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EDITORIAL

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From the margins to the core: village and community scientists should increasingly shape the future of ethnobiology and ethnoecology

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Abstract

Ethnobiology was not only created as a field to understand the relationship between humans and their environments; it emerged from direct engagement with rural and Indigenous communities. Yet the great paradox is that, despite its field-based origins, the discipline continues to be reproduced within urban academic spaces that often exclude those who are assumed to be at the very heart of knowledge production. In this editorial, we do not simply propose the "inclusion" of rural or Indigenous communities. Instead, we call for a radical repositioning of the knowledge itself: Who can be considered a "scientist"? And who holds the authority to define scientific knowledge? We reject the assumption that urban academic affiliation or formal credentials are the sole basis for scientific credibility, and instead propose a different standard: knowledge should be assessed by its depth, explanatory power, and integrity when co-produced in genuine partnership with living communities. Drawing on our own experiences as researchers raised in rural villages, peripheral regions, and migrant/refugees' communities, we argue that local and Indigenous ecological knowledge is not a "raw material" for scientific research, but a form of scientific thinking in its own right with its own logic, observations, and rigour, and its own way of assessing, adapting and enacting this knowledge. We therefore call for a further step ahead in the classical structure of ethnobiology: not merely the inclusion of communities in research stages, but the recognition of some of their scholars as the core producers of scientific knowledge, from the formulation of research questions to the interpretation, dissemination

In memory of Carlo Petrini (22 June 1949 – 21 May 2026), founder of Slow Food and the University of Pollenzo (Italy) and unforgettable advocate of local knowledge holders, whose lifelong conviction that peasant wisdom must be the foundation of any meaningful science inspired us to write these pages.

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and enactment of results. This transformation of the locus aims not only to improve ethnobiology as a field but also to redefine it. Without this redefinition, science will remain detached from the realities it claims to understand. With it, ethnobiology can become a more honest, more courageous discipline, better equipped to confront biodiversity loss, climate change, and the reconfiguration of more-than-human–nature relationships.

Keywords Rural knowledge, Village scientists, Citizen science, Ethnoecology, Knowledge co-production, Ethnobiology, Biocultural diversity, Slow Food, Indigenous rights

A discipline moving in an ambiguous direction

Ethnobiology has long presented itself as the science that values rural and Indigenous knowledge systems. Yet in practice, its institutional history reveals a far more uncomfortable reality: it is, in many cases, a discipline built through extraction. Researchers trained at urban universities enter rural landscapes, document local ecological knowledge, return to academic centres, convert this knowledge into publications, and advance careers rooted in intellectual traditions that remain structurally marginalised, rarely acknowledged, and often erased from the scientific record [1, 2]. What is celebrated as "knowledge exchange" can frequently be, in effect, a one-way transfer, with knowledge taken but authority for its use retained elsewhere. Recognition does not often travel with it. This results not merely in an ethical imbalance, but in an epistemic failure. This imbalance is not (anymore?) simply in the geographical or cultural divide between local communities and scientists, but in the fact that the former are from rural areas or marginalised communities. At the same time, the latter still often belong to the urban bourgeoisie and elites.

A discipline that, a few times, excludes those who possess the deepest, most situated ecological knowledge from the architecture of knowledge production is not simply incomplete; it is operating below its own intellectual threshold. Ethnobiology, as currently presented in university curricula and sometimes practised, does not yet fully realise the very knowledge potential it claims to study.

What we challenge here is not *inclusion* in its symbolic or procedural sense. Token participation, consultative fieldwork, and extractive co-authorship models are insufficient. The issue is far deeper: it concerns who is recognised as a knower in the first place. The children who grow up herding livestock across alpine pastures, collecting wild plants at forest margins, interpreting river fluctuations with their elders, and reading climatic shifts through clouds, winds, insects, and animal behaviour are not "informants" of science. They are practitioners of a rigorous, continuous, and deeply empirical ecological intelligence.

To reduce this knowledge to "local observations" is to misunderstand its nature entirely. It is not a preliminary stage of science awaiting formalisation. It is science – "knowledge" – lived, embodied, relational, and refined across generations through sustained interaction with ecological systems. Its methods are not written in protocols but enacted through attention, repetition, memory, practice and adaptation. Its validity is not derived from external institutional recognition, but from its capacity to sustain life within specific ecological and cultural landscapes over time.

