

Back-and-forth moribund ethnobotany: Erosion and fragmentation of Local Ecological Knowledge among Afghan returnees in contemporary Afghanistan and perspectives for an ethnobiology of the refugees

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Abstract

Background

Forced migration represents one of the most underexplored contexts in ethnobiological research. Afghan returnees, individuals recently repatriated from Pakistan following decades of exile, constitute a distinct but neglected category within refugee studies, embodying what we term “double displacement.” This study investigates how this layered migratory trajectory has affected Local Ecological Knowledge (LEK) related to wild food plants and herbal teas.

Methods

Fieldwork was conducted in May 2025 at the Omari Refugee Temporary Shelter Centre in eastern Afghanistan. Semi-structured interviews were conducted with 144 returnees (60 men, 84 women) using a stratified random sampling approach. Data were collected in Pashto and Farsi/Dari in accordance with the ISE Code of Ethics. Frequency of quotation (FQ) and comparative analysis with a prior study on Afghan refugees in Pakistan [59] were applied.

Results

Twenty-three plant taxa from 13 botanical families were recorded. Of these, 78% are remembered only from the past (WFPP), 9% are currently foraged (WFPCF), and 13% are currently practiced (WFPCP). No species exceeded 40% FQ; only three species surpassed 10% FQ. Comparison with the Pakistan-based cohort reveals a dramatic collapse from nine to three active genera, with *Trachyspermum ammi* as the sole common element.

Conclusions

The erosion of LEK observed among Afghan returnees exceeds patterns documented in voluntary migration contexts and reflects the compounding effects of forced mobility, prolonged urbanization, gender-based mobility restrictions, and cultural stigmatization of foraging. The concept of “inert knowledge” culturally present but behaviorally inactive is proposed as a framework for understanding biocultural fragmentation under forced displacement. Urgent biocultural policies are required to support the revitalization of LEK among returnees.

Science Highlights

- Afghan returnees exhibit 78% LEK erosion, one of the highest rates documented in migrant ethnobotany, driven by forced rather than voluntary displacement.

- “Double displacement” (exile plus repatriation) produces qualitatively distinct and more severe biocultural fragmentation than single-step migration.
- Herbal teas (medicinal-symbolic) show greater resilience than wild vegetables (subsistence-practical), revealing differential erosion by knowledge type.
- Gender-based mobility restrictions disproportionately accelerate LEK loss among women, despite their role as primary knowledge custodians.
- The concept of “inert knowledge” remembered but no longer practiced provides a novel theoretical lens for refugee ethnobiology.

Policy and Practice Recommendations

- Integrate biocultural LEK documentation and seed distribution into UNHCR and FAO emergency response frameworks for refugee returnees.
- Establish community pharmacopoeia gardens at returnee transit shelters as low-cost health and knowledge revitalization tools.
- Design gender-sensitive programs to restore women’s access to wild plant environments through safe mobility networks and home garden schemes.
- Embed ethnobotanical knowledge transmission in school-based programs in returnee settlement areas.
- Commission longitudinal ethnobiological monitoring of LEK dynamics across forced displacement cycles in conflict-affected regions.

Introduction

Forced migration has emerged as one of the defining humanitarian and ecological challenges of the twenty-first century, affecting over 120 million people globally [27, 28]. While the socio-political and economic consequences of displacement have received considerable scholarly attention, the biocultural dimensions of forced mobility and, in particular, the fate of Local Ecological Knowledge (LEK) embedded in human-plant relationships remain critically understudied [1, 8, 35]. This gap is especially pronounced in conflict-induced displacement contexts, where environmental disconnection, trauma, and social fragmentation intersect to produce distinctive patterns of knowledge erosion and transformation.

Within ethnobiology, research on migrant plant knowledge has grown substantially over the past two decades, documenting patterns of adaptation, substitution, and partial retention across diverse voluntary migration contexts in the Americas [9–15], Europe [16–22], and Africa [23]. The seminal framework proposed by Pieroni and Vandebroek [8, 38] established migration as a productive lens for studying ethnobotanical dynamics, revealing how displaced communities rebuild, hybridize, and sometimes lose their relationships with plants. However, this body of literature has focused predominantly on voluntary, economically motivated migrants in stable resettlement contexts, leaving forced migrants, particularly

refugees, internally displaced persons, and returnees largely invisible in the ethnobiological record [34, 35].

