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The Importance of Becoming Tamed: Wild Food Plants as Possible Novel Crops in Selected Food-Insecure Regions

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Abstract: Domestication of new plants is one of the key (ongoing) phenomena in the history of agriculture. Wild plants are the ancestors of current and future crops and the largest reservoir of genetic diversity for crop breeding and improvement. Wild food species have been used for human nutrition since ancient times and are often the object of human strategies for coping with emergency situations, such as natural disasters and conflicts. We analyzed qualitative data collected through ethnobotanical field studies conducted in recent years in five selected Eurasian regions (Afghanistan, Kurdistan region of Iraq, Pakistan, Syria, and Ukraine) that have been recently affected by wars and/or socio-political turbulence. Data were collected through participant observation and semi-structured interviews with local people. We identified five taxa for each region, which are culturally very salient in the local food systems, that retain an important economic value in local markets, and that, therefore, could be good candidates for becoming novel crops. The cultivation of the reported species may significantly help local communities in their post-war livelihoods and especially in terms of food security and domestic nutritional care. Future studies should focus on the agronomic feasibility of the highlighted species within their regional ecosystems.

Keywords: ethnobotany; wild food plants; Afghanistan; Kurdistan; Pakistan; Syria; Ukraine

1. Introduction

Domestication of new crops is one of the key events that formed the history of agriculture [1]. The number of plant species on our planet is estimated to be around half a million, among which, there are around 250 species considered fully domesticated, while other species are either semi-domesticated, undomesticated, or unidentified. Out of the 250 domesticated species, there are only a few species (e.g., potato, rice, wheat, corn, cassava) that form a source of 95% of the world's caloric intake [2]. Investment in these specific species puts huge pressure on the global biodiversity system; besides, undiversified food negatively impacts human health and leads to malnutrition. In addition to the role of wild

plants in being ancestors of the current as well as future crops, crops' wild relatives remain the largest reservoir of genetic diversity for crop breeding and improvement, especially since 75% of the genetic diversity of agricultural crops was lost during the last century [3]. Wild plants serve in solving the challenges of producing crop varieties resistant to pests and diseases; they also contribute to finding new varieties adapted to the changing climate conditions such as drought, high temperature, and frost waves [4]. Several conventional and modern techniques are used in wild plant domestication such as selection, reproduction, hybridization, and genetic modification [5].

Wild food plants (WFPs) have been used for human nutrition since ancient times. The bio-cultural heritage of wild food plants, neglected and underutilized species (NUS) has been the subject of numerous studies around the world over the past decade, given that diet diversification and traditional ingredients are regarded as key issues in combating malnutrition and famine [6–9]. Not least, recognizing the significance of NUS in traditional foods and cultures helps empower indigenous groups and reaffirm their identity [10]. Furthermore, focusing on traditional plant foraging is critical in many remote areas of the world for a better understanding of its role in informing food system sustainability, providing potential health benefits, maintaining key elements embedded in the local food heritage, as well as to fostering the revitalization, reinvention and valorization of local gastronomies [11–14].

A previous study from a few Eurasian regions highlighted the importance of WFP species as a part of the traditional cuisine [15]. The role of wild plants becomes crucial when they contribute to the survival of local people in times of food shortage and unaffordability [16,17]. A recent study showed that the reliance of local people on wild plants as a source of food had increased during times of conflict [18]. Hence, the main aim of this study is to identify those culturally salient wild food plants that could become novel crops and therefore help to cope with food insecurity in specific Eurasian food-insecure regions that have recently been affected by conflicts.

2. Materials and Methods

2.1. Background for the Case Study Areas

We chose five case studies (Afghanistan, Kurdistan region of Iraq, Pakistan, Syria, and Ukraine) representing five different areas and ecosystems (Central Asia, Middle East, South Asia, Mediterranean, and Eastern Europe), respectively. The climate in Afghanistan and Pakistan is continental with low annual precipitation and long dry seasons, which lead to a short period of availability of wild food plants [19,20]. To some extent, the climate in the Kurdistan region of Iraq is similar to the one in Central Asia. On the other hand, the Mediterranean ecosystem in coastal Syria, with around 1000 mm of rainfall annually, leads to a longer period of availability of wild food plants [18]. In Ukraine, wild foraging is a forest-based practice [21]; this makes wild foraging dependent mainly on the collection of wild fruits, which appear mainly during the summer and early autumn. The five selected study areas experienced similar problems arising from conflicts and security unrest. These new realities were reflected in all life aspects including agricultural production, access to food, and local communities' perceptions towards the surrounding environment.

