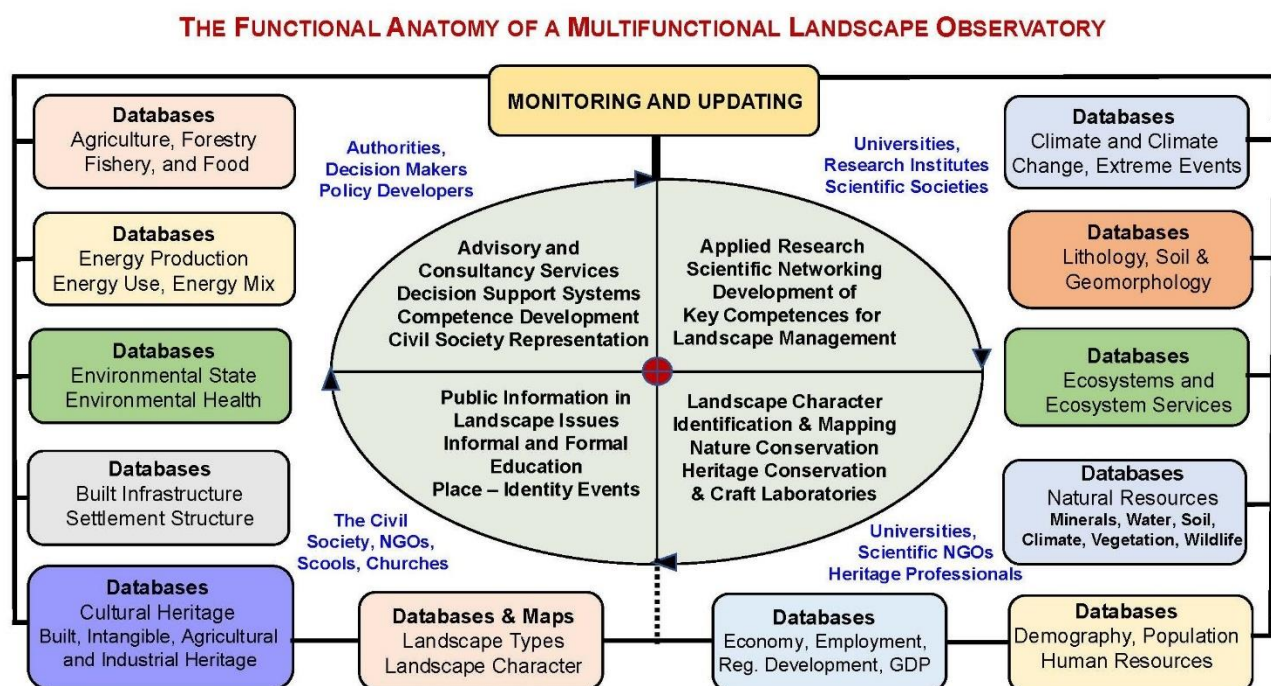


Figure 3. Landscape observatories are multi-sectoral knowledge platforms that monitor landscape changes, bridge scientific research with public policy, and actively engage civil society to foster regenerative landscape stewardship. Source: adopted from Ternell et al. (2024)

six indicator families: ecosystem condition, climate risk, circular resource flows, visitor pressure, socio-economic benefit and workforce capability. Its dashboards can support carrying-capacity assessments, route planning, heat-risk warnings, soil and water monitoring, circular-bioeconomy feasibility, habitat connectivity, training needs and verification of regenerative claims. Ecomuseums complement observatories because they translate data and heritage into lived experience. The concept of Balaton Ecomuseum illustrates an integrated cultural landscape approach in which herbal medicine, wine culture, gastronomy, crafts, biodiversity, thermal culture, routes, education and local products become a participatory system rather than a single museum object (Némethy et al., 2020). In disadvantaged areas this matters because ecomuseums can support socio-economic recovery through training, visitor interpretation, local product development, community pride, youth engagement and new forms of heritage-based entrepreneurship.

Renewable energy mix and bioenergy safeguards

Renewable energy is essential to the framework, but it should be treated as an energy mix rather than a single-technology solution. Solar PV, solar thermal, heat pumps, geothermal, wind, small hydro where ecologically acceptable, biogas, sustainable biomass and waste-to-energy routes can support farms, hospitality, food processing, cold storage, electric mobility and community facilities. IEAs Renewables 2024 and

Renewables 2025 reports show strong growth in renewable power but also stress grid, permitting, financing and supply-chain constraints (IEA, 2024, 2025). IRENA and ILO (2024) underline that renewable energy expansion is also a labour-market transition requiring skills, decent work and inclusive planning. Bioenergy deserves special attention because it connects directly to agricultural residues, forestry residues, manure, wastewater sludge and organic wastes. However, bioenergy is indispensable but should not be exclusive: it must be part of complex renewable systems to avoid conflict between food production, biomass production and ecosystem health (Némethy, 2018). This aligns with current circular-bioeconomy concepts: use residues and by-products first, avoid land conversion for energy crops where it harms food security or biodiversity, and evaluate impacts through LCA, local air-quality safeguards and community benefits.

Implementation roadmap for projects and regions with particular emphasis on HRM issues

Regenerative landscape stewardship translates complex ecological goals into a logical, phased, and manageable execution plan. The strategy can be well outlined with a roadmap (Table 3) that ensures crucial steps are taken, including foundational diagnostics, capability building for the local workforce, strategic alignment of human resources, and the creation of cooperative, scalable governance structures.