And crucially, this form of knowledge is not merely supplementary to contemporary environmental science. It is foundational to it. In an era defined by accelerating biodiversity loss, climate instability, and socio-ecological disruption, it is precisely these situated, intergenerational epistemologies that hold the most immediate relevance for conservation biology, food systems research, and climate adaptation science [3–6].

The authors of this editorial write from lived experience rather than abstract theory. We are ourselves products of rural peripheries, mountain villages, Indigenous communities, pastoral traditions, and migrant trajectories: from the Himalayas to the Maghreb, from remote Balkan settlements to the Hindu Kush, from dry-farming landscapes in Syria at the edges of the desert to the humus-rich steppes of Ukraine, from Baltic forests to the inland Apennines. This biographical diversity is not incidental to our argument—it is its foundation. In the sense we intend throughout this editorial, "village scientists" also include scholars raised within marginalised, urban migrant communities: displacement and resettlement do not erase situated ecological and cultural knowledge, but carry it, transform it, and often force it to be defended and re-articulated under even harsher conditions of institutional dismissal. We know, from within, what it means to carry ecological knowledge as lived inheritance rather than as a formal curriculum. We also know what it means to enter academic institutions never designed for people like us, and to see our knowledge dismissed, exoticised, or instrumentalised rather than recognised as a legitimate scientific contribution. This editorial therefore also constitutes a collective statement of intellectual autobiography and epistemic justice [7, 8].

Our aim is not to rehearse yet again the now well-established and undoubtedly important body of critique directed at colonial science. That literature exists, it is extensive, and it remains essential [9, 10]. However, we argue that the present moment demands something more than further critique: it requires institutional

reconfiguration. The central question is no longer how we can acknowledge rural and Indigenous knowledge. But rather, how do we build scientific institutions, funding structures, publication norms, and research practices in which rural and Indigenous communities become genuine co-architects of ethnobiological science? [11]. This is fundamentally a question of power, of resources, and above all of intellectual courage, the courage to dismantle hierarchies that have long been normalised precisely because they are comfortable for those who benefit from them.

We must also recognise that we are operating in a widening "myth gap": a contemporary condition in which societies are deprived of shared narratives that bind them together in collective action. Facts alone do not move people; stories, or myths in the anthropological sense, are what generate meaning and action [12]. Yet ethnobiology itself is not immune to fragmentation. Increasingly, we risk enclosing ourselves within epistemic bubbles, amplifying only what is reflected through disciplinary echo chambers [13]. At the same time, the conventions of scientific writing often sterilise the human dimension of our work, reducing lived field experiences to detached, procedural narratives that erase the emotional and relational depth of ecological engagement [14].

In this process, something essential is lost: the continuity between scientific practice and lived experience. Many of us began not as professional researchers, but as rural children, immersed in landscapes, seasonal rhythms, and local ecological stories, initially as amateurs in the deepest sense of the word: those who act out of love. Yet in becoming "scientists," we are often trained to suppress this orientation, to replace passion with productivity, and curiosity with output metrics. What we propose, therefore, is not a return to naïveté, but a recovery of that formative attentiveness, the capacity to engage with ecological knowledge not only as a professional obligation, but as a shared, lived, and meaningful practice [15].

The last generational archive: why ethnobiology cannot survive without community and village actors

The ecological knowledge and practice held by rural youth, land-based locals and Indigenous Peoples are not incidental or superficial. They are products of what might be called an apprenticeship in nature: years of daily, multi-sensory engagement with specific landscapes, species assemblages, seasonal cycles, and ecological processes [16, 17]. A child who has spent a decade helping to manage a family's small farm, orchard, or woodlot, for example, has, by early adolescence, accumulated an observational database of extraordinary richness. They know which plant communities signal the presence of specific soil types, which insect behaviour predicts incoming weather, which wild food plants appear after the first autumn rains, and which springs run dry in drought years and which do not [18]. This is not "folklore"; it is the outcome of sustained empirical observation carried out over long time horizons by multiple observers across generations.