2.1.1. Afghanistan

Afghanistan has a distinct flora with about 5000 recognized species, 25–30% of which are endemic to the country [22]. Over four decades of continuous war, overgrazing and climate change have severely damaged the ecosystem and disturbed the human art of dependence on the environment and its biodiversity [19]. In Afghanistan, rural communities continue to gather wild food plants as a key component of their daily diet for several months of the year. Women are the main traditional ecological knowledge (TEK) holders and foragers of widely available wild plants and weeds, gathered by using just their hands from anthropogenic areas close to cultivated plots. Young boys and girls, along with senior women and men, climb mountains to collect available wild food plants and sell them

cheaply in local markets to shopkeepers. Most of the wild plants gathered from mountains and weeds collected from areas close to agricultural plots are perceived as medicinal and combating hunger and malnutrition in times of famine.

2.1.2. Kurdistan Region of Iraq

Iraqi Kurdistan is a crucial area in the world in the history of agriculture. It hosts in fact some of the most important Neolithic settlements in Eurasia, such as Charmo, dating back to about 7000 BC [23,24]. Even though there is not yet a complete flora of Iraq including Kurdistan, it has been reported that in Kurdistan Region there are more than 3300 species [25]. A large proportion of these plants are located in the mountainous areas of the Kurdistan Region [26].

Iraqi Kurdistan has been the arena of some studies on WFPs in recent years, since Kurdish foraging practices are considered to be among the most vibrant and resilient ones in the world [21,23,24]. The turbulences of the past decades following the fall of Saddam Hussain's regime and especially those linked to areas which have been recently controlled by the so-called "the Islamic State" have increased the uncertainty in terms of food security. WFPs and especially wild vegetables during the spring are prominent in the local Kurdish foodscapes, making Kurdistan possibly the most iconic hotspot of wild vegetable diversity we have in Eurasia. However, the custom of knowing and gathering wild edible plants is mainly retained by elderly people, while young community members have often lost this heritage, despite local markets still offering a remarkable spectrum of diverse species to urban populations.

2.1.3. Pakistan

In Pakistan, recent studies have shown that the consumption of WFPs has remarkably decreased in the North Western belt of the country. The foraging practices are almost on the verge of extinction in many local communities. Most often, people rely on cultivated vegetables and commoditized food ingredients; therefore, ethnobotanical knowledge of WFPs is gradually decreasing and is quite threatened in certain localities. In the past, many plants have been part of traditional food systems across different cultural groups [20,27–31].

For the last two to three decades, remarkable social change has significantly impacted local foraging practices. Food mobility has altered the traditional food systems even in highly remote rural and mountain areas [30]. There are myriad of factors that may have restructured the local food systems and the foraging of WFPs. For instance, mass migration from rural and mountain areas towards cities is one of the prominent factors which has led people to rely on commercial food ingredients. Military conflicts that have been taking place in many parts across the tribal belt in western Pakistan have also indirectly affected land use management and access to foraging patches and horticultural practices. Especially in South Waziristan, the fragile security situation has led many people to abandon the local horticultural practices, while many households fled their villages and now they only come back to their villages for a very short time in summer.

2.1.4. Syria

Wild plants form an essential part of the traditional Mediterranean food system [7], and specifically wild vegetables are considered the "hidden Mediterranean diet" [32]. In coastal Syria, as a part of the Eastern Mediterranean basin, cooked vegetables and salads made from wild greens have been particularly important as local traditional foods since ancient times [33]. A recently published study from the coastal region of Syria documented 75 plant species used for food and beverage preparation [18]. Another study highlighted how wild plants contribute to the beverage culture among Syrian residents and diaspora [34]. The conflict in Syria started almost 12 years ago, and so far, it has caused mass food insecurity in the country where 60% (more than 12.4 million people) suffer from insecurity in securing their daily meals [35]. Sulaiman et al. stated that two-thirds of the study respondents reported an increase in their use of wild food plants during the conflict compared to the pre-

conflict era [18]. This clearly shows how significant is the role of wild plants in the resilience of people under conflict conditions. The sustainability of wild plant use is another crucial aspect that has been affected in recent years; local people reported that the abundance of several species has significantly decreased [15].

