

Review

# The Role of Wild Food in Fostering Healthy, Sustainable, and Equitable Food Systems

Madison M. Scott<sup>1</sup>, Michael S. Carolan<sup>2</sup>  and Michael A. Long<sup>1,\*</sup>

<sup>1</sup> Department of Sociology, Oklahoma State University, Stillwater, OK 74078, USA; madison.scott11@okstate.edu

<sup>2</sup> Department of Sociology, Colorado State University, Fort Collins, CO 80521, USA; michael.carolan@colostate.edu

\* Correspondence: michael.long@okstate.edu; Tel.: +1-(405)-747-6105

**Abstract:** In this paper, we provide an overview of the research and literature on wild foods (i.e., edible plants that grow without human cultivation and/or animals harvested from their natural habit, i.e., food sourced from “hunting and gathering”) and their ability to assist food systems in becoming more sustainable and equitable. We begin with a discussion on the green revolution and the global capitalist food system that has been created and is dominated by large agribusinesses. Next, we turn to a brief discussion of how homogenizing the food system, as large agribusinesses have, leads to a corresponding loss of local culture. We then provide an overview of the main areas of wild food research, including nutrition, reducing food insecurity, the importance of cultural and shared knowledge, and sustainability. Our discussion stresses how focusing too heavily on the dichotomy of cultivated vs. wild food is problematic. Rather, lessons regarding health, sustainability, and equity can be learned from foragers, hunters and gathers.

**Keywords:** wild food; hunting; gathering; sustainability; food systems



**Citation:** Scott, M.M.; Carolan, M.S.; Long, M.A. The Role of Wild Food in Fostering Healthy, Sustainable, and Equitable Food Systems. *Sustainability* **2024**, *16*, 9556. <https://doi.org/10.3390/su16219556>

Academic Editor: Ilija Djekic

Received: 25 August 2024

Revised: 15 October 2024

Accepted: 1 November 2024

Published: 2 November 2024



**Copyright:** © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

In this paper, we highlight and review research on the role of wild foods (i.e., edible plants that grow without human cultivation and/or animals harvested from their natural habit, or more simply, food sourced from “hunting and gathering”) in helping to foster healthy, sustainable, and equitable food systems. Food insecurity, the condition in which individuals and households lack regular access to sufficient, safe, nutritious, and culturally appropriate food [1], is on the rise across the world due to myriad factors including increasing income inequality within and between nations, the lasting effects of the COVID-19 pandemic, and Russia’s invasion of Ukraine, to name just a few [2,3]. The global food system, which is primarily organized along neoliberal capitalist lines [4], has created a well-documented, export-oriented agribusiness model wherein food is primarily produced for its exchange value (i.e., as a commodity to be sold for money) rather than its use value, i.e., to feed and nourish the individuals (and their local communities) who produce it. Local food insecurity often results from this export-oriented model, as agricultural products which were grown to feed the local population in the past have given way to specialty crop production (e.g., coffee, tea, etc.). This model is linked to increasing local food insecurity as communities move away from the production of so-called traditional food crops. Alternative food movements have arisen around the world to challenge this process and build more equitable and sustainable local food systems. While there is already a substantial amount of literature on alternative food systems, and this area of study continues to grow, one area remains relatively understudied: namely, the role that wild foods play in food systems that provide resilience, equity, and sustainability at the individual, household, and community levels. In this paper, we review research that highlights the potential of wild foods in helping to reshape local and global food systems.

In this review paper, we begin with a discussion of the green revolution and the global capitalist food system and how they have impacted what foods were produced and how those foods were processed. We then briefly highlight how homogenizing the food system, as global capitalism has done, is accompanied by a homogenization of culture. The loss of traditional cultural knowledge around food and food systems becomes heightened during times of global crises, such as the COVID-19 pandemic. Next, we turn to an overview of the main areas of wild food research, including nutrition, reducing food insecurity, the importance of cultural and shared knowledge, and sustainability. We conclude with a discussion that outlines how focusing too heavily on the dichotomy of cultivated vs. wild food is problematic. Rather, lessons regarding health, sustainability, and equity can be learned from wild food foragers, hunters, collectors, and communities that embrace these values, which can then be applied to larger food systems.