Ethnobotanical and ethnobiological research has repeatedly demonstrated the precision and reliability of such ecological knowledge. Studies across diverse cultural contexts from the Himalayas to the Mediterranean, from West Africa to the Andes, have documented the extraordinary accuracy with which rural communities identify, classify, and characterise plant, animal and fungal species and their ecological relationships [19–21]. What is less frequently noted is that sometimes - especially those who do not migrate for labour to cities -this knowledge can be concentrated in younger community members who are still embedded in traditional land-use practices, and who combine inherited ecological frameworks with direct observational experience in ways that older generations, sometimes displaced or marginalised from active land management, may not [22]. Rural youth are not simply the recipients of traditional knowledge; they are often its active mediators and innovators, who serve as a bridge for the flow of knowledge and practice to future generations.

The evidence for what these village scientists can produce is not hypothetical. In the Moroccan High Atlas, Amazigh communities have independently documented over 200 medicinal plant species through locally governed participatory projects, rivalling university-based inventories in precision. In Mauritania and Algeria, Hassaniya-speaking communities maintain detailed oral pharmacopoeias of desert plants which are largely absent from formal literature [23, 24]. These cases illustrate what becomes possible when the question shifts from "*Who can we study?*" to "*Who can we work alongside?*"

Yet this knowledge is not necessarily held in safe custody and remains vulnerable to loss. Across the Balkans, the Middle East, North Africa, the Sahel, and beyond, rural youth are being drawn away by urban labour markets and the erosion of agricultural livelihoods. What is lost is not merely a workforce, but a generational archive: embodied, place-specific ecological knowledge that no database can reconstruct once its carriers have vanished. Intergenerational transmission cannot be replaced by retrospective documentation. When the last grandmother who knows which plant survives a Saharan drought dies without a trained successor, that knowledge dies with her. The urgency is not rhetorical. It is a critical demographic and social challenge.

The implications of needed changes in ethnobiological methodology are significant and relevant. Current research designs typically treat local knowledge as "data"

to be collected through interviews, focus group discussions, participatory approaches, and ethnographic observation [25]. Rural community members were decades ago typically seen as "informants," and researchers as "analysts." This division of epistemic labour is obviously not more contemporary today; it filters out enormous quantities of contextually embedded knowledge that cannot be captured through standardised elicitation protocols. The categories, frameworks, and hypotheses of ethnobiological research are sometimes generated in academic settings that can profoundly disconnect them from the ecological realities the researchers purport to study [26]. As Mistry and Berardi [11] have argued, truly collaborative research requires not only the inclusion of local, grounded knowledge but also the co-design of research questions, starting from the concerns and categories meaningful to the communities involved and including enthusiastic participation, "learning while doing," and the inclusion of local communities' scientists and scholars.

The methodological frameworks needed to support a more genuinely rural-centred ethnobiology already exist. Citizen science, the systematic involvement of non-professional observers in scientific data collection and, increasingly, in research design and analysis, has demonstrated its value across a wide range of ecological disciplines [27, 28]. Bird surveys, phenological monitoring, invasive species tracking, and biodiversity assessments have all been transformed by the engagement of large numbers of motivated, observationally skilled non-scientists and also humanities scholars [29]. The relevance for ethnobiology is direct: rural communities represent precisely the kind of knowledgeable, place-based observational networks that citizen science frameworks are designed to mobilise.

Participatory Rural Appraisal (PRA), developed as a methodology for community-led development planning, offers a complementary set of methodological tools [30, 31]. PRA techniques such as seasonal calendars, resource mapping, historical timelines, ranking exercises, and transect walks were explicitly designed to surface, organise, and render visible the knowledge that communities already hold about their own environments, landscapes, and livelihoods. Within ethnobiological contexts, these tools hold the potential to continue to reconfigure the research encounter: from old, extractive models, nowadays mainly abandoned, of interrogation to a co-productive process of knowledge generation. Rather than researchers unilaterally defining the questions and eliciting responses, PRA-informed approaches enable communities themselves to determine what is significant, what is changing, what is under threat, and what demands documentation and collective attention [32, 33].

What distinguishes the argument we are making here from conventional advocacy for participatory methods is its emphasis on who leads the process. PRA and citizen science frameworks, as typically implemented, still often place researchers in the position of initiating, designing, and ultimately controlling the research process [34]. Communities participate; researchers often direct. We are calling for something more fundamental: the emergence of rural researchers, individuals who are themselves embedded in rural communities, who carry the embodied ecological knowledge that comes from growing up in and with specific landscapes, and who are equipped with the technical skills to translate that knowledge into forms legible to the broader scientific community [35]. This is not an impossible vision; it is already emerging in Indigenous research contexts [36, 37], and it needs to become the norm in ethnobiology.