2.1.5. Ukraine

Foraging for wild plants (especially berries) and mushrooms is an important practice for millions of people living in Ukraine. This activity is perceived as a way to perpetuate the connectedness to the surrounding landscape. Nevertheless, the current war in Ukraine has resulted in an abrupt change in the people-nature relationship [36]. This mainly disconnects Ukrainians from their landscapes by preventing them from moving freely and by pushing them into a massive forced emigration and internal relocation [36,37]. This change is represented by the displacement of local people to safe areas (which are mainly rural areas) and avoiding the movement in open natural spaces in fear of mines and military operations. These changes have been reflected in a dramatic decrease in foraging activity and wild fruit collection. However, due to economic uncertainties such as increasing prices for food and unemployment, the demand for those products is increasing.

Due to the war, 90% of Ukrainians could face extreme economic vulnerability and poverty [38], possibly resulting in an increase in the demand for wild foods.

2.2. Data Collection and Data Analysis

Our present study is based on a qualitative comparative case method [39]. We mainly rely on unpublished qualitative data collected from the five countries corresponding to our long-term research areas (Table 1). The selected case studies are well-established field sites of the authors, and we collected data over time through participant observation and semi-structured interviews with local people (mainly elderly people). We selected five species from each study area. The selection criteria of the species were similar among all study areas. The selected species fulfil one or more of the following criteria: it has a high value in local food culture, is used quite often by the local communities, and/or has promising economic value represented by market demand. Study participants were asked about wild food plants, their uses, mode of preparation and consumption. Visits to local markets were conducted to record the availability and prices of the reported species. Local informants were asked to estimate the species abundance in the wild. We recorded the botanical characteristics of the species as well as their local cultural value. Informants were asked whether there were any attempts to cultivate the reported species. We followed the Code of Ethics of the International Society of Ethnobiology [40]. Proper botanical identification was conducted based on the national floras and plant specimens deposited in herbaria in the study areas (Herbarium of the Department of Botany at the University of Swat in Pakistan; Estonian University of Life Sciences herbaria; the Herbarium of the American University of Beirut; Rozthochya Nature Reserve) which store voucher specimens from Pakistan, Kurdistan, Syria, and Ukraine.

Table 1. The case studies conducted on wild food plants in five Eurasian countries.

Country	Region	Interviewers
Afghanistan	Diverse areas across the country	A.K.M., A.F.
Kurdistan region of Iraq	Autonomous Kurdish Region	A.P., R.S., H.M.
Pakistan	North Western regions	M.A.A.
Syria	Coastal region	N.Su.
Ukraine	Western *oblasts*	N.St., G.M.

The collected data was mainly qualitatively analyzed, with an intention to deeply understand the importance of highlighted species and the characteristics that may promote their domestication. The analysis exhibited the ethnobotanical uses of the reported species, as well as their socio-cultural significance. To determine the market value of some species,

we drew a comparison between the wild species' prices and other cultivated crop prices, while highlighting the average wages in the study areas. We assessed the environmental sustainability aspect by analyzing the estimated abundance of the species as well as observing the foraging patterns in the study areas. In addition, we reviewed the literature on the nutritional value of some species. Our analysis and discussion demonstrated the possibilities for and obstacles to cultivating the selected species.

3. Results and Discussion

3.1. Ecology, Diversity, and Nutritional Value of the Reported Species

The reported species belong to 20 genera and 16 families (Table 2). Those with herbaceous growth habits form 68% of the reported species, compared to 24% of shrubs and 8% of trees. The diversity of the reported species can be attributed to the ecosystem differences of the reported species. However, the results show that there is an overlap in the used species between the study regions. Species such as *Gundelia tournefortii* and *Chenopodium album* are used in different ecosystems and food cultures, which demonstrate the unique gastronomic characteristics of these species. The shrub-dominant habit of species growth in Ukraine explains the forest-oriented foraging pattern in the region; on the other hand, we observed the herb-dominant habit of species growth in Central Asia and the Middle East which relates to the pastoralism-based human ecological interactions.

