





## Article

# “It’s Years of Walking, of Reading the Forest”: White Truffle Hunters’ Perception of Socio-Ecological Change in Langhe and Roero, NW Italy

Mousaab Alrhoun<sup>1</sup> , Monica Zanaria<sup>2</sup> , Federico Elia<sup>1</sup>, Naji Sulaiman<sup>1,\*</sup> , Andrea Pieroni<sup>1,3,\*</sup>   
and Paolo Corvo<sup>1</sup>

<sup>1</sup> University of Gastronomic Sciences, Piazza Vittorio Emanuele II 9, 12042 Pollenzo, Italy; m.alrhoun@unisg.it (M.A.); f.elia@studenti.unisg.it (F.E.); p.corvo@unisg.it (P.C.)

<sup>2</sup> Department of Social and Cultural Anthropology, Facultad de Filosofía, Universidad Nacional de Educación a Distancia (UNED), Paseo Senda del Rey 7, 28040 Madrid, Spain; mzanaria1@alumno.uned.es

<sup>3</sup> Department of Medical Analysis, Tishk International University, Erbil 4001, Iraq

\* Correspondence: n.sulaiman@unisg.it (N.S.); a.pieroni@unisg.it (A.P.)

## Abstract

Truffle hunting in the Piedmontese landscapes of Northern Italy is not merely a foraging practice but a deeply embodied and multispecies relationship grounded in intergenerational knowledge, sensory attunement, and emotional connection to forest ecologies. This study draws on qualitative interviews with local truffle hunters (*Trifulau*) to examine how socio-ecological transformations driven by land privatization, vineyard expansion, monocultural hazelnut plantations, and tourism disrupt these traditional practices. Thematic analysis reveals five dimensions of transformation: ecological estrangement, dispossession and exclusion, erosion of knowledge transmission, commodification and spectacularizing, emotional and ontological loss. Hunters describe a loss of sensory orientation, access to ancestral commons, and a breakdown of the human–dog forest relational web, accompanied by feelings of grief, alienation, and identity erosion. We argue that these changes undermine ecological sustainability and threaten emotional, cultural, and epistemological sustainability. The findings call for a broadened understanding of sustainability, one that recognizes affective, multispecies, and place-based knowledge systems as vital to sustaining cultural landscapes. This study contributes to debates on rural transformation, non-material heritage, and the invisible costs of commodifying traditional ecological practices in globalizing economies.

**Keywords:** cultural sustainability; ecological estrangement; emotional heritage; knowledge transmission; multispecies ethnography; Piedmont; rural transformation; truffle hunting



Academic Editor: Asterios Bakolas

Received: 27 June 2025

Revised: 13 August 2025

Accepted: 4 September 2025

Published: 7 September 2025

**Citation:** Alrhoun, M.; Zanaria, M.; Elia, F.; Sulaiman, N.; Pieroni, A.; Corvo, P. “It’s Years of Walking, of Reading the Forest”: White Truffle Hunters’ Perception of Socio-Ecological Change in Langhe and Roero, NW Italy. *Sustainability* **2025**, *17*, 8053. <https://doi.org/10.3390/su17178053>

**Copyright:** © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The sustainability of white truffle hunting, a deeply rooted cultural and ecological practice in the Langhe and Roero regions of Northwestern Italy, is undergoing significant transformation. White truffles (*Tuber magnatum* Pico), belonging to the Ascomycota phylum, form ectomycorrhizal associations with specific tree species, contributing to forest ecosystem health and biodiversity. Traditionally, the harvesting of truffles, often referred to as truffle hunting, has reflected a long-standing interplay between human communities and their environments. This practice, steeped in local knowledge and heritage, has served

not only as an economic activity but also as a form of environmental management rooted in sustainability [1].

However, truffle hunting is increasingly challenged by modern agriculture, economic globalization, tourism, and land-use change. In southern Europe, especially in the Langhe and Roero areas of Piedmont, noticeable shifts are occurring within the ethnoecological framework that has long sustained truffle harvesting. Traditional methods and knowledge, passed down through generations of *Trifulau* (truffle hunters), are now being disrupted by the extension of mechanized cultivation techniques and rising market demands [2]. While modern farming and plantation-style truffle production may enhance short-term yields, they often do so at the expense of local biodiversity and threaten the long-term viability of wild truffle ecosystems [3,4].

At the same time, the growing global appetite for truffles has intensified tourism, gentrification, and the commodification of truffle landscapes. Rural areas that once relied on community-based, subsistence foraging is increasingly integrated into market-driven economies. As economic incentives grow, ecological considerations are often sidelined, gradually eroding traditional environmental knowledge and land stewardship practices [5]. Our prior fieldwork conducted a decade ago in these regions already documented the early signs of such transitions, which today are even more pronounced. Changes in land ownership, the influx of outsiders, and the pressure to commercialize cultural heritage reshape the physical landscape and the social dynamics of truffle-hunting communities [6].

As international demand for white truffles drives prices upward, local communities face increasing internal pressures and external competition, with consequences for social cohesion and ecological resilience [7]. These transformations raise critical questions about truffle hunting's future as a sustainable socio-ecological system. We use the term 'social-ecological systems' to describe the intertwined nature of human and ecological domains, where changes in one inevitably affect the other [8]. 'Social-ecological transformations' refer to substantial shifts in the configuration and interactions of these systems over time, often linked to land use change, economic pressures, or cultural transitions [9].