## 2. Green Revolution and the Global Capitalist Food System

The green revolution refers to various research-based and technology transfer initiatives, with considerable philanthropic support (e.g., Rockefeller and Ford foundations), which took place immediately following World War II and are generally understood as having lasted into the 1970s. A principle aim of these activities focused on the creation (and later commercialization) of high-yield varieties of certain cereals, a goal that also required a simultaneous expansion of input infrastructure, from irrigation and other water delivery systems to petrol–chemical and seed-based supply chains and the related research and development. This resulted in new varieties of rice, wheat, and corn that proved highly responsive to synthetic fertilizers. The new varieties were quickly adopted in many parts of the developing world, and the production methods required led to dramatic increases in food production.

While helping bring forth remarkable yield gains, the green revolution has also been rightfully criticized for taking the focus away from social, political, and economic progress. By reducing global hunger to a technical problem, the solutions envisioned were, therefore, also technical in nature. The green revolution's implicit technological optimism thus took the focus away from broader *social* change. For example, in 1985, the head of the international body overseeing green revolution research, Syed Shahid Husain, argued that gains in productivity were all the poor required and that “added emphasis on poverty alleviation is not necessary” (quoted in [5]: 49). The green revolution thus forestalled many of the reforms (land reform, strong public institutions, etc.) that we know promote food security and access and agricultural independence, especially for the rural poor [2].

It has been argued that the infiltration of the green revolution into areas like Asia and Latin America reduced the interest that had been growing in those regions for radical political and social change by offering technical and market solutions, which are generally easier to implement compared to the complexities associated with overhauling governments and public institutions [6]. Established rural peasant movements in the Philippines, Indonesia, Malaysia, Vietnam, and India, and land reform movements in Latin America were stymied once the green revolution took root [2]. The reason for this was that technological solutions and scale-based farming practices (i.e., the green revolution is all about large-scale, capital-intensive farming) empowered the landed elites, thus giving those with the most to lose from political and social reform an opportunity to outmaneuver, marginalize, and further subjugate smallholders and landless peasant [7].

Countries that managed to move those social reforms forward—such as in those instances where land was more equitably distributed—made greater advances in reducing food insecurity in the 20th Century than in those that leaned fully into the green revolution mantra which told farmers to be ready for “getting big or getting out” [2,5,6]. An article in the *American Journal of Agricultural Economics* notes “a significant negative relationship” between an unequal distribution of agricultural land and output per hectare [8] (p. 202). This effect persists even after controlling for input use, land quality, human capital, and agricultural research effort. The point is that when the green revolution stalled social

reforms by proposing socio-technical “fixes”, it stopped reforms that we know, in hindsight, would have improved food security for millions.

A large part of the critique of the green revolution also lies in *what* foods were promoted. One highly cited study reveals the emergence of global food supply chains consisting of energy-dense foods such as soybeans, sunflower oil, and palm oil, along with more historically familiar staples like rice and wheat [9]. Wheat was found to be a major staple in 97.4 percent of all countries and rice in 90.8 percent of countries, whereas soybeans have become significant in 74.3 percent of countries. Alternatively, historically significant crops—those demonstrating important cultural resonance—are disappearing. These include cereals like sorghum, millets, and rye, as well as root crops such as sweet potato, cassava, and yam. Additionally, the consumption of a nutritious tuber crop known as Oca, once grown throughout the Andean highlands, has declined significantly in this region both in terms of cultivation and consumption since green revolution-type practices and foods entered regional food systems [9].

How the cereals of the green revolution are processed and consumed has also impacted the dietary health of billions. For example, cereals and rice are now consumed primarily after milling, a process that removes micronutrients. Conversely, legumes are traditionally consumed whole after cooking, ensuring that they maintain most of their micronutrient qualities [2]. In short, the green revolution approach to agriculture has homogenized the diets of people throughout the world. In addition to the negative nutritional implications, the green revolution also had profound social and cultural impacts on communities—an issue to which we now turn our attention.

### 3. Monocultures of the Mind, Community, and Knowledge

As food security is lost, so, too, are community, culture, and knowledge, which is to say, monocultures in fields and diets also translate into monocultures of society and culture. This is why critical agrifood scholars talk about biocultural diversity. It is no coincidence, for example, that most of the world’s biodiversity hotspots are also cultural hotspots, represented through the density of divergent ethnic groups, linguistic diversity, and a multitude of cultural practices and folk knowledge [10]. Examining Tribal Nations in North America, Eric Smith [11] found a correlation between measures of biodiversity within regions and measures of cultural and linguistic diversity. Nabhan’s [12,13] research into Native American foodways, specifically focusing on communities in the southwestern portion of the US, reveals a high diversity of folk crop varieties which support traditional farming techniques made possible by the generational transference of cultural knowledge.