Many of the reported species are leafy vegetables which are an important source of vitamins and minerals; this includes species such as *Malva sylvestris* (rich in Ca, Mg, and K), and *Gundelia tournefortii* (Ca, K, Na, P, Fe, Mg, and vitamin E) [41,42]. The zinc-rich species such as *Allium ampeloprasum* and *Gundelia tournefortii* could be crucial for the immune system [43]. *Capparis spinosa* possesses various biological activities, including antioxidant, antidiabetic, and anticancer, in addition to being a rich source of crude protein [44]. *Chenopodium album* leaves are rich in proteins (4.2%) with a high proportion of essential amino acids, as well as in fibers and vitamin C [45].

3.2. Mode of Preparation and Consumption

The reported species from Afghanistan were prepared in several ways. *Allium rosenbachianum* (locally called *Kheze*) is mainly gathered from the mountains surrounding the capital. Leaves of *A. rosenbachianum* are freshly gathered, washed and then boiled in water. Subsequently, this water is discarded, and leaves are fried with onion and tomatoes. This dish is eaten with mud oven-made bread *tandori naan*. A semi-similar way of preparation is followed with *Capparis spinosa* (locally called *Kevera*) where the fresh flowering buds are gathered, dried and fried with onion, tomatoes along with eggs for better taste (Figure 1). This dish is also eaten with traditionally prepared bread *tandori naan*. On the other hand, local people consume *Eremurus afghanicus* (locally known as *Siech*) in a variety of traditional ways such as with rice, or as a soup mixed with beans, mung bean and pea; while in the northern part of Afghanistan, the plant is chopped and used as a filling for the national Afghan dish *bolani* (a flat-bread, normally baked with a vegetable filling). On the other hand, the underground stem part of *Rheum spiciforme* is consumed fresh, while the fruits of *Quercus* spp. are processed into flour and used for the preparation of acorn bread (*pragi* or *nan-e-bloot*).

In the Kurdistan region of Iraq, as in several other Middle Eastern areas, *Gundelia tournefortii* (Kurdish: *Kingr*) is one of the most common foods in the spring (Figure 2). The internal lower aerial parts and sometimes roots are taken out from the soil and, after removing the thorny parts, are boiled for one to two hours and successively fried in oil with salt, onions, and garlic; another way of preparing the plant is in *Kingr kabab*, a traditional Kurdish food where eggs and flour are mixed with the vegetable and fried in oil. The way of preparing *Arum* spp. leaves (Kurdish: *Kardw*) is similar to *Kingr*, but one main difference is that *Arum* species, because of their toxicity, need to be first detoxified with water and sumac (*Rhus coriaria* L.). *Rheum ribes* stalks (Kurdish: *Rewas*) and *Dichoropetalum aromaticum* (Kurdish: *Baraza*) aerial parts are considered crucial snack foods consumed within the domestic arena with family members and friends, and which have a dense social and

nutritional meaning in the local culture (*Baraza* exclusively in the East of Iraqi Kurdistan). *Quercus aegilops* (Kurdish: *Barw*) fruits are instead harvested and roasted all over the region. Oak trees have a crucial cultural meaning in the Kurdish culture: they represented the main staple in times of famine, also via acorn bread-like preparations, while they sometimes provide in early summer the proverbial Kurdish manna, which is considered a delicacy and medicine in Kurdistan [46]. Oak trees have also recently been the object of a specific campaign organized by the local authorities, which aimed to cultivate one million *Quercus* trees; this is the biggest campaign of reforestation ever started in the Kurdistan region.

Table 2. Top culturally salient WFPs holding potential for domestication in five conflict-affected contexts across Asia and Eastern Europe.