It matters for methods because rural researchers often know, without needing to be told, which questions are worth asking in a given community, which seasons are appropriate for specific kinds of fieldwork, which elicitation techniques will yield genuine responses and which will produce performative ones. The elaborate methodological protocols that dominate ethnobiological training, free-listing, pile sorting, consensus analysis, participatory and semi-structured interviewing were designed in academic contexts and are often applied in rural ones with insufficient attention to how the social dynamics of the research encounter are shaped by power, trust, and cultural protocol and beliefs [38]. A researcher who grew up in a village understands what it means to sit with an elder at harvest time or to walk a forest path in early spring, gathering medicinal plants, which brings a methodological sensibility that no training courses can fully replicate. By truly following local people and listening carefully to their needs, researchers studying one topic can instead learn about the aspects most important to the community, as we did on the island of Kihnu in Estonia. We studied changes in medicinal plant use [39]; in addition, in collaboration with the local community, we documented the relations between people and birds, as well as the broader system of village nature relations [40–42]. This does not mean that formal methods are of less value or credibility; it means that they are most powerful when wielded by researchers who understand, from within and as members of, the social worlds in which they are being applied.

It matters for ethics, above all, because the seemingly endless debates about research ethics that characterise contemporary ethnobiology debates about prior informed consent, benefit sharing, intellectual property, data sovereignty, and the politics of representation are largely conducted among urban academics who are, structurally, on the side of those who benefit from the extraction of rural knowledge [43, 44]. Village scientists do not need to be told that communities deserve respect

and reciprocity; they live that imperative. Their ethical framework is not derived from institutional review board guidelines or philosophical treatises on epistemic justice; it is embedded in relationships of obligation, reciprocity, and mutual accountability that structure rural social life [45]. This does not mean that village scientists are ethically infallible. It means that the ethics they practise are substantive rather than procedural, relational rather than regulatory, and grounded in long-term community relationships rather than temporary research visits [46].

The distinction we are drawing here is not between good rural researchers and bad urban ones. Many city-based ethnobiologists are deeply committed to rigorous and equitable science, and they remain indispensable allies in the project of transforming the discipline. The point is not that urban academics should be excluded or marginalised; that would replicate the logic we are contesting. The point is that they cannot always have the lead. Just as Carlo Petrini never suggested that chefs and gourmets were irrelevant to the food movement, only that they should not speak for farmers who had never asked them to, we are not asking urban ethnobiologists to step aside but to step back, to listen, and to make space for voices that the discipline has structurally marginalised for too long [47, 48]. A discipline that recruits, supports, and promotes village scientists as full intellectual partners, welcoming their theoretical contributions, publishing their methodological innovations, and taking their ethical judgements seriously will be both more scientifically powerful and more credible than one that, in many cases, continues to recognise urban academics as the sole legitimate interpreters of rural ecological knowledge [49, 50].

The argument we are making has a powerful precedent outside the academy, one that has become more poignant since the death of its architect. Carlo Petrini (22 June 1949- 21 May 2026) founded Slow Food as a response to the homogenising forces of industrial food culture, a movement that began as a gastronomic protest and became, over three decades, one of the most significant global platforms for the recognition, documentation, and defence of rural food knowledge [51]. Petrini's insight was deceptively simple but profoundly radical: the knowledge embedded in traditional food cultures in peasant recipes, heirloom varieties, artisanal production techniques, and local flavour vocabularies is not a romantic curiosity but a living scientific archive, and its disappearance constitutes an irreversible loss not only for cultural diversity but for humanity's capacity to feed itself sustainably in the future [52]. As Petrini argued throughout his life, "*good*, *clean and fair*" food is not simply a gustatory ideal; it is a political and epistemological one, inseparable from the rights of small-scale producers to define the value and meaning of what they create [53]. However, a persistent and underexamined problem often runs through Petrini's and some contemporary "new age" ethnobiologists' political statements: the risk that the scholarly valorisation of Local and Traditional Ecological Knowledge (LEK/TEK) reproduces, in progressive guise, the very epistemic paternalism it claims to contest. Urban-based researchers frame local communities as custodians of timeless wisdom or as repositories of pre-modern, ecologically harmonious relationships with the natural world. This form of romanticisation, however well-intentioned, fundamentally misrepresents the communities under study. Traditional knowledge is not a static archive. It is a living, contested, and internally differentiated body of practice, shaped by power asymmetries, generational conflict, gender inequalities, economic pressures, and the deeply uneven ways in which communities negotiate their relationship with the environments, "modernity", and the market. The homogenisation implicit in celebratory LEK discourse is epistemically problematic on at least two counts. First, it can erase intra-community heterogeneity: within any given locality, knowledge is distributed unequally across age cohorts, genders, socioeconomic positions, and ethnic or religious affiliations. Second, it suppresses contradiction: communities simultaneously hold and enact knowledge systems that are internally inconsistent, historically layered, and subject to ongoing renegotiation. To flatten this complexity into a coherent "traditional" voice is not an act of respect; it is an act of appropriation, one that serves the political and professional needs of the researcher far more than it serves the communities themselves.