Ethnoecology provides a valuable lens to analyze this evolving relationship between humans and the truffle ecosystem. Local ecological knowledge (LEK) plays a crucial role in maintaining sustainable harvesting practices and fostering an understanding of the environmental conditions necessary for truffle growth [10]. In the face of ongoing modernization, it is imperative to explore how traditional and contemporary practices might coexist and contribute to a more sustainable future for both truffle landscapes and the communities that depend on them [11]. We suppose that we need to situate truffle hunting within the framework of biocultural heritage, which recognizes the inseparable linkages between biological diversity and cultural practices as explained by [12]. Truffle hunting is not only an ecological activity but also a cultural tradition shaped by accumulated Local Ecological Knowledge (LEK), sensory experience, and intergenerational transmission. Understanding these practices through a biocultural lens allows us to highlight how socio-ecological transformations threaten not only biodiversity but also cultural identity and knowledge systems embedded in these landscapes [13].

One important mechanism linking tourism to ecological change is the expansion of viticulture driven by the demand for wine tourism. This shift often results in the restriction of secondary forests to narrow margins, reducing the available habitat for truffle-symbiotic trees. As these marginal zones are increasingly encroached upon, the spatial distribution of viable truffle grounds contracts, disrupting both ecological processes and traditional harvesting routes. Similar pressures have been documented in wild plant systems in the Western Alps, where tourism-driven land use changes lead to habitat reduction and biodiversity loss [14].

The intricate relationship between truffle hunting, sustainability, and human ecology is increasingly strained by modern forces that prioritize short-term profit over long-term stewardship. The urgent challenge is to reconcile economic development with ecological integrity and cultural sustainability. This research contributes to this discourse by illuminating how local communities are navigating these transitions and what pathways might support the continued viability of truffle hunting in a rapidly changing world.

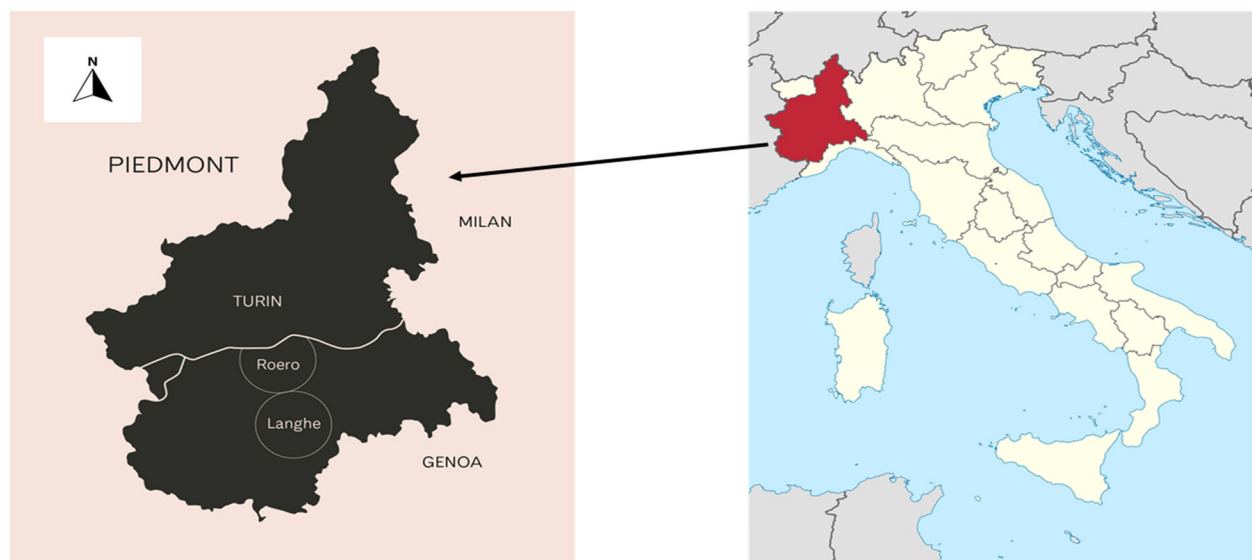
This study aims to:

1. Investigate the changing ecological conditions underpinning wild white truffle hunting.
2. Assess the evolving modes of knowledge transmission and harvesting practices among local truffle hunters.
3. Analyze local perceptions of the expanding tourism industry, particularly regarding gentrification and the commercialization of truffle hunting in the Langhe and Roero regions.

## 2. Materials and Methods

### 2.1. Fieldwork and Participant Selection

This research is grounded in a multisided ethnographic approach conducted in the truffle-producing areas of southern Piedmont, Italy, with a particular focus on the Langhe, Roero, and Alta Langa regions (Figures 1–3). The objective was to explore the affective, sensory, and ecological dimensions of truffle hunting as experienced by local *trifulau* (truffle hunters), and to understand how recent transformations, environmental, economic, and cultural, have disrupted these embodied practices and their transmission.



**Figure 1.** Study area map within the map of Italy.





**Figure 2.** Typical landscape of the Piedmontese Langhe, with vineyards and picturesque villages (Photo credit M. Zanaria).



**Figure 3.** Hazelnut groves around Alba (Photo credit M. Zanaria).

The study involved long-term immersion in truffle landscapes and communities, with repeated stays across multiple seasons to capture both temporal and ecological rhythms of the practice. A total of 25 semi-structured interviews were conducted with truffle hunters aged between 50 and 90, many of whom had engaged in the practice for multiple decades. Participants were identified through snowball sampling, informal networks, and field

presence at local events and forest sites. To capture generational shifts and disruptions in knowledge transmission, special attention was paid to intergenerational family dynamics, with interviews conducted with elderly hunters and their descendants. In Langhe, the largest group consists of individuals aged 61 to 70 (11 persons), followed by those over 70 years old (6 persons), and finally those aged between 50 and 60 (4 persons), totaling 21 participants. In contrast, the Roero region has a smaller sample of four individuals, predominantly over 70 (3 persons), with only one aged between 61 and 70 and none in the youngest age group. Overall, among the 25 individuals surveyed, the 61 to 70 age group is the most represented, followed by the over-70 group, and the smallest group includes those aged 50 to 60. This distribution highlights an older demographic in both regions, with Langhe exhibiting a larger and more evenly distributed age range than Roero, where the population is skewed towards older individuals. (See the characteristics of the sample in Table 1).