Case Study	Species Name, Family	Part Used	Growth Habit	Estimated Environmental Sustainability	Occurrence in Local Markets	Attempts for Cultivation
Afghanistan	*Allium rosenbachianum* Regel, Amaryllidaceae	Leaves	Herb	High	Widespread	No
	Capparis spinosa L., Capparaceae	Flowering buds	Shrub	Moderate	Widespread	No
	Eremurus afghanicus Gilli, Asphodelaceae	Leaves	Herb	High	Widespread	No
	Quercus spp., Fagaceae	Fruits	Tree	High	Widespread	No
	Rheum spiciforme Royle and other *Rheum* spp., Polygonaceae	Stalks	Herb	High	Widespread	No
Kurdistan region of Iraq	*Arum* spp., Araceae	Aerial parts	Herb	High	Widespread	No
	Dichoropetalum aromaticum (Rech.f.) Pimenov & Kljuykov, Apiaceae	Aerial parts	Herb	Moderate	Widespread	No
	Gundelia tournefortii L., Asteraceae	Young leaves and roots	Herb	High	Widespread	No
	Quercus aegilops L., Fagaceae	Fruits	Tree	High	Widespread	No
	Rheum ribes L., Polygonaceae	Stalks	Herb	High	Widespread	No
Pakistan	*Amaranthus viridis* All., Amaranthaceae	Aerial part	Herb	Critically low	Almost absent	No
	Chenopodium album L., Amaranthaceae	Aerial part	Herb	Moderate	Rare	No
	Lepidium draba L., Brassicaceae	Aerial part	Herb	High	Widespread	No
	Malcolmia africana (L.) W.T.Aiton, Brassicaceae	Aerial part	Herb	High	Widespread	No
	Rumex spp., Polygonaceae	Aerial part	Herb	High	Widespread	No
Syria	*Allium ampeloprasum* L., Amaryllidaceae	Young aerial part and bulb	Herb	Moderate to low	Rare	No
	Anchusa strigosa Banks and Sol., Boraginaceae	Young aerial part	Herb	Low	Fair	No
	Crataegus azarolus L., Rosaceae	Fruits	Shrub	Low	Rare	Yes
	Gundelia tournefortii L., Asteraceae	Leaves midrib and underground stem	Herb	Critically low	Almost absent	Yes
	Malva sylvestris L., Malvaceae	Young aerial part	Herb	High	Widespread	No
Ukraine	*Chenopodium album* L., Amaranthaceae	Young aerial part	Herb	High	Widespread	No
	Corylus avellana L., Betulaceae	Kernels	Shrub	High	Widespread	Yes
	Hippophae rhamnoides L., Elaeagnaceae	Fruits	Shrub	High	Widespread	Yes
	Rubus idaeus L., Rosaceae	Fruits	Shrub	High	Widespread	Yes
	Vaccinium myrtillus L., Ericaceae	Fruits	Shrub	High	Widespread	No

Figure 1. Dried flower buds of *Capparis spinosa* (Photo: Manduzai A.K.).

Figure 2. Wild food plants (*Arum* spp. in the middle upper part of the picture and *Gundelia tournefortii* in the bottom) sold in a local market in Kurdistan (Photo: Ahmed H.M.).

In NW Pakistan, all of the reported species are consumed as cooked vegetables. However, some species such as *Lepidium draba* are also prepared as a salad or consumed as a raw snack (Figure 3). Some of the reported species are highly used in other parts of Pakistan as several studies from other regions reported the use of *Amaranthus* spp. [20,27,28,31]. Similarly, *Rumex* spp. is highly consumed and forms an essential part of cooked wild vegetables.

Figure 3. A local vendor selling WFPs (i.e., Eremurus *stenophyllus, Lepidium draba* subsp. *chalepense, Rumex dentatus*) in Quetta Bazar in Pakistan (Photo: Aziz M.A.).

Out of the five reported WFPs in Syria, four species are prepared by steaming the young aerial part with some food compounds. "*Sleeq*" is a popular wild plant-based dish where several wild leafy vegetables are steamed together with onion and olive oil. However, each of the reported species can be prepared in several ways. For instance, *A. ampeloprasum* can be consumed fresh as an appetizer, fried with eggs, or steamed with other wild leafy vegetables (Figure 4). *G. tournefortii* is a highly preferred species for its unique taste; it is usually steamed with chickpea or minced meat. The species *M. sylvestris* (locally called *Khebbaizeh*) is steamed with onion, olive oil, and bulgur. On the other hand, *C. azarolus* is consumed as a snack, especially when local people walk in the wild.