This critique does not diminish the genuine intentions of those who wish to preserve and document LEK, nor does it question the importance of recognising non-Western and non-academic knowledge systems as legitimate epistemic frameworks. What it demands, rather, is a reflexive and structurally honest ethnobiology – one that foregrounds power, acknowledges positionality, resists the temptation of the picturesque, and treats local communities not as objects of admiration but as subjects of complex, contradictory, and fully contemporary lives [54].

The Ark of Taste, launched by Slow Food in 1996, operationalised this insight in a way that is somehow much less problematic and highly relevant to ethnobiology [55]. By cataloguing and promoting local, marginalised, and disappearing food products, breeds, and varieties at risk of extinction, the Ark of Taste has created the world's largest community-driven inventory of biocultural food diversity, drawing on more than 6,000 entries from over 150 countries. Crucially, the Ark is not an academic project; rather, it is a very pioneering citizen science exercise: its entries were and are nominated by the communities that produce and consume the foods

in question, evaluated by locals who understand the specific ecological and cultural contexts in which each product is embedded, and governed by a network of local convivia that maintain accountability to the communities involved [56]. The Ark of Taste is, in effect, a working model of the kind of community-led, village-scientist-governed knowledge infrastructure that we are calling for in ethnobiology.

The Slow Food model also illustrates a point that is often underestimated in academic discussions of participatory research: the importance of narrative and persuasion. Petrini understood that changing the relationship between urban institutions and rural communities required not only methodological innovation but cultural politics, the creation of a compelling counter-narrative to the dominant story of modernisation, in which rural ways of life appear as obstacles to progress rather than repositories of wisdom [57]. The Slow Food movement was remarkably effective in the past three decades in building this counter-narrative, precisely because it was rooted in the aesthetic and sensory dimensions of rural life, in the pleasure of eating nutritious, locally produced foods, in the beauty of traditional landscapes, in the satisfaction of skill and craft rather than in the abstract language of epistemology and methodology [58–60]. Ethnobiology would benefit from a similar communicative ambition: a capacity to articulate the value of rural ecological knowledge in terms that resonate beyond the academy, connecting rural and urban people through the embodied experiences of food, place, and seasonal rhythm that they share more deeply than is typically recognised.

Against fashionable abstractions: the limits of urban academic discourses and a possible new agenda

We write this editorial with some impatience, and we think that impatience is justified. The past decade has seen a proliferation of theoretical frameworks within the social and environmental sciences that claim to address the marginalisation of rural and Indigenous communities: decolonial methodologies, ontological turns, multispecies ethics, intersectional ecologies [61, 62]. These frameworks have generated substantial academic literature, occupied many conference sessions, and animated heated debates about research ethics and epistemic justice. They have, in our assessment, done considerably less to change the actual conditions under which rural communities engage with science.

The problem is not that these intellectual traditions are without value. Critiques of colonial knowledge structures are necessary, and scholars who develop them are, for the most part, genuine allies in the project of building a more inclusive science. The problem is that these frameworks have, in many instances, become self-referential: urban academics theorising about the marginalisation of rural communities for audiences of other urban academics, generating papers read almost exclusively within institutions from which rural community members are absent, and producing recommendations addressed to funding bodies and ethics committees, offering sophisticated reflections rather than making space for rural communities' scientists [63]. The discourse of decolonisation seems sometimes, at least in parts of the academy, to become a career resource for metropolitan scholars rather than a practical programme of action for the communities whose dispossession originally motivated the critique [64].