**Table 1.** The characteristics of the participant sample in the study.

Area	Visited Locations	Age of the Study Participants		
		50–60	61–70	>70
Langhe	Diano d’Alba, Dogliani, Alba, Monforte, Cortemilia, Verduno, and Barbaresco	4	11	6
Roero	Santa Vittoria and Vezza d’Alba	0	1	3

## 2.2. Data Collection and Analytical Framework

Data collection involved multiple complementary methods designed to capture the complex socio-ecological and sensory dimensions of truffle hunting: Semi-structured interviews were conducted with participants who provided informed consent; these interviews were recorded and fully transcribed. The discussions explored themes including forest knowledge, emotional and sensory relationships with the landscape, human–canine partnerships, ecological changes, access challenges, commercialization, and intergenerational knowledge transmission. Participant observation occurred during truffle hunting excursions, including night-time forays, informal social interactions, and moments of canine training and foraging. Detailed fieldnotes documented not only verbal communication but also embodied gestures, spatial dynamics, emotional responses, and environmental atmospherics.

Sensory ethnography methods were employed to closely attend to sounds, smells, textures, and environmental conditions, illuminating how sensory memory and environmental attunement shape truffle-hunting practices. Photographic and cartographic documentation recorded landscape changes, access restrictions, and habitat transformations such as fencing, agricultural expansion (vineyards, hazelnuts), and deforestation.

The analytical approach combined hermeneutic-phenomenological methods with thematic coding, emphasizing the practice’s affective, ontological, and multispecies aspects. NVivo 15 software facilitated clustering of narrative themes, but the interpretive process prioritized iterative, close readings of interviews and fieldnotes. Recurring metaphors related to disorientation, loss, silence, memory, and ecological grief were interpreted not as isolated emotional states but as manifestations of broader socio-ecological and ontological shifts. Table 2 summarizes the key analytical themes alongside the guiding questions that shaped data collection and interpretation, linking empirical materials to core research concerns. This study draws on interdisciplinary scholarship in environmental anthropology, rural studies, and the anthropology of knowledge and heritage, engaging with debates

on ecological estrangement, landscape dispossession, sensory sustainability, and rural gentrification [15–23]. Ethical practices were adhered to throughout the data collection process following the Code of Ethics of the International Society of Ethnobiology [24]. All participants provided informed oral consent. To ensure confidentiality and protect sensitive knowledge about forest resources, participant identities and precise locations have been anonymized or generalized. The research adhered to ethical guidelines of the Ethnobotany Society and maintained a commitment to respectful, reciprocal engagement with local communities.

**Table 2.** Key Analytical Themes and Guiding Questions Derived from Data Sources and Methods.

Themes/Data Collection Focus	Data Sources/Methods	Inferred Analytical Questions
Truffle knowledge & harvesting practices	Semi-structured interviews with harvesters, participant observation, and informal conversations	How do harvesters describe their knowledge and practices related to truffle hunting? How has this knowledge been transmitted or disrupted?
Affective & sensory experiences of the landscape	Interviews and participant observations during forest walks	How do harvesters experience and emotionally relate to the forest environment? What sensory changes are perceived due to environmental and social changes?
Access to truffle grounds & legal/social restrictions	Semi-structured interviews	How have changes in access rights affected harvesters' ability to forage? What conflicts or exclusions arise from land ownership and regulations?
Ecological and environmental changes	Interviews, field observations, and ecological notes	What environmental changes do harvesters notice in the forest? How do these changes impact truffle abundance and quality?
Economic and commercialisation dynamics	Interviews, market observations, and informal conversations	How is truffle harvesting commercialised? What economic pressures and market dynamics influence harvesting practices?
Knowledge transmission and generational changes	Interviews, community discussions	How is traditional ecological knowledge transmitted across generations? What factors contribute to its erosion or persistence?
Social conflicts and gentrification effects	Interviews, participant observation, and local media review	What social conflicts exist around truffle hunting? How does gentrification impact local harvesting communities?

### 3. Results and Discussion

The thematic analysis identified five key themes reflecting participants' experiences related to truffle hunting and their relationship with the forest environment. The percentages indicate the proportion of respondents referring to each theme and are intended to illustrate thematic prevalence (Table 3)

**Table 3.** Key themes reflecting participants' experiences related to truffle hunting and their relationship with the forest environment.

Theme	Subtheme	Mentions	Percentage of Participants
Ecological Estrangement	Loss of familiar landscapes	22	85%
	Sensory disorientation (sounds, smells, textures)	17	65%
	Multispecies disconnection (dogs' confusion, broken forest dialogues)	15	58%
Dispossession and Exclusion	Privatisation and fencing of truffle grounds	19	73%
	Loss of access to ancestral paths and commons	16	62%
	Economic and emotional displacement	13	50%
Erosion of Knowledge Transmission	Generational discontinuity (youth disinterest, lifestyle mismatch)	18	69%
	Disruption of embodied and affective pedagogy	14	54%
	Digital media replacing traditional learning	11	42%
Commodification and Spectacularizing	Tourist-oriented performances of truffle hunting	16	62%
	Truffle hunters as staged local figures	13	50%
	Forest as a sanitised backdrop	12	46%
Emotional and Ontological Loss	Grief, alienation, and identity erosion	20	77%
	Forest no longer offering healing, peace	17	65%
	Feeling of being a stranger in familiar spaces	15	58%

Ecological Estrangement was the most frequently mentioned, with participants expressing a strong sense of loss regarding familiar landscapes (85%) and sensory disorientation caused by changes in sounds, smells, and textures (65%). This estrangement also included disruptions in multispecies interactions, such as dogs' confusion and the breakdown of forest dialogues (58%).