Fruits and nuts are the consumed part of most of the reported species in Ukraine; these can be explained by the forest-based forage ecosystem in the country. The nuts of *Corylus avellana* are mainly used in baked cookies and pies such as the traditional cookies of "Swallow's Nest" as well as the Christmas ritual dish "*Kutya*" (Figure 5). The nuts are also used as a snack and as an addition to some desserts. The fruits of *Vaccinium myrtillus* are consumed in various ways. The fruits can be preserved by keeping them with sugar in cold places over the winter. They are also used in preparing different jams and tinctures. Fresh fruits of *V. myrtillus* are used for traditional *varenyky* (a kind of tortellini with berries). The fruits can also be boiled and served with sour cream. Another mode of preparation is by using fresh fruits as ingredients in pies. Blueberries (*V. myrtillus*) are also used to make juices, fruit drinks, extracts, syrups, compotes and marmalades. They are also preserved dried to be used as tea or in pies and other preparations in wintertime [21]. Raspberry (*Rubus idaeus*) is another species whose fruits are consumed. It can be eaten fresh or used to make jam, jelly, marmalade, pastille, and juices. Raspberry wines, tinctures, and liqueurs are characterized by high-taste properties and exceptional aroma. The fruits can also be dried or preserved by grinding them with sugar. On the other hand, the aerial part of *Chenopodium album* is used (locally called *Loboda*). The species was used intensively in the past when there was little to eat in the spring. *C. album* is used in soups (e.g., green borscht), stews and fried vegetables. It could be used fresh or salted. The young aerial part is washed well before use by soaking it in a salty liquid. The plants can be preserved by spreading or

hanging them in bundles in the open air and then storage in glass jars or wooden boxes lined with paper.

Figure 4. Allium *ampeloprasum*; (Photo: Sulaiman N).

Figure 5. Hazelnut (*Corylus avellana*); (Photo: Stryamets S).

Table 2 clearly shows that the dominant modes of preparation and consumption among the reported species are the cooked green part of the species, and the snack consumption

of the raw fruits. However, some species could provide other uses such as grains in *Chenopodium album*, and *Amaranthus viridis*.

3.3. Economic Value of the Reported Species

All the reported species were found to be sold in local markets. More than three-quarters (76%) of the species are reported as widespread in the local markets (Table 2). In Afghanistan, Pakistan, and Kurdistan, young boys and girls, along with senior women and men, climb mountains to collect available wild food plants and sell them cheaply in local markets to shopkeepers. On the other hand, rural women in Syria collect wild plants from the surrounding communal lands and orchards and sell them to local shops or directly to customers in local markets. In Ukraine, both women and men collect wild species from the nearby forests and sell them to local markets. Some of our respondents in Syria reported that income generated from selling wild plants reaches up to 20% of their annual income. However, security concerns may limit these practices quite often as all our case study areas have experienced conflict and security unrest.

The prices of most of the wild plants in local markets are relatively lower than the cultivated species. This drives many people, especially those who live in the cities and town centers and cannot access the wild, to buy WFPs because they are more affordable in some study areas. However, some wild species are more expensive than the other cultivated species, as those wild plants are perceived as organic and healthier products. In addition, some species become rare in nature while the demand is high; this is reflected in relatively high prices. Table 3 shows the price of several species compared to the approximate price of other cultivated vegetables and fruits, and to the mean monthly salary [47].

Table 3. Comparison of the prices of the most iconic wild food plants and of cultivated species in the five selected case studies.