Afghanistan provides an exceptional and urgent case for examining these dynamics. Four decades of protracted conflict have generated one of the world's largest and most enduring displaced populations, primarily in Pakistan and Iran [25, 26]. Since 2023, Pakistan's intensified deportation policies have triggered mass repatriation, returning hundreds of thousands of Afghans to a country fundamentally altered by conflict, Taliban governance, and economic collapse [27]. These returnees constitute a category that has received scant attention in both migration studies and ethnobiology: individuals who have undergone what we term "double displacement," first uprooted from their homeland, then forced repatriation to a context they may no longer recognize as home.

The concept of double displacement builds on forced migration theory [28, 34] and extends it into the biocultural domain. Unlike voluntary migrants who may maintain transnational connections to home environments, or internally displaced persons who retain proximity to familiar ecosystems, doubly displaced returnees face a compounded ecological estrangement. Their LEK was originally disrupted by exile and shaped by decades of urban refugee life in Pakistan; return does not restore the conditions under which that knowledge was produced and transmitted. This makes them a theoretically significant but empirically neglected group for understanding the limits of biocultural resilience under extreme structural constraint.

Prior ethnobotanical research on Afghan communities is limited but illuminating. Manduzai et al. [59] documented wild plant use among Afghan refugees in Mansehra, Pakistan, finding a diverse pharmacopoeia of nine genera actively used in camp settings, maintained through market access and community networks. Shah et al. [60] showed that stricter border enforcement and economic marginalization further constrained plant access even among Pakistan-based refugees. No study has, however, examined what happens to LEK upon return to Afghanistan, particularly given the recent mass repatriation and the radically altered socio-ecological context of contemporary Afghanistan.

This study addresses this gap through the following research questions: (1) What wild food plants and herbal teas are remembered or currently used by Afghan returnees? (2) How has double displacement affected the retention, erosion, and transformation of LEK? (3) What cultural, social, and gendered factors explain differential knowledge retention? (4) How does the returnees' knowledge compare with that of Afghan refugees who remained in Pakistan?

Our objectives were to document returnees' ethnobotanical knowledge, assess erosion patterns through comparative analysis, examine gendered dimensions of knowledge loss, and propose a theoretical framework centered on the concept of "inert knowledge" to advance refugee ethnobiology as a distinct research trajectory.

Materials and Methods

Study site and participants

Fieldwork was conducted in May 2025 at the Omari Refugee Temporary Shelter Centre in eastern Afghanistan, a transit facility for Afghans recently repatriated from the provinces of Khyber Pakhtunkhwa, Baluchistan, and Punjab in Pakistan. Eastern Afghanistan spans diverse ecological zones from mountain terrain to lowland semi-arid plains, but the returnees' immediate context, a peri-urban shelter, offers minimal opportunities for foraging or engagement with wild plant resources. This environmental constraint is analytically central to our findings.

A total of 144 returnees participated (60 men, 84 women), selected through stratified random sampling to ensure representation across gender, age groups (18–30, 31–50, > 50 years), and duration of prior stay in Pakistan. All participants had resided in Pakistan for at least five consecutive years before repatriation.

Data collection

Semi-structured ethnobotanical interviews were conducted by the first author (AKM) in Pashto and Farsi/Dari, the two dominant languages among participants. Prior verbal informed consent was obtained from all participants in accordance with the Code of Ethics of the International Society of Ethnobiology (ISE) [41]. Interviews covered current and remembered uses of wild vegetables and herbal ingredients, including folk names, procurement methods, preparation techniques, and perceived health properties. The food-as-medicine interface was explored using established ethnopharmacological frameworks [42, 43]. Mushrooms and wild fruits were excluded as the survey was conducted at a medical camp with constrained interview time.

Plant identification

Plants for which voucher specimens were available were identified at the herbarium of the Faculty of Pharmacy, Kabul University, using regional floristic references [44, 45, 46]. For species without vouchers, identification was based on photographs, comparisons of folk names with published ethnolinguistic surveys in Pashto- and Dari-speaking areas [47–58], and expert consultation (AGK). The qualifier “#” indicates identification based on folk names and descriptions only. Nomenclature follows World Flora Online [47]; family assignments follow APG IV [48].