The theme of Dispossession and Exclusion highlighted issues of privatisation and fencing of truffle grounds (73%), which limited access to ancestral paths and communal lands (62%), resulting in economic and emotional displacement for many (50%). Participants also reported an erosion of Knowledge transmission, characterised by generational discontinuity, where youth showed disinterest or lifestyle mismatches (69%), alongside disruptions in traditional, embodied pedagogies (54%), and the increasing replacement of these by digital media (42%). The theme of Commodification and spectacularizing illustrates how tourism has transformed local practices, with many noting tourist-oriented performances of truffle hunting (62%) and the staging of hunters as local figures (50%), effectively sanitising the forest as a backdrop (46%). Lastly, Emotional and Ontological Loss captured feelings of grief, alienation, and identity erosion (77%), alongside the perception that the forest no longer provides healing or peace (65%), and a pervasive sense of estrangement from once familiar spaces (58%). These interconnected themes underscore the complex socio-ecological transformations impacting the environment and community identity.



### 3.1. The Loss of Hunting Serendipity and the Ecological Estrangement in Truffle Landscapes

The loss of truffle grounds is experienced not only as environmental degradation but also as a profound spatial and emotional dislocation among the Piedmontese truffle hunters. The truffle forest is not merely a habitat but a relational field built across decades of bodily familiarity, shared access, and multispecies collaboration. When access is lost through privatisation, fencing, or vineyard expansion, it is not only a question of land ownership but one of ecological exile.

One elderly informant described how the landscape that once offered him complete bodily orientation has become fractured and increasingly alien:

*“I used to walk across this hillside with my eyes closed. Every tree, every root, every shadow was part of my map. Now, there are fences, walls, pools, and dogs that are not mine everywhere you go. Even my dog gets confused; he doesn’t recognise these places anymore because they have changed under his nose.”* (M, 84, Roero)

In this sense, the *trifulau* experiences a kind of affective dispossession, where intimate landscapes no longer “speak” to their embodied memory. The displacement is not simply legal or economic; it is ontological, refers to a fundamental change in the very being or existence of the truffle hunter’s relationship with the landscape, which means that the loss is not just about legal ownership or economic access to land but about a deep disruption in how the truffle hunters exist in and relate to their environment, their sense of identity, belonging, and embodied knowledge is altered or erased. Privatisation and fragmentation intensify this estrangement. Once embedded in informal commons regimes where “a path was for everyone,” access is now systematically enclosed. Another hunter offered a deeply personal reflection:

*“For fifty years, I have walked these paths. My father walked them before me, and my grandfather before him. Now, a small sign appears, saying I cannot enter anymore. But I know these places better than the people who bought them.”* (M, 67, Alta Langa)

As many informants stressed, this rupture is deeply tied to the transformation of the surrounding landscape. The massive expansion of hazelnut monocultures has replaced oak and poplar forests and altered the substrate that allows truffles to emerge. The truffle’s mycorrhizal web is severed through deep ploughing and chemical interventions. As one informant lamented:

*“When they prepare the land for hazelnuts, they dig so deep that they destroy everything underground. The roots, the water veins, the life under the soil, all gone. After that, you can forget about truffles. The land becomes dry, dead, a desert for mushrooms.”* (M, 74, Roero). *“There used to be music in the woods. The birds, the insects, even the fog moving among the trees. Now there is just emptiness. The vines take over, but they don’t sing.”* (M, 76, Barbaresco)

This loss of acoustic and atmospheric cues reveals the depth of sensory dislocation inherent in ecological estrangement. Far from being a simple foraging act, Truffle hunting is founded upon intricate forms of sensorial attunement. Human and canine hunters become unmoored without the forest’s multispecies signals. Finally, several hunters reflect on how forces beyond their control drive these transformations:

*“It is not the forest that has changed itself; it is people who have changed the forest. They are making money, building new villas, and expanding the vineyards all the way to the edge of what used to be sacred woods. And for us, there is nothing left but memories.”* (M, 70, Alba) (Figures 4 and 5)





**Figure 4.** In this picture of the Langhe hills, it is possible to see what is left of the woods and the truffles' hunting areas (generally impervious areas within vineyards and hazelnut groves) (Photo credit M. Zanaria).



**Figure 5.** Small wood located on the hills around Alba, owned by a truffle hunter (Photo credit M. Zanaria).

Increased tourist presence in truffle landscapes can also lead to direct habitat degradation. Inexperienced visitors may inadvertently compact soils, disturb delicate mycorrhizal

networks, and disrupt microhabitats essential for truffle formation. Additionally, tourism infrastructure, such as trails and hospitality facilities, can alter local microclimates, impacting truffle phenology and occurrence. Similar pressures have been observed in Northern Italy with wild edible plants, where a growing demand from high-end restaurants and tourism-oriented gastronomy has driven shifts in foraging intensity and site accessibility. As documented in Lombardy, such commercialization, while often framed as a revival of tradition, can diverge from local ethnobotanical heritage and raise concerns over the sustainability of harvesting practices [25].