Case Study	Species Name	Price per Unit	Price of 1 kg Tomato	Price of 1 kg of Apple	Mean Monthly Salary (USD)
Afghanistan	*Allium rosenbachianum* *Capparis spinosa*	2 USD/kg 5 USD/kg	0.5 USD/kg	0.7 USD/kg	50
Iraq	*Arum* spp., *Rheum ribes*	3 USD/kg 2.05 USD/kg	0.68 USD/kg	0.7 USD/kg	1000
Pakistan	*Amaranthus viridis* *Chenopodium album*	1 USD/kg 0.9 USD/kg	2.2 USD/kg	2 USD/kg	365
Syria	*Anchusa strigosa* *Malva sylvestris*	0.3 USD/kg 0.2 USD/kg	0.4 USD/kg	0.7 USD/kg	30
Ukraine	*Corylus avellana* *Vaccinium myrtillus*	5 USD/kg of unpeeled nuts 5 USD/kg	1.7 USD/ kg	0.35 USD/kg	625

3.4. Sustainability Status of the Reported Species

Many of the reported species have been listed in the Red List Book such as *Rubus idaeus*, *Capparis spinosa, Vaccinium myrtillus, Corylus avellana*, *Crataegus azarolus*, and *Dichoropetalum aromaticum* [48]. An alarm status has been reported for some of these species such as *Crataegus azarolus*, and some other unlisted species such as *Amaranthus viridis*, *Allium ampeloprasum*, and *Gundelia tournefortii*, for which locals reported a noticeable decrease in the species' availability. This can be attributed to the unsustainable manner of harvesting in the case of *Allium ampeloprasum* as the whole plant is pulled with its bulb before reaching the flowering stage, while the case is different in *Crataegus azarolus* as the shrub is being largely cut to be used as firewood due to the fuel deficiency during the conflict in Syria. On the other hand, species such as *Dichoropetalum aromaticum* and *Capparis spinosa* are gathered in a sustainable way (only aerial parts are collected), but the common over-foraging of these species, due to their cultural and economic value, may raise a sustainability concern on the long term. *Vaccinium myrtillus* is largely available in (Western) Ukraine, yet its productivity depends on the year and on the

intensity of the previous harvest. In some areas of Ukraine, we observed an over-harvesting status of berries due to the crucial importance of this product for local economies of some Carpathian villages [15]. *Corylus avellana* is widely used as a building material for fences, decorations, and garden braces. In the steppes of Ukraine, *Corylus avellana* is used as firewood, and this may explain its unstable abundance status.

3.5. A Shift from Wild to Cultivated: Possibilities and Obstacles

All the reported species have high cultural importance as they form part of the traditional cuisine and are used on specific occasions (e.g., *C. avellana* is used in preparing a ritual Christmas dish in Ukraine). Drawing from our direct observations in the field, the reported species became crucial for local people in recent years after the study areas experienced tough economic circumstances linked to wars and socio-political turbulence. In a few cases, these species served as main food sources for many families. Economically, since all the highlighted species in Table 2 are sold in local markets, this suggests that these species have a considerable market demand and a promising economic value. Moreover, the potential new crops are supposed to be more eco-friendly as they are well adapted to local environmental conditions and thus can withstand biotic and abiotic stresses. Agricultural inputs (e.g., fertilizers and pesticides) will be less needed with the new potential crops as they have higher genome diversity and are more resistant to diseases and pests, as well as more adapted to different soil conditions. In addition, plant propagation materials (e.g., seeds, cuttings, division, grafting) are widely available in the wild. Thus, farmers will be more independent in their farming from commercial propagation materials. We observed that most of our study participants have either a piece of land or a home garden where they are able to practice horticulture, especially growing different vegetables. Some of our respondents reported difficulties experienced in foraging in some periods of the recent past, due to security concerns. Therefore, the cultivation of the foraged species could possibly provide rural households with more diverse and nutritious food resources without the need to forage in remote areas or to put themselves in unsafe/risky situations. For all the aforementioned reasons, the possibility of cultivating these species represents a serious option to be considered.