Data analysis

Frequency of quotation (FQ) was calculated as the percentage of participants citing each species, categorized as: + (rarely quoted, < 10%), ++ (commonly quoted, 10–40%), +++ (very commonly quoted, > 40%). Plant uses were classified as WFPP (wild food plants remembered from the past), WFPCF (currently foraged), or WFPCP (currently practiced through cultivation or purchase). Comparative

analysis used data from Manduzai et al. [59] (Afghan refugees in Mansehra, Pakistan), applying the same methodological categories to enable direct cross-context comparison. Thematic analysis of qualitative interview data followed an inductive coding approach, with emergent themes reviewed by all authors.

Results

Overview of recorded plants

Twenty-three plant species from 13 botanical families were recorded (Table 1). The majority were cited only as remembered from the past (WFPP, $n = 18$, 78%), reflecting the profound disconnection from active foraging among returnees. Only two species are currently foraged (WFPCF: *Bryophyllum pinnatum*, *Mentha longifolia*), and three are currently practiced in some form (WFPCP: *Bryophyllum pinnatum*, *Salvia rhytidea*, *Trachyspermum ammi*). No species exceeded the “very commonly quoted” threshold ($> 40\%$ FQ). Three species reached “commonly quoted” (10–40%): *Berberis lycium* (28%), *Descurainia sophia* (22%), and *Foeniculum vulgare* (18%), all herbal teas. The remaining 20 species (87%) were rarely quoted ($< 10\%$ FQ). Figure 1 presents the distribution of plant uses across the three categories.

[Figure 1. Wild food plants quoted among Afghan returnees, classified by use category: WFPP (remembered from past), WFPCF (currently foraged), WFPCP (currently practiced).]

Table 1

Wild plants recorded among Afghan returnees from Pakistan at the Omari Refugee Temporary Shelter Centre, eastern Afghanistan (May 2025).

Plant taxon, botanical family, and voucher code	Vernacular name	Procurement	Used parts	Preparation and perceived health properties	FQ
<i>Dactylorhiza umbrosa</i> (Kar.&Kir.) Nevski., Orchidaceae KUFP-2024-2531	Chambolak	bmP	Roots	B: decoction, antidepressant	++
<i>Berberis lycium</i> Royle. #, Berberidaceae	Zardchoba	bmP	Roots	B: decoction, anti-allergic	+++
<i>Bryophyllum pinnatum</i> (Lam.) Oken. #, Crassulaceae	Patarchat	fP	Leaves	F: mastication, litholytic	+
<i>Curcuma longa</i> L. #, Zingiberaceae	Korkaman	bmP	Rhizome	F: decoction, analgesic & internal wounds, powdered, skin rashes	+++
<i>Cinnamomum verum</i> J. Presl. #, Lauraceae	Daar cheeni	bmP	Inner bark	B: decoction, anti-diabetic	++
<i>Cannabis sativa</i> L., Cannabaceae KUFS 010443	Charas	bmP	Resin	F: consumed, analgesic	++
<i>Descurainia sophia</i> (L.) Webb ex Prantl., Brassicaceae KUFP-2014-0624	Khaksheer	bmP	Seeds	B: decoction, anti-cough, anti-cold	+++
<i>Foeniculum vulgare</i> Mill., Apiaceae KUFP-2015-0908	Badyan	bmP	Seeds	F: powdered and ingested, nootropic	+++
<i>Ferula</i> sp., Apiaceae KUFP-2013-0758	Badbarak	bmP	Roots	B: decoction, carminative	++
<i>Mentha longifolia</i> (L.) L., Lamiaceae KUFP-2015-0794	Velanay	fP	Aerial parts	F: powdered and ingested, carminative	++
<i>Momordica charantia</i> L. #, Cucurbitaceae	Karela	bmP	Peel	B: decoction, anti-diabetic	++
<i>Nepeta junica</i> Benth., Lamiaceae KUFP-2013-0744	Gulbakhoor	bmP	Aerial parts	B: decoction, anti-pyretic	++
<i>Olea europaea</i> L. #, Oleaceae	Zaitoon	bmP	Leaves	B: decoction, analgesic	++