The *trifulau* thus articulates a form of ecological grief intimately linked to processes of capitalist rural transformation. What disappears is not only the truffle but an entire relational epistemology rooted in embodied ecological practices. The traditional practice of truffle hunting in the Piedmontese landscape has long embodied a profound multisensory and emotional relationship between humans, dogs, forests, and the invisible fungal world. However, many interviewees express a growing sense of rupture in this intricate web, which can be conceptualized as a progressive erosion of emotional and sensory sustainability, a dimension often overlooked in conventional ecological or economic narratives. Several interlocutors describe how the intensification of competition, the influx of untrained foragers, and the growing commercialization of truffles have led to a diminished affective connection to the forest:

*“It used to be a dialogue with the woods; now it’s a race against others. The silence is broken, the peace is gone. I feel like a stranger in the places where I grew up.”* (M, 59, Diano d’Alba)

*“Before, I could sit for hours, listening, feeling the soil under my hands, smelling the damp leaves. . . now there is no time. People run with their dogs like it’s a sport, not a search.”* (M, 75, Alba)

The sensory harmony between the hunter, the dog, and the forest environment, which some might call a form of *embodied ecological knowledge*, is increasingly compromised. Searching for truffles traditionally involved a deep attunement to subtle environmental cues: the scent in the air, the moisture of the ground, the behaviour of the dog, even the sounds of nocturnal life. As one elderly hunter laments:

*“When I was young, my father taught me to feel the breath of the earth. The cold, the humidity, even the wind had a meaning. Now the machines make noise, the ground is dry, the dogs are often confused.”* (66, M, Alba)

Moreover, losing these sensory dimensions directly affects emotional well-being and identity. Many respondents describe a sense of grief and alienation:

*“I no longer recognize the forest. The places have changed, the people have changed. It’s as if something inside me is dying as well.”* (78, M, Verduno)

*“Truffle hunting was a way to find balance. Without it, or with the way it has become, I feel anxious instead of peaceful. The woods no longer heal me.”* (56, M, Dogliani)

This emotional and sensory sustainability, rooted in stable intergenerational knowledge, slow and respectful interaction with the ecosystem, and the intimate partnership with the dog, constitutes a form of non-material heritage now under severe threat. As these testimonies suggest, the commodification and spectacularizing of truffle hunting not only endanger ecological balance but also undermine the very experiential essence that has sustained the practice for many decades. A subtler yet profound impact lies in the erosion of emotional embedding with nature. Truffle hunting historically offered prolonged, serendipitous engagements with the forest, an embodied rhythm of immersive practice.



As the practice becomes more market-driven and time-efficient, these slow, affective encounters diminish, weakening one of the central experiential pillars of local human–nature relationships [26].

### 3.2. The Disruption of Local Knowledge Transmission

Among Piedmontese truffle hunters, knowledge transmission has historically unfolded as a long, embodied apprenticeship, shaped by repeated exposure to specific forest ecologies, subtle cues, and intergenerational immersion. This pedagogical ecology was not structured through formal instruction but embedded in the rhythms of daily co-presence with humans and nonhumans. However, in recent decades, this delicate chain of transmission has been increasingly disrupted. Informants consistently articulate how younger generations are neither willing nor able to engage with the slowness, uncertainty, and relational complexity that truffle hunting demands.

One elder hunter explained, almost with resignation, the fundamental shift in learning dispositions:

*“I walked with my grandfather before I could even speak. He never explained much. You learned with your feet, your nose, and your skin. My son says he feels lost in the woods. He doesn’t trust the air, and doesn’t know how to read the place. Maybe I didn’t teach him well, or maybe he never wanted to learn.”* (M, 67, Alta Langa)

The embodied pedagogy described here rests upon modes of sensory attunement, rather than explicit instruction. It is precisely this form of affective apprenticeship that is increasingly ruptured by generational shifts in lifestyle, values, and temporal orientations. As another informant observed:

*“You can’t learn this in one year. It takes decades of walking, failing, and paying attention. Today, they want everything fast. They watch videos, they read online, but the forest does not speak through a screen.”* (M, 76, Barbaresco)

The truffle hunter’s lament is not simply a nostalgic defence of tradition, but rather a recognition that truffle knowledge is situated, not abstractable. The rise of digital culture, urban employment, and globalised expertise makes embodied, place-based knowledge appear anachronistic. One younger informant noted his nephew’s disinterest bluntly:

*“He says: ‘I saw a video about truffle dogs on YouTube.’ But what can YouTube teach you? You don’t smell humidity through a screen. You don’t feel when the soil is breathing or when the roots are alive.”* (M, 62, Monforte)

Tourism intensification also contributes to the erosion of transmission chains. Family-based, place-specific knowledge, formerly imparted through slow, seasonal apprenticeship, is increasingly commodified for tourist performances. Younger locals often pivot toward tourism employment, which offers quicker monetary returns, shortening or bypassing the traditional apprenticeship trajectory [26].

This epistemic gap extends beyond mere knowledge loss. Several hunters emphasize how the relational fabric connecting humans, animals, and forest spaces is no longer reproduced. As one remarked,

*“When you teach a boy to hunt truffles, you’re not teaching him to find something. You’re teaching him to listen, to trust the dog, to respect the silence. You walk together, season after season. That’s how you learn. But now, they don’t have time for that. They want the truffle without the walk.”* (M, 70, Alba area)

The transformation of truffle hunting into a tourist performance also tends to simplify intricate cultural knowledge. Nuanced vocabularies, fine-grained ecological classifications, and sustainable foraging rituals are often replaced with marketing-friendly narratives

that attract visitors but dilute the depth of LEK. The erosion of transmission thus reflects broader temporal mismatches between the slow, cyclical temporality of truffle ecologies and the accelerated, linear temporality of contemporary youth culture. The body's intimate dialogue with the forest requires prolonged exposure and patient repetition, conditions that are increasingly incompatible with modern lifestyles. One of the oldest informants summarised this affective rupture with painful clarity:

*"I could tell my grandson where to go, but it wouldn't help. The trees don't speak to him. He never stayed long enough to hear them. You need years before a place accepts you."*  
(M, 84, Roero)

Our findings illustrate how the disruptions to truffle hunting in Langhe and Roero reflect broader patterns of biocultural erosion. The loss of access to secondary forest, the breakdown in human–dog relational networks, and the commodification of truffles represent not only ecological but also cultural and emotional losses. Framing these changes within biocultural heritage underscores that sustaining landscapes requires preserving intertwined biological and cultural diversity. The emotional and ontological impacts described by hunters reveal the often-overlooked affective dimensions of socio-ecological change, contributing to growing scholarship on multispecies ethnography and cultural sustainability [12,13].