Table 3. *Implementation roadmap: circular bioeconomy-driven regenerative landscape stewardship.*

PHASE	KEY ACTIONS
1. Diagnose the landscape system	Map ecological boundaries, degraded areas, ecotones, water flows, biomass streams, visitor flows, energy demand, cultural assets, governance mandates and labour-market conditions.
2. Establish the learning infrastructure	Create or strengthen a landscape observatory, ecomuseum, living lab or university-community platform for monitoring, education and participatory decision-making.
3. Build the HRD competence matrix	Assess current skills, identify critical gaps, design microcredentials, define certified-task boundaries and plan multiskilling pathways across seasons.
4. Pilot circular-regenerative operations	Start with visible, measurable loops: composting, vineyard/pruning biomass, food-waste prevention, water retention, biodiversity strips, regenerative tourism interpretation, renewable-energy pilots.
5. Align strategic HRM	Integrate regenerative competences into recruitment, onboarding, job design, performance indicators, reward systems, occupational safety, health protocols and leadership development.
6. Scale through cooperative governance	Create clusters among farms, hotels, restaurants, schools, municipalities, protected areas, waste operators, energy providers, artisans and DMOs.
7. Verify and adapt	Publish indicators, compare baselines, report trade-offs, update training, redesign weak loops and avoid unverified regenerative claims.

Suggested indicator families

Table 4 sets out a practical indicator framework for assessing regenerative landscape stewardship across ecological, economic, social and organisational dimensions. Rather than measuring environmental performance in isolation, the indicators connect ecosystem recovery with circular resource use, renewable energy transitions, tourism and heritage value, workforce de-

velopment, worker wellbeing and participatory governance. Together, these indicator families help track whether landscape-based initiatives are not only reducing harm, but actively restoring natural systems, strengthening local economies, improving skills and employment conditions, and building accountable, community-centred stewardship practices

Table 4. *Indicators linking ecological performance, circular economy, tourism value and HRD/HRM performance.*

INDICATOR FAMILY	EXAMPLES
Ecosystem indicators	Soil organic matter, infiltration, erosion risk, water quality, habitat connectivity, biodiversity, pollinator presence, invasive species, native vegetation survival, carbon stocks where robustly measured.
Circularity indicators	Organic residues prevented, recovered or valorised; compost/biochar/biogas outputs; food waste per visitor/night; water reused safely; local material loops; avoided disposal.
Energy indicators	Renewable share, energy intensity per product and visitor-night, storage capacity, energy poverty reduction, biomass sustainability, emissions estimates.
Tourism and heritage indicators	Visitor dispersion, seasonality, interpretation quality, local procurement, community satisfaction, heritage condition, ecomuseum participation, carrying-capacity thresholds.
HRD indicators	Competence gaps closed, training hours, microcredentials, job rotation, retention, participation in observatory/ecomuseum learning, digital/GIS literacy, regenerative leadership capability.
Worker wellbeing indicators	Heat-stress incidents, hydration/shade compliance, fair wages, workload balance, safety incidents, seasonal employment stability, inclusion of disadvantaged groups.
Governance indicators	Cross-sector agreements, public reporting, community benefit sharing, participatory planning sessions, conflict resolution, auditability of regenerative claims.

Risks, limits and safeguards

Regenerative practice can create environmental, social and economic value, but it also introduces risks when concepts are applied too quickly, too broadly or without accountability. Safeguards are therefore essential to ensure that regeneration does not become a branding exercise, shift burdens onto workers and communities, or create unintended ecological harm. The following risks should be assessed early, managed through clear governance, and monitored through transparent evidence, regulation and participation:

- **Greenwashing/Regenerative-washing:** Avoid claims that cannot be linked to baselines, additionality, community participation and independent or public reporting.
- **Skill overload:** Multiskilling must be paired with fair pay, time for learning, supervision and specialist support.

Safety and legality: By-product use, medicinal plants, animal feed, wastewater reuse, food processing, bioenergy and visitor access require regulatory gates.

- **Biodiversity trade-offs:** Circular biomass demand, tourism access, renewable-energy infrastructure or urban agriculture can harm habitats if poorly sited.
- **Equity risks:** Regeneration fails if ecological indicators improve while workers face heat stress, local producers absorb risk or communities lose control over heritage narratives.
- **Measurement uncertainty:** Soil carbon, biodiversity and social value should be reported transparently with methods, baselines and uncertainty.

Conclusions

Circular bioeconomy-driven regenerative landscape stewardship provides a coherent way to connect rural development, green cities, urban-peri-urban-rural eco-

logical transition, regenerative organic agriculture, urban agriculture, ecosystem remediation, regenerative tourism, renewable energy and cultural heritage. Its practical value is strongest when framed through the Azienda Agricola Model: a multifunctional, circular, place-based and networked estate/destination system that links production, hospitality, heritage, education, local products, ecosystem services and regional planning. The decisive implication for HRD and strategic HRM is that regeneration depends on people systems. New technologies and circular facilities matter, but they only become regenerative when workers, managers, communities and institutions develop the competences to operate, adapt, monitor and govern them. Multiskilling is viable and important because regenerative landscapes are complex, seasonal and networked. However, it must be designed as a fair T-shaped competence architecture with specialist support, not as unprotected work intensification. The main contribution can be framed as follows: regenerative landscape stewardship is a capability-based territorial transition. HRD and strategic HRM are not support functions; they are the mechanisms through which circular bioeconomy, ecosystem restoration, climate resilience and place-based tourism become durable, auditable and socially just.

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