Plant taxon, botanical family, and voucher code	Vernacular name	Procurement	Used parts	Preparation and perceived health properties	FQ
<i>Salvia rhytidea</i> Benth., Lamiaceae KUFP-2015-0430	Tukhm-e-malanga	bmP	Seeds	F: cold macerate, carminative	+
<i>Plantago ovata</i> Forssk., Plantaginaceae KUFP-2018-2034	Aspaghol	bmP	Seeds	B: boiled in milk, carminative	++
<i>Peganum harmala</i> L., Zygophyllaceae KUFP-2014-0199	Esphand	bmP	Roots	F: powdered and ingested, anti-diabetic	++
<i>Papaver somniferum</i> L., Papaveraceae KUFS 016418	Ghozay post	bmP	Pericarp	B: decoction, analgesic	++
<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry. #, Myrtaceae	Lawang	bmP	Seeds	B: decoction, carminative	++
<i>Trachyspermum ammi</i> (L.) Sprague ex Turrill., Apiaceae KUFP-2019-2209	Ajwain	bmP	Seeds	B: decoction, carminative	+
<i>Withania coagulans</i> (Stocks) Dunal., Solanaceae KUFP-2014-1927	Khamazoora	bmP	Seeds	B: decoction, anti-hepatic	++
<i>Zygophyllum indicum</i> (Burm.f.) Christenh. & Byng. #, Zygophyllaceae	Mazhgakai	bmP	Whole plant	B: decoction, bronchodilator	++
<i>Zingiber officinale</i> Roscoe #, Zingiberaceae	Adrak	bmP	Rhizome	B: decoction, bronchodilator	++
<i>Glycyrrhiza glabra</i> L., Fabaceae KUFP-2006-0032	Khogawalay	bmP	Roots	B: decoction, anti-cough, anti-cold	++

Lamiaceae (3 species: *Mentha longifolia*, *Nepeta junica*, *Salvia rhytidea*), Apiaceae (3 species: *Descurainia sophia*, *Foeniculum vulgare*, *Ferula* sp., *Trachyspermum ammi*), and Zingiberaceae (2 species: *Curcuma longa*, *Zingiber officinale*) were the best-represented families, consistent with South Asian ethnobotanical patterns [59, 60]. The predominance of aromatic species rich in essential oils reflects their dual culinary-medicinal significance and their availability in dried form through market channels, a factor central to understanding differential persistence across knowledge types.

Patterns of knowledge erosion and gendered LEK

The 78% rate of species relegated to passive memory (WFPP) is the most striking quantitative finding of this study. Wild vegetables show near-total erosion: no leafy weed or vegetable species is actively foraged or cultivated. This collapse is linked to extended residence in peri-urban Pakistani settings where foraging was impractical, to gendered mobility restrictions that disproportionately affected women (the primary foragers), and to the social stigmatization of wild plant consumption as a marker of poverty. As one female participant stated: *"In the cities, we cannot go outside to forage wild plants."* Another added: *"We have not heard from our elders about wild green plants."* These testimonies reveal not just behavioral discontinuity but ruptures in intergenerational transmission chains, which Reyes-García et al. [36] identify as the primary vector of LEK loss.

Herbal teas show moderate persistence (approximately 30% of remembered species remain in some form of use). Their greater resilience reflects: (a) availability of dried ingredients through markets, enabling knowledge maintenance without active foraging; (b) their integration into medicinal and social practices that carry positive cultural salience; and (c) their compatibility with restricted domestic environments. As one female participant noted: *"We do not use wild plants for food or medicine, since our elder women forbid it; instead, we rely on conventional medicines from local markets."* This testimony reveals how elder authority, operating within a context of cultural adaptation to urban displacement, can actively reinforce the abandonment of traditional practices.