In this light, the disruption of knowledge transmission is not merely informational, but ontological: it involves the breakdown of an entire multispecies pedagogical system. As intergenerational lines weaken, not only is knowledge lost, but so too is the very mode of being that allowed that knowledge to emerge and flourish.

### 3.3. Gentrification, Spectacularizing, and the Commodification of Truffle Hunting

While truffle hunting in the Langhe has long been rooted in intimate, multispecies ecologies and kin-based transmission, recent transformations have increasingly subjected the practice to processes of rural gentrification and cultural spectacle. The influx of elite tourism, gastronomic branding, and organised truffle experiences for visitors is not simply altering economic patterns; it is reconfiguring the ontological meaning of the practice itself. Truffle hunting risks becoming detached from its embedded socio-ecological matrix and transformed into a consumable performance. Several informants expressed unease at how the traditional practice has been appropriated into scripted events designed for urban tourists, foreign visitors, and luxury gastronomy. As one hunter explained,

*"Now they organise tours where they bury truffles in the morning and dig them up in the afternoon. The tourists clap, take photos, and smile for Instagram. But the dog learns nothing from this. And neither do the people. They come for the story, not for the forest."*  
(M, 54, Dogliani) (Figure 6)

The *trifulau* described how truffle knowledge was traditionally kept within families and shared privately, but nowadays they feel reduced to mere symbols or tourist attractions—almost like costumes on postcards. One hunter from Alba (male, 76) expressed that this shift has turned their expertise into something flattened and commodified, rather than lived and embodied knowledge. Another hunter (M, 70, Alba) noted how tourists seek an idealized experience of truffle hunting, wanting perfect weather, smiling dogs, and guided, easy walks rather than the true, often uncomfortable reality of foraging in the forest. A third informant (M, 67, Alta Langa) emphasized that truffle hunting is not about magic or luck but years of hard work and intimate knowledge of the forest. He lamented that staged hunts for tourists undermine this real mystery by presenting a superficial performance.





**Figure 6.** A bad “catch” from a day of truffle hunting near Alba. (Photo credit M. Zanaria).

These processes are not isolated but reflect broader dynamics of rural spectacle production observed in gentrifying landscapes [23,27]. Here, cultural capital circulates globally while local epistemologies are emptied of their original context. The *trifulau* becomes a living symbol for gastronomic tourism, both celebrated and, paradoxically, marginalised from control over the very narratives that now define them. As one informant bitterly summarised,

*“Now they call it ‘territorial valorisation.’ But who decides what has value? The restaurant owners? The tour companies? We are the ones who have lived this for decades. But in their story, we are just part of the scenery.”* (M, 62, Monforte)

In this way, gentrification operates not only spatially but ontologically: it erodes traditional relationships with land, knowledge, and community under the guise of preservation and promotion. The commodification of truffle hunting thus represents not the celebration of cultural heritage but its reconfiguration into a marketable spectacle, severed from the slow, intimate, and precarious realities upon which the practice historically depended.

### 3.4. The Truffle as a Mirror of Social and Environmental Transformations

The white truffle of Alba, a prized symbol of the Piedmont region, is not only a gastronomic delicacy but also a sociological indicator of the contemporary tensions between tradition and change, local and global, nature and economy. Data show that the truffle, as a bioindicator, is directly affected by climate change. Its sharp decline becomes emblematic of the ongoing ecological crisis. This highlights the vulnerability of local traditions to global phenomena. The knowledge of *trifulau*-rooted in natural rhythms and the land risks becoming obsolete or ineffective if the environment itself is radically transformed. The replacement of forests with vineyards and hazelnut groves responds to market logic but leads to the erosion of the cultural landscape.

The truffle is not just a natural resource, but part of a socio-cultural ecosystem made up of practices, values, and intergenerational knowledge. Here, monoculture also becomes

symbolic monoculture: it homogenizes the landscape and silences the diversity of know-how. The responses from those involved reveal forms of socio-environmental resilience, including the planting of new truffle-host trees, forest maintenance, and the creation of truffle grounds. These efforts are not only environmental but also collective cultural actions, showing how the local community tries to reclaim its territory and symbolic identity. Importantly, these practices occur within a complex political framework involving land rights, local governance, and market regulations, which shape both the possibilities and limitations for community-led stewardship. The increasing internationalization of the truffle market, also fuelled by the fair, turns the fungus into a global object of desire. The rising economic value of the truffle is a form of “capitalization of tradition”. However, this also risks distorting its original meaning: from a shared cultural good to an elite niche product.

The contrast between older and younger generations of *trifulau* highlights a shift in values: from respect for nature and community to a focus on individualism and profit. Yet a counter-narrative is emerging among youth-more environmentally conscious and committed to reviving sustainable practices. This reflects a broader late-modern societal tension, where new generations seek to reinvent tradition in a drastically changed context.

The Truffle Fair is not just an economic event; it functions as a contemporary ritual that celebrates, narrates, and reinvents the identity of the region. Through food and wine, Alba builds a powerful self-narrative, with the truffle becoming both a symbol and a tool of territorial marketing-with significant social and economic effects. The case of the white truffle of Alba offers a privileged lens through which to observe how a local community responds to the major transformations of our time. In its fragility and preciousness, the truffle embodies a complex interweaving of nature, culture, economy, and identity. Preserving it means not only saving a species but also protecting a collective memory and a way of inhabiting the world.