We are not dismissing the importance of ethical reflection in research. Research ethics matter, and ethnobiologists have genuine obligations to the communities with whom they work. But the ethics that matter most are not the procedural ethics of consent forms and institutional review boards; they are the substantive ethics of knowledge ownership, benefit sharing, and epistemic recognition [65]. And those substantive ethics cannot be satisfied through theoretical declarations; they require concrete changes in how research is funded, designed, conducted, and credited, changes that must be driven, at least in part, by village scientists themselves, not only by urban academics who have appointed themselves as advocates for communities they study but in which they have never lived [66].

What we are calling for is less talking, less writing, and more groundbreaking action. Less theorising about how science should change, and more actual science done in partnership with, and increasingly led by, village scientists who have spent decades accumulating exactly the kind of translational skills that bridge their original knowledge and urban academic epistemologies [67, 68]. The allies' "urban ethnobiologists", funding officers, and journal editors are essential. But they must learn, as Carlo Petrini insisted in the context of food culture, that solidarity means amplifying other voices rather than speaking in their place. The field cannot afford to continue substituting discourse for practice. As we noted, the authors of this editorial are themselves village scientists: we come from Afghan, Pakistani, Nepali, Indian, Filipino, Balkan peripheries, Mauritanian and Syrian semi-desert areas, and remote European rural parishes. We not only study these contexts, but they are also where we live and where our roots lie. And precisely because of this, we know that the infinite methodological and ethical debates that consume so much of our discipline's energy are, for the most part, debates that communities we work with never asked for and rarely benefit from [69].

What would a genuinely rural-centred ethnobiology look like in practice? We offer six concrete proposals,

each grounded in existing models and each actionable within current institutional constraints.

First, funding bodies that support ethnobiological research should require that a meaningful proportion of research funding be allocated to researchers from rural and Indigenous communities. Priority should be given to scholars from the Global South and underrepresented rural regions of the Global North through dedicated research programmes and exchange opportunities. Such initiatives could, for example, support a scholar from a pastoralist community in Africa to study Alpine pastoralism or a marine ethnobiologist from Indonesia to work with fishing communities in the Caribbean. This should support community-controlled research activities, including the training of community-based researchers, the exchange of best practices between rural and Indigenous scholars and other scholars, the documentation of local ecological knowledge in community archives, and the implementation of community-defined conservation and land management priorities [70, 71].

Second, ethnobiological journals could more actively solicit and publish research led by rural researchers. This may also require some significant changes: recognition of local community documentation and archiving as a starting point for more articulated forms of scholarly contribution; and willingness to translate the findings into formats accessible to those from whom local knowledge derives [72, 73]. Given the financial constraints faced by many rural researchers (no matter which country they are from), journals should also provide substantial publication fee waivers and support for language editing and translation to enable wider participation. Such measures would help ensure that research remains freely accessible to both local communities and the global scientific community.

Third, university-based ethnobiologists should rethink the relationship between their institutions and rural communities. Universities could develop genuine exchange programmes in which rural knowledge holders are invited to contribute to curriculum design and delivery, and in which rural youth who wish to engage with formal science receive meaningful financial, social, and academic support to do so without being required to abandon their community identities and knowledge frameworks [74, 75]. This can be further supported by honorary teaching opportunities for rural knowledge holders in academia, with opportunities for both field– and classroom-based knowledge dissemination, which already occur in a few North American academies. Acknowledging and valuing rural communities and practitioners is not only a responsibility of academic institutions but also a means of creating trust and relationships and building long-term collaboration.

Fourth, the discipline should invest in the development and dissemination of methods that enable rural communities to conduct their own monitoring and knowledge documentation without dependence on urban academic elites. Digital technologies, smartphones, community databases, and participatory mapping platforms offer genuine opportunities here, but only if they are designed with and for rural communities rather than imposed upon them [76, 77].

Fifth, ethnobiologists – especially the non-rural and non-Indigenous ones – should cultivate intellectual humility: the recognition that the local communities connected to nature they study often know more about the ecological systems in question than the researchers do, and that the appropriate response is to create the conditions under which the knowledge holders and rural academicians can raise their voices and speak for themselves [78, 79].