Women reported remembering more species on average (mean = 4.2) than men (mean = 2.8), confirming their role as primary LEK custodians. Yet women showed lower current practice rates (12% vs. 18% for men). This paradoxical higher baseline knowledge but greater erosion reflects the intersection of gender norms and structural constraints: restricted outdoor mobility during urban exile limited women's foraging practice, while men retained access to markets where some plant products could be purchased. Men's market access is illustrated by this participant's account: *"When I ask for vegetables, my husband brings the most easily available cultivated vegetables in the local market."*

Comparative analysis: Pakistan vs. Afghanistan

Figure 2 presents a Venn diagram comparing plant genera cited by Afghan returnees in Afghanistan (PACA) with those documented among Afghan refugees in Pakistan (PACP) by Manduzai et al. [59].

[Figure 2. Venn diagram comparing plant genera cited by Afghan returnees in Afghanistan (PACA) vs. Afghan refugees in Pakistan (PACP). Overlap: *Trachyspermum* only.]

Afghan refugees in Pakistan used nine genera actively (*Berberis*, *Plantago*, *Trachyspermum*, *Withania*, *Amaranthus*, *Camellia*, *Malva*, *Myrtus*, *Rumex*), while returnees in Afghanistan practice only three (*Bryophyllum*, *Salvia*, *Trachyspermum*). Only *Trachyspermum ammi* persists across both contexts, attributable to its dried-seed storability, pan-cultural culinary importance, and market availability, the

three conditions identified by Shah et al. [60] as necessary for LEK maintenance under structural constraint. The genera lost upon return reflect compound barriers: ecological mismatch (*Berberis*) requires highland environments absent near lowland camps, economic collapse preventing purchase (*Camellia*), loss of plant material during forced and rapid repatriation, severing of the elder-knowledge networks that sustained use, and food aid dependency reducing foraging motivation. The presence of *Bryophyllum* and *Salvia* exclusively in the returnee list suggests adoption during the Pakistani exile, followed by transport to Afghanistan, representing a form of cultural neo-genesis within the displaced pharmacopoeia.

Discussion

The findings of this study advance refugee ethnobiology as a distinct theoretical trajectory within migration studies, one that foregrounds not adaptation and hybridization, the dominant themes in voluntary migration contexts, but rupture, fragmentation, and the structural determinants of biocultural loss. Three theoretical contributions merit extended discussion.

First, the magnitude of erosion observed here, 78% of species reduced to passive memory, exceeds rates documented in all comparable migrant ethnobotany studies. Ceuterick et al. [17] found approximately 40% retention among Andean migrants in the UK; Fontefrancesco et al. [22] documented 40–70% retention among Albanian and Moroccan migrants in Italy; Pirker et al. [13] reported partial retention with substantial hybridization among Tyrolean migrants in the Southern Hemisphere. The Afghan returnee case diverges qualitatively from these voluntary migration trajectories. We propose that forced migration, particularly when compounded by prolonged urban exile and conflict-context return, produces a qualitatively distinct mode of knowledge erosion that existing theoretical frameworks derived from voluntary migration fail to capture. Double displacement, the sequential rupture of displacement and repatriation, is not simply additive in its effects but multiplicative, stripping away the social, environmental, and temporal conditions for knowledge transmission at each phase.

Second, we introduce the concept of “inert knowledge” to describe the specific condition of LEK observed among returnees: culturally present (remembered, nameable, attributable with properties) but behaviorally deactivated (no longer practiced, foraged, or transmitted). This concept distinguishes the Afghan returnee situation from both active knowledge (practiced and transmitted) and lost knowledge (neither remembered nor named). Inert knowledge occupies a liminal status; it is a form of biocultural heritage that exists as personal and collective memory but has been severed from the environmental and social conditions that gave it functional life. The theoretical significance of this distinction is considerable: it implies that knowledge revitalization, the reactivation of inert knowledge under changed conditions, may be possible in ways that recovery of genuinely lost knowledge is not. This opens an important policy window, but one that requires urgent action before holders of inert knowledge age out of living memory.

Third, the gendered dynamics of knowledge erosion in this study resonate with, but also complicate, the broader literature on gender and LEK. The paradox of women holding higher baseline knowledge while experiencing greater erosion rates reflects a structural trap specific to contexts of forced urban displacement in patriarchal settings: women's greater initial investment in plant knowledge makes them the custodians most affected by the gendered mobility restrictions that urban refugee life imposes. This pattern has not been systematically documented in prior ethnobiological literature, though de Meiros et al. [29] and de Oliveira Abreu et al. [30] have noted gender asymmetries in urban-rural knowledge differentials in Brazilian contexts. The Afghan case adds a forced migration dimension that transforms gender asymmetry from a cultural tendency into a structural trap, with the potential for permanent intergenerational rupture if women's foraging access is not restored.