Our findings resonate with a growing body of interdisciplinary research that examines how environmental transformations, including those driven by climate change, produce profound cultural and emotional impacts on communities intimately connected to specific landscapes. Similarly to studies on glacier retreat and “haunted” spaces [28,29], the experiences of white truffle hunters reveal a sense of alienation and ontological loss as familiar forest environments are altered by ecological changes, land-use restrictions, and socio-economic pressures. These disruptions challenge not only ecological sustainability but also cultural continuity and embodied knowledge systems. By situating our study within this broader context, we emphasize the necessity of recognizing multispecies and affective dimensions of sustainability that encompass both environmental and cultural resilience in the face of global change.

#### 4. Conclusions

This study highlights how traditional truffle hunting in Langhe and Roero represents a deeply embedded, multispecies, and embodied practice rooted in local ecological knowledge (LEK) and cultural identity. These practices have historically sustained a delicate balance between human activity and forest ecosystems, allowing truffle populations to regenerate while maintaining social and ecological integrity [30].

However, this balance is increasingly threatened by rising external pressures, particularly the expansion of tourism-driven demand for truffles. Unlike long-standing commercial exchange, today’s growth in short-term profit-seeking and the spectacle of truffle tourism disrupts not only ecological sustainability but also the silent and intimate knowledge shared between hunters, dogs, and forest environments. This commodification risks eroding the

very knowledge systems and relationships that have supported sustainable harvesting over generations [31–33].

Additionally, changes in land, especially vineyard and hazelnut orchard expansion, climate change, and diminishing interest among younger generations further jeopardize the future of these practices [34]. Without thoughtful intervention, the intergenerational transmission of truffle-related LEK and the ecological conditions that sustain it may be lost.

Academically, this paper contributes to interdisciplinary debates on cultural sustainability, multispecies ethnography, and rural transformation. It deepens understanding of how embodied knowledge, affective relationships, and ecological attunement function as key components of biocultural heritage, and how these are challenged by contemporary economic and environmental pressures. It also expands the definition of sustainability to include relational, affective, and experiential dimensions, rather than solely material or economic criteria.

By framing truffle hunting within the concept of biocultural heritage, the paper calls for governance frameworks and ecotourism models that recognize the ecological and cultural specificity of truffle landscapes. Sustainable rural development must move beyond economic metrics to also protect affective, embodied, and multispecies knowledge systems essential to cultural landscapes [30]. To ensure long-term resilience, policies must balance ecological stewardship with respectful, low-impact forms of engagement. This includes promoting small-scale, community-led ecotourism initiatives that foster environmental awareness and cultural continuity, supporting both the forest ecosystems and the people who have lived with and through them for generations.

**Author Contributions:** Conceptualization, M.A., N.S., A.P. and P.C.; Funding acquisition, N.S.; Investigation, M.Z. and F.E.; Methodology, M.Z., P.C. and A.P.; Software, M.A.; Validation, N.S., A.P. and P.C.; Visualization, M.A. and M.Z.; Writing—original draft, M.A. and A.P.; Writing—review & editing, M.Z., N.S. and P.C. All authors have read and agreed to the published version of the manuscript.

**Funding:** This publication is part of the project NODES, which has received funding from the MUR-M4C2 1.5 of PNRR, which is funded by the European Union-NextGenerationEU (Grant agreement no. ECS00000036).

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Ethics Committee of the University of Gastronomic Sciences (protocol code: UNISG24092024) on 24 September 2024.

**Informed Consent Statement:** Verbal informed consent has been obtained from participants. Verbal consent was chosen over written consent because it is culturally appropriate, context-sensitive, and respectful of local traditions.

**Data Availability Statement:** Data supporting the reported results are presented within the manuscript. Further inquiries may be directed to the corresponding author.

**Acknowledgments:** The authors are thankful to the local people.

**Conflicts of Interest:** The authors declare no conflicts of interest.

## References

1. Alrhoun, M.; Romano, A.; Sulaiman, N.; Pieroni, A. Old Plants for New Food Products? The Diachronic Human Ecology of Wild Herbs in the Western Alps. *Plants* **2025**, *14*, 122. [\[CrossRef\]](#)
2. Saf, A. The importance of rural tourism in the context of sustainable urban development and its impact on rural development: The case of Foça Kozbeyli. *Kent Akad.* **2022**, *15*, 1835–1854. [\[CrossRef\]](#)
3. Oliach, D.; García-Hernández, J.; Martínez-Moreno, S. Truffle market evolution: An application of the Delphi method. *Forests* **2021**, *12*, 1174. [\[CrossRef\]](#)