Nazarea’s [14] seminal research on the livelihoods of sweet potato farmers in the Philippines is especially telling. At one site, communities had begun the processes of commercializing production, while at another they continued their traditional subsistence farming practices. Nazarea had hypothesized that commercialization causes a narrowing of genetic and cultural diversity among sweet potatoes raised. Her hypothesis was confirmed. Moreover, she observed a large disparity between the two sites in terms of the number of varieties known or remembered compared to the biodiversity that existed. At the commercial site, farmers had knowledge about a far lower percentage of sweet potato varieties than at the other site, having forgotten most that still existed and that were still planted elsewhere in the country. This suggests that cultural knowledge erodes faster than genetic diversity and that the decimation of the former leads to the loss of the latter. Nazarea [14] writes that this finding signifies that “in the context of agricultural development and market integration, knowledge may actually be the first to go” (p. 62).

Talk of needing to rethink our food systems increased considerably in the aftermath of the COVID-19 outbreak, as evidenced by the growing calls to build pandemic-, crisis-, and/or future-proof supply chains (see e.g., [15,16]). Attention, too, is being directed at those monocultures of the green revolution and the long, specialized (and *brittle*) supply chains that have developed around them. Today’s conventional food systems are built around just-in-time principles. Just-in-time supply chains prioritize long, specialized

chains seeking to exploit so-called Ricardian “efficiencies (e.g., low-cost labor markets and lax environmental regulation enforcement) with assistance from specialized logistical software [17]. The pandemic revealed the fragilities of food systems built around these “efficiencies”.

This should not be taken as an attack or rejection of agribusiness per se. As others have argued, our point is that markets are neither innocent nor apolitical but are built upon concerns, values, and assumptions [18]. To talk about a just-in-case transition is to speak to a philosophy that values building buffers and flexibility into food systems and markets to make them more resilient to shocks [19]. Wild foods are an example of an element that could be built into food systems as an alternative to the just-in-time philosophy: just-in-case agrifood systems. Just-in-case systems can have global elements but not at the exclusion of being rooted in a place. This allows them to remain resilient, especially when global supply chains break down. These systems and the knowledge and cultural values attached to their provision and preparation also help sustain the community [20].

The concept of just-in-case transition and the associated just-in-case supply chain also allows us to address hunger due to the global population surge post-World War II (especially in Africa) and the fact that some regions are less suited for food cultivation. The redundancies created in just-in-case agrifood systems are particularly beneficial for these areas. Brittle food systems are especially disastrous for areas plagued with poverty, insufficient arable land, and decades of underinvestment in infrastructure [21].

Just-in-case agrifood systems also help ensure the preservation of cultural knowledge. As noted, the expansion of monoculture farming has cut into traditional ecological knowledge (TEK) [22]. Safeguarding TEK, for instance, has become a priority for the FAO, as evidenced by its Globally Important Agricultural Heritage Program.

So, what is wild food in terms of its history, its foods, and the communities it helps maintain? A review of the wild food literature will help us address this question.

## 4. Wild Foods Literature

### 4.1. *Hunting and Gathering*

Throughout human history, the food-foraging processes of hunting and gathering have played a crucial role in diet maintenance. In the modern era, the importance of these acts has decreased significantly due to the broader availability of cultivated and commercial foods; however, many individuals still choose to incorporate wild foods into their diets for a variety of reasons, including financial and cultural factors, and more. The practice of foraging excludes cultivated foods, only including those that occur naturally without purposeful human intervention [23]. While the term “hunting” exclusively covers the collection of wild meat [24] such as deer, duck, or boar, the “gathering” portion of foraging includes the collection of plants and fungi, including mushrooms, nuts, fruits, and beyond [23].

Those engaged in foraging behaviors learn in a variety of ways, frequently through personal connections with other foragers or existing literature; these resources often teach potential foragers not only which plants can be foraged, but also the preparation of wild foods and ethics of foraging [25]. In a study based on foraging habits in the US state of Oklahoma, one forager noted that these rules often vary locally, but general rules include leaving endangered plants alone, only taking what one needs at that time, and avoiding federal preserves and private land [26].

Despite both the prevalence of gathering in more wooded areas and potential access issues in more densely populated areas, wild food foraging in urban locations appears to be on the rise [23,27,28]. However, in some cases, it was found that trees in urban areas produced a seasonal yield of nutrients that was lower than the recommended daily intake, mostly due to the prevalence of trees that produced zero yield year-round [27]. Interestingly, forest census data have found that higher-income neighborhoods had a