The differential persistence of herbal teas versus wild vegetables observed here also advances our understanding of how knowledge type drives differential erosion. Building on Ellena et al.'s [40] observation that medicinal-symbolic knowledge often outlasts subsistence-practical knowledge in migrant contexts, our data show that market access is the critical mediating variable: knowledge associated with storable, marketable plant products (dried seeds, bark, rhizomes) survives not because the knowledge itself is stronger but because market channels substitute for direct ecological access. This finding has implications for understanding how globalized herbal markets may artificially inflate the apparent resilience of certain LEK categories while masking deeper ruptures in the human-environment relationship.

From the perspective of forced migration studies, this paper argues for a "biocultural turn" in refugee research. Humanitarian frameworks have historically prioritized shelter, nutrition, security, and legal status, which Kibreab [28] calls the "material" dimensions of displacement. Our findings suggest that LEK constitutes a "material-symbolic" resource: it is practically useful for food security and healthcare but also a carrier of identity, dignity, and social cohesion. Its erosion is therefore not merely a cultural loss but a material vulnerability. Returnees who have lost knowledge of wild edibles are more dependent on food aid and market access; those who have lost herbal knowledge are more reliant on formal healthcare in a country where healthcare systems have largely collapsed.

These findings also connect to the political ecology of return migration. Unlike voluntary returnees who may choose the timing and terms of return, Afghan returnees have been expelled under duress, arriving without adequate preparation, resources, or social networks to facilitate reintegration. The ecological conditions for LEK recovery, secure land access, stable community networks, proximity to known ecosystems, and intergenerational interaction, are structurally absent in transit shelters. Without deliberate policy intervention, the inert knowledge documented here may complete its transition to lost knowledge within a single generation.

Comparison with findings from community-based ecological restoration in related contexts such as the UNDP jujube tree-planting initiative in Nangarhar, Afghanistan [61] suggests that cash-for-work programs combining economic incentives with culturally relevant plant cultivation can simultaneously address

livelihood needs and create conditions for biocultural revitalization. Similar models, adapted to include wild plant species from the WFPP category, could function as vehicles for LEK reactivation.

Several limitations of this study require acknowledgement. The cross-sectional design at a transit shelter captures an acute displacement moment rather than long-term resettlement dynamics; current use patterns may shift substantially after resettlement. Retrospective recall of Pakistan-based practices may be subject to memory idealization. The small sample size ($n = 144$) limits statistical power for subgroup analyses. Future longitudinal research should track the same cohort across the resettlement process, examine LEK dynamics among returnees who settle in rural versus urban areas, and compare findings with those from returnees in Iran and other displacement contexts.

Conclusion

This preliminary study provides the first systematic documentation of wild plant LEK among Afghan returnees, revealing a pattern of biocultural erosion that exceeds any previously documented in migrant ethnobotany. Of 23 recorded species, 78% persist only as inert knowledge culturally present but behaviorally inactive. Wild vegetables have been almost entirely abandoned; herbal teas show only moderate, fragile persistence, mediated by market access rather than ecological engagement. The “double displacement” trajectory specific to returnees produces compounding disruptions to the social, environmental, and generational transmission of LEK that voluntary migration frameworks cannot adequately capture.

Theoretically, this study advances refugee ethnobiology as a distinct research field, introduces the concept of inert knowledge as a framework for understanding biocultural fragmentation under forced displacement, and documents a gendered structural trap in which women’s role as primary LEK custodians is actively undermined by the mobility restrictions of forced urban exile. Practically, the findings call urgently for biocultural approaches to humanitarian response: seed distribution programs, community pharmacopoeia gardens, gender-sensitive access to wild plant environments, and school-based ethnobotanical programs that involve elder women as knowledge holders before their knowledge completes its transition from inert to lost.

In an era of escalating forced displacement globally, the fate of LEK under conflict-induced migration is not merely an academic question: it is a question of food security, health resilience, cultural dignity, and the conservation of the biocultural heritage that displaced communities carry with them across every border they are forced to cross.