4. García-Barreda, S.; Marco, P.; Martín-Santafé, M.; Tejedor-Calvo, E.; Sánchez, S. Edaphic and temporal patterns of *Tuber melanosporum* fruitbody traits and effect of localised peat-based amendment. *Sci. Rep.* **2020**, *10*, 61274. [\[CrossRef\]](#)
5. Pieroni, A. The changing ethnoecological cobweb of white truffle (*Tuber magnatum* Pico) gatherers in South Piedmont, NW Italy. *J. Ethnobiol. Ethnomed.* **2016**, *12*, 1. [\[CrossRef\]](#)
6. Reyna, J.; García-Barreda, S. Black truffle cultivation: A global reality. *For. Syst.* **2014**, *23*, 144–147. [\[CrossRef\]](#)
7. Marco, P.; Tejedor-Calvo, E.; Gracia, A.P.; Gómez-Molina, E.; García-Barreda, S.; Sánchez, S. and Sanz, M.Á. Peat-based amendment of soils reduces the complexity of the volatile profile in cultivated black truffles. *J. Sci. Food Agric.* **2024**, *104*, 8945–8952. [\[CrossRef\]](#)
8. Berkes, F.; Folke, C. Linking Social and Ecological Systems for Resilience and Sustainability. In *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*; Berkes, F., Folke, C., Colding, J., Eds.; Cambridge University Press: Cambridge, UK, 1998; pp. 1–25.
9. Berkes, F.; Colding, J.; Folke, C. *Navigating Social–Ecological Systems: Building Resilience for Complexity and Change*; Cambridge University Press: Cambridge, UK, 2003.
10. Hilszczańska, D.; Rosa-Gruszecka, A.; Kosel, B.; Horak, J.; Siebyła, M. A survey of the knowledge of truffles among Polish foresters and implications for environmental education. *Forests* **2019**, *10*, 365. [\[CrossRef\]](#)
11. Mustafa, G.; Atakol, O. An overview on truffle aroma and main volatile compounds. *Molecules* **2020**, *25*, 4948. [\[CrossRef\]](#) [\[PubMed\]](#)
12. Maffi, L.; Woodley, E. *Biocultural Diversity Conservation: A Global Sourcebook*; Earthscan: London, UK, 2010.
13. Pretty, J.; Adams, B.; Berkes, F.; de Athayde, S.F.; Dudley, N.; Hunn, E.; Maffi, L.; Milton, K.; Rapport, D.; Robbins, P.; et al. The intersections of biological diversity and cultural diversity: Towards integration. *Conserv. Soc.* **2009**, *7*, 100–112. [\[CrossRef\]](#)
14. Alrhoun, M.; Sulaiman, N.; Mattalia, G.; Ahmed, H.M.; Khatib, C.; Cantürk, Y.Y.; Zucca, G.; Ammam, A.; Ahmad, M.; Pieroni, A. Ethnoecology of desert truffles hunting: A cross-cultural comparative study on practices and perceptions in the Mediterranean and the Near East. *J. Arid Environ.* **2025**, *229*, 105367. [\[CrossRef\]](#)
15. Ingold, T. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*; Routledge: London, UK, 2000.
16. Abram, D. *The Spell of the Sensuous: Perception and Language in a More-Than-Human World*; Vintage Books: New York, NY, USA, 1996.
17. Howes, D. (Ed.) *Empire of the Senses: The Sensual Culture Reader*; Berg: Oxford, UK, 2005.
18. Classen, C. *The Deepest Sense: A Cultural History of Touch*; University of Illinois Press: Urbana, IL, USA, 2012.
19. Bendix, R.; Eggert, A.; Peselmann, A. (Eds.) *Heritage Regimes and the State*; Göttingen University Press: Göttingen, Germany, 2012.
20. Phillips, M. Counterurbanisation and rural gentrification: An exploration of the terms. *Popul. Space Place* **2009**, *15*, 557–575. [\[CrossRef\]](#)
21. Sanga, G.; Ortalli, G. (Eds.) *Nature Knowledge: Ethnoscience, Cognition, and Utility*; Berghahn Books: New York, NY, USA, 2003.
22. Tsing, A.L. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*; Princeton University Press: Princeton, NJ, USA, 2015.
23. Woods, M. Engaging the global countryside: Globalization, hybridity and the reconstitution of rural place. *Prog. Hum. Geogr.* **2007**, *31*, 485–507. [\[CrossRef\]](#)
24. ISE (International Society of Ethnobiology). The ISE Code of Ethics. Available online: <https://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics/> (accessed on 15 June 2025).
25. Sulaiman, N.; Zocchi, D.M.; Bonafede, S.; Nanni, C.; Söukand, R.; Pieroni, A. Going or Returning to Nature? Wild Vegetable Uses in the Foraging-Centered Restaurants of Lombardy, Northern Italy. *Plants* **2024**, *13*, 2151. [\[CrossRef\]](#)
26. Pieroni, A.; Alrhoun, M.; Sulaiman, N. Plural and commoning? Forecasting four scenarios for ethnobiology and ethnomedicine by 2035. *J. Ethnobiol. Ethnomed.* **2025**, *21*, 46. [\[CrossRef\]](#) [\[PubMed\]](#)
27. Macdonald, S.J. *Memorylands: Heritage and Identity in Europe Today*; Routledge: London, UK, 2013.
28. Jeans, C. Morning Glaciers: Animism Reconsidered through Ritual and Sensorial Relationships with Mountain Entities in the Alps. *Humans* **2023**, *3*, 239–250. [\[CrossRef\]](#)
29. Varnajot, A.; Salim, E. The hauntology of climate change: Glacier retreat and dark tourism. *Tour. Geogr.* **2025**, *27*, 102–119. [\[CrossRef\]](#)
30. Ibănescu, B.C.; Stoleriu, O.M.; Munteanu, A.; Iașu, C. The impact of tourism on sustainable development of rural areas: Evidence from Romania. *Sustainability* **2018**, *10*, 3529. [\[CrossRef\]](#)
31. Hamid, A.A.; Seida, A. Tourism and Rural Development. 2024. Available online: <https://www.intechopen.com/chapters/86865> (accessed on 3 September 2025).
32. Bakhmatova, Y. Development prospect of agro-tourism and positive effects of tourism activities in rural regions. *E3S Web Conf.* **2021**, *273*, 09001. [\[CrossRef\]](#)



33. Mathis, A.; Rose, J. Balancing tourism, conservation, and development: A political ecology of ecotourism on the Galapagos Islands. *J. Ecotourism*. **2016**, *15*, 64–77. [[CrossRef](#)]
34. Yiqing, T.; Li, R.; Shu, Q.; Wang, Y. Governing the tourism commons: Can self-governing institutions ensure the continuation of the rural tourism life cycle? *J. Travel Res.* **2025**, *64*, 576–595. [[CrossRef](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.