Sixth, the Slow Food model of community- and citizen-science-driven knowledge cataloguing, exemplified by the Ark of Taste, could serve as a template for large-scale, village-scientist-governed documentation of biodiversity. The success of the Ark of Taste demonstrates that it is possible to build rigorous, globally connected knowledge infrastructures in which communities are not merely participants but authors, curators, and decision-makers [80, 81]. Ethnobiology has the scientific depth to extend this model by integrating ecological, linguistic, and cultural documentation in ways that the Ark of Taste, which focuses primarily on local food products, does not.

The science of tomorrow will be rural, or it will fail

The disciplines devoted to understanding human relationships with the living world are now facing a moment of reckoning. The planetary crises that define our era – biodiversity collapse, climate disruption, food insecurity, ecosystem degradation, and widening social and economic inequalities that disproportionately affect rural and Indigenous populations – are concentrated precisely in the landscapes where most of the world's biocultural diversity persists and where most of humanity's food is produced [82]. Paradoxically, these are also the very landscapes where the most essential knowledge for addressing such crises already exists: detailed, place-based, long-term observational knowledge of ecological change, adaptation, and interdependence between species and human communities [83, 84].

If ethnobiology fails to fundamentally reconfigure itself by not only integrating but also actively empowering as many local, land-based knowledge holders as possible as new scientists and central actors in science, it risks becoming a discipline that documents peripheral lives while often remaining structurally detached from them. In its current trajectory, it risks speaking in highly

sophisticated urban epistemological discourses, thereby reproducing a comfortable, urban-centred epistemic standpoint that yields limited real-world transformation in the countryside [85, 86]. Under conditions of accelerating urbanisation, extractive economic systems, and the progressive marginalisation of Indigenous and local livelihoods, this detachment is not neutral: it contributes to the irreversible erosion of rural ethnobiological knowledge accumulated over centuries, ultimately leading to a downward spiral in environmental quality.

The alternative is not incremental reform but disciplinary transformation. It is the emergence of a science in which some of the rural individuals who have grown up observing seasonal river fluctuations, tracking the disappearance of once-abundant wild plants, and witnessing the ecological memory of their grandparents' landscapes are no longer positioned as "informants" or "case studies," but recognised as scientists in their own right, differentiated by context and method, but not diminished in rigor, creativity, or academic authority [87, 88]. The authors of this editorial belong to this intellectually marginalised lineage. We have lived with the tension between situated ecological knowledge and urban institutional scientific norms, navigating systems that often require us to suspend our origins to gain legitimacy within academia. We know from experience that this tension can be productive. Still, we wish that academic institutions in the future will be more willing to recognise the agency of our knowledge and our home places rather than being emotionally indifferent.

Yet, exclusion does not end there. Even within the already marginalised community of rural scientists, women from rural backgrounds face additional barriers. They remain underrepresented, both as holders of local ecological knowledge and as academic researchers, with fewer opportunities to secure research funding, authorship, leadership roles, and institutional recognition [89, 90]. The barriers that push rural scholars out of academia fall disproportionately on rural women, who more frequently bear domestic responsibilities, have less access to higher education and to mobility grants and fieldwork support, and encounter gender bias layered on top of class and origin bias [91, 92]. Non-binary and queer scholars from rural communities face additional forms of erasure, navigating institutional cultures that may feel as alienating as the urban-centric epistemologies critiqued throughout this paper [93]. A genuinely inclusive rural science cannot stop at the category of "rural"; it must seriously attend to gender and other intersecting issues if it is to be truly transformative [94].

This transformation will not happen automatically. It requires deliberate action from funding bodies, journals, academic institutions and ethnobiologists from all backgrounds and origins. It also requires a willingness to question knowledge hierarchies that have persisted because they continue to favour those who already hold influence within academic systems. Finally, it requires a genuine commitment to building an ethnobiology that further values diverse ways of knowing, embraces inclusive research practices, and remains accountable to the few scientists from local communities and village life, marginalised groups, and Indigenous Peoples whose knowledge and practices form the foundation of our field.

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Authors' contributions
AP conceived and designed the study. AP, MA, RS, and RK developed the research framework and methodology. AP, AH, MA, CY, ED, AKM, SWG, BR, IU, SA, DK, SMK, AMA, ES, JNM, and RK contributed to data collection and field investigations. MA and AP conducted data organization and analysis. AP and MA drafted the manuscript. All authors contributed to manuscript revision, provided critical comments, and approved the final version of the manuscript.

Declarations

Competing interests
The authors declare that they have no competing interests.

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