Declarations

Ethics approval and consent to participate:

The study adhered to the International Society of Ethnobiology Code of Ethics (<https://www.ethnobiology.net>). Verbal informed consent was obtained from all participants before the

interview. Participants were informed of their right to withdraw at any time.

Consent for publication:

All participants consented to the publication of their opinions in accordance with the ISE ethical guidelines.

Competing interests:

The authors declare no competing interests.

Clinical trial number

not applicable.

Human Ethics and Consent to Participate declarations

not applicable.

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Author Contribution

Ajmal Khan Manduzai & Andrea Pieroni designed the study and methodology, analyzed the most salient outcomes, and drafted the preliminary version; Ajmal Khan Manduzai & Andrea Pieroni reviewed the initial manuscript. Abdul Ghani Karimi assisted in plant identification. The final version was later revised and approved by all authors.

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Availability of data and materials:

The data supporting this study's findings are incorporated in the article. Further inquiries should be directed to the corresponding author.

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Figures

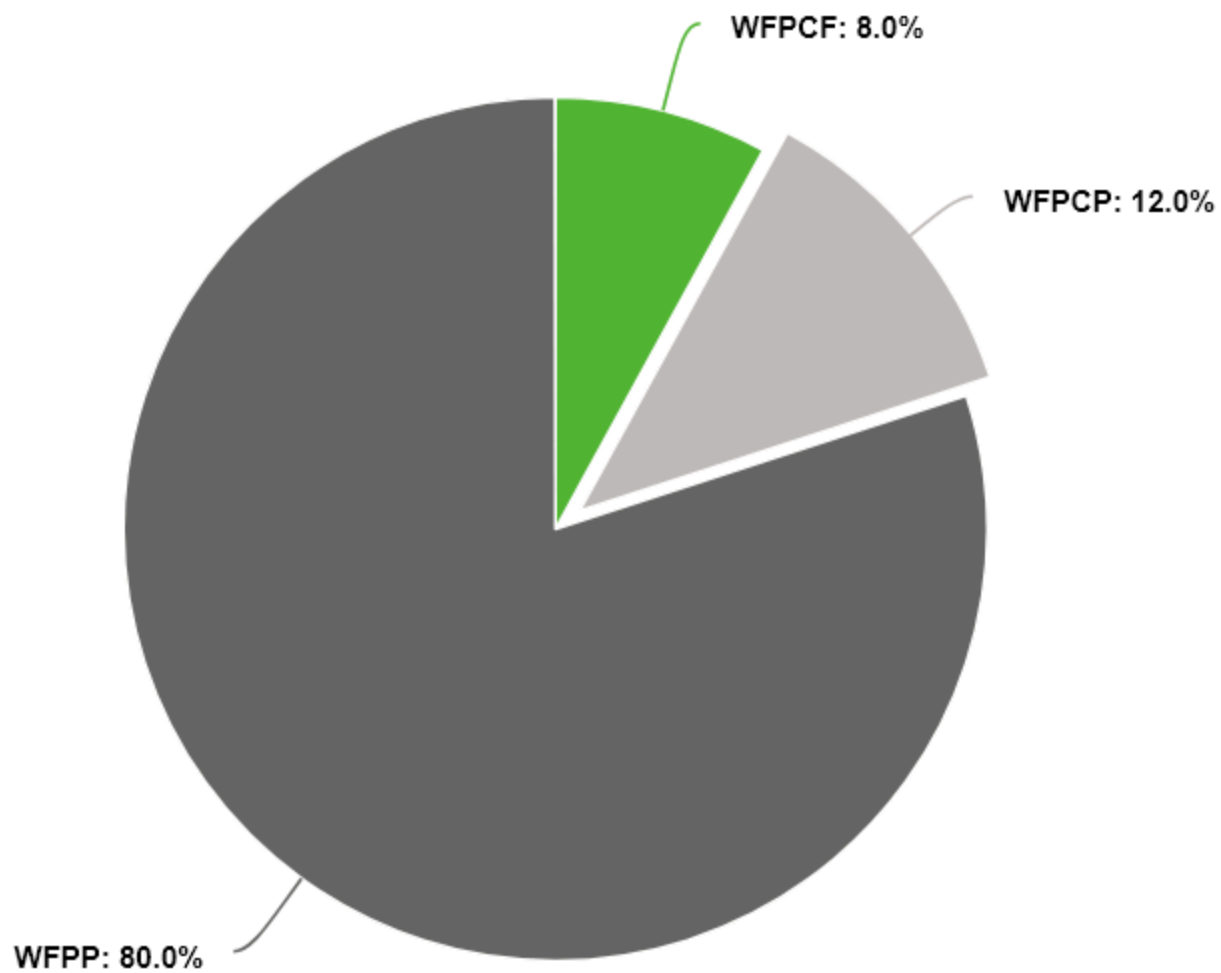


Figure 1

Wild food plants that were quoted among the considered diaspora. WFPP: Wild food plants remembered from the past. WFPCF: Wild food plants that are currently foraged. WFPCP: Wild food plants that are currently used.

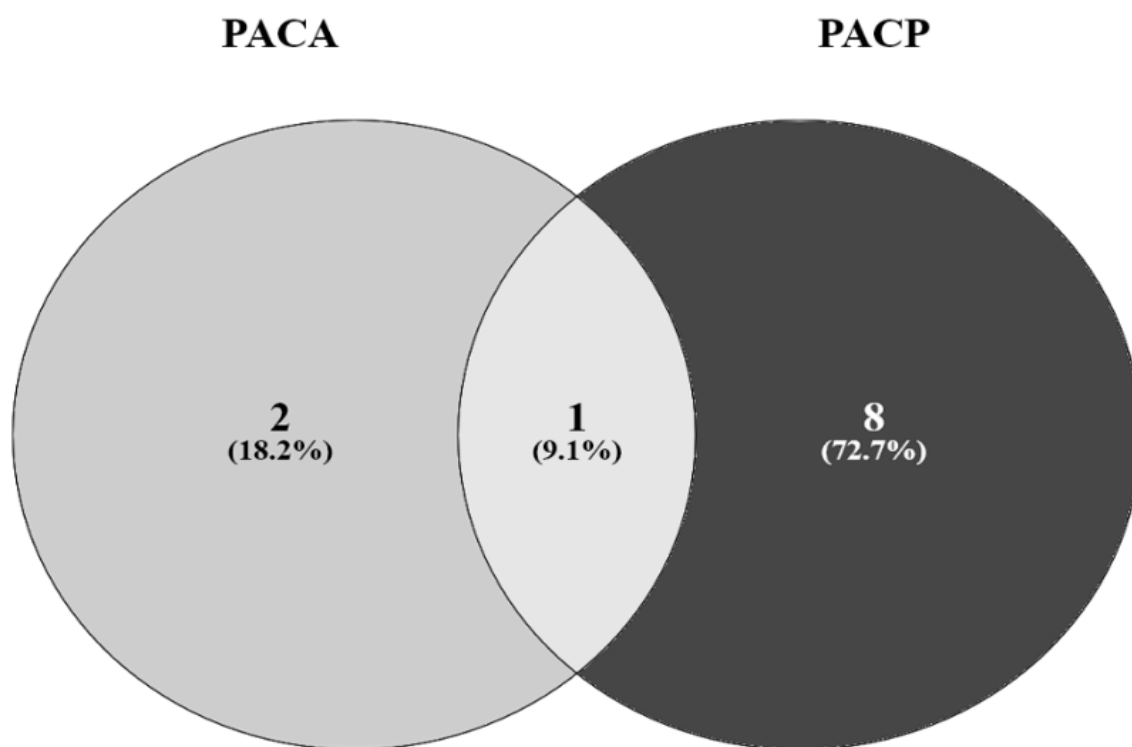


Figure 2

Venn diagram comparing plant genera cited by Afghan returnees in Afghanistan (PACA) vs. Afghan refugees in Pakistan (PACP). Overlap: *Trachyspermum* only.

Overlaps between the plant genera quoted by Afghan migrants in Pakistan and those quoted in the current study by the Afghan returnees in Afghanistan. PACA: Plant genera currently used by Afghan returnees in camps in Afghanistan. PACP: Plant genera currently used by Afghan refugees in camps in Pakistan.