However, there are several obstacles to the exploration of this option. This is mainly related to the initiatives that should be taken by community leaders and local agricultural institutions. Moreover, the decreased abundance of these plants in the wild is another critical issue; therefore, the start of such a project for taming them could also serve as a bio-conservation measure. Agronomic feasibility is another crucial factor that needs to be studied before initiating cultivation programs in order to examine the yield and the potential pests and diseases that could challenge the cultivation. Molina et al. studied the agronomic feasibility of *Cichorium intybus* in the Mediterranean conditions of Spain and found that it has a higher yield than in its natural habitat (7016 kg/ha), whereas the yield of *Rumex pulcher* was 4923 kg/ha [49]. The same study highlighted the yield of some edible species in the wild such as the bulbs of *Allium ampeloprasum* and the fruits of *Crataegus monogyna* were around 250 kg/ha and 500 kg/ha, respectively. Another study reported a similar production yield of *Allium ampeloprasum*, and found the yield was positively correlated with monthly precipitation at harvest time [50]. However, cultivation experiments have to take into consideration that these values differ between ecoregions based on several factors such as soil, precipitation, temperature among the seasons, and plant varieties. Domestication of wild species through traditional agronomic methods is supposed to be ethically and socially feasible as it does not contain any genetic-editing techniques as in some other domestication processes [51]. In addition to species yield, taste quality is among the major traits that have to be considered when domestication programs are applied, as the gastronomic characteristics of the species will crucially affect their market demand.

Another crucial aspect that highlights the importance of the listed species is that some of them are considered to be wild crop relatives such as *Allium ampeloprasum* as a

wild relative to the cultivated garlic and leek (*Allium sativum* and *Allium porrum*), and *Corylus avellana* as a relative to *Corylus maxima* [52]. Thus, these wild species could play an important role in breeding such crops and conserving their diverse genetic materials.

3.6. Domestication as a Mean to Safeguard and Reinforce the Food Heritage of Local Communities: Potential Risks and Unintended Side Effects

All the reported species are embedded into the food culture and gastronomy of the studied local communities. However, the dynamics at play have hindered the use of some of these species, given the increasing detachment of local dwellers from the foodscapes where these species have been traditionally managed and harvested due to security issues related to the conflictual situations our case studies are facing. This could affect the persistence of the traditional gastronomic knowledge attached to these species. In this sense, the transformation of some of the identified species into novel cultivated crops could positively impact the maintenance and reinforcement of some key traits of the traditional gastronomic culture and associated heritage, also in post-conflict times.

However, this process is not free from possible frictions and side effects that could affect both the social and cultural value of these species, as well as their role in the diet of local communities. An increase in commercial value and adaptations to the market dynamics could negatively reverberate on the conservation of socio-cultural values attached to these species. Moreover, as already shown elsewhere [53–55], the valorization of wild foods and food-related resources could negatively affect the sustainability of the species and the ecosystem. While the issue could be possibly overcome through the cultivation of some of the identified species, the transformation of foods traditionally linked to subsistence and local diets into marketable products could run the risk of fostering their commodification (i.e., cultural and heritage commodification), eroding the values linked to specific social and cultural practices, shifting their role from subsistence foods to cash crops, and triggering the co-optation of products and associated knowledge by extra-local economic actors [56].

In order to potentially limit these side effects and create positive externalities in terms of the food security and traditional food heritage of local communities, a balance between the promotion of these foods for household consumption and as a source of income should be found. This would, in turn, require further participatory research aimed at exploring the possible scenarios related to the valorization processes (i.e., increase in the social and economic value and desirability of a product), focusing on potential changes in the roles that these species have traditionally played in the livelihoods and culture of local communities.

4. Conclusions

The present paper contextualizes and compares five Eurasian case studies that underwent similar socioeconomic realities arising from conflict situations and security unrest. We highlighted a total of 20 taxa with high potential to become novel cultivated plants in the present and/or in the post-conflict time. The reported species have high cultural importance for the local communities and have promising economic value. The suggested wild species for cultivation could improve the nutritional status of local communities and their security (as they can cultivate them close to their houses, avoiding the risk of foraging in areas distant from inhabited areas), and they could improve the economic situation for the household as they may contribute to income generation. The cultivation of the species will also significantly contribute to the conservation of vulnerable species, especially those highlighted by the Red List Book. The reported species in the present study may also be suitable for cultivation in the neighboring regions of our study areas. In addition, this study may contribute to drawing the attention of the scientific community to the importance of wild plants as possible novel crops, especially under the circumstances of climate change and biodiversity loss. Future studies should focus on the agronomic feasibility of the highlighted species within their regional ecosystems. Afterwards, local agrarian, NGO and other institutions could consider these local plants for widespread cultivation as a way to reduce food insecurity in conflict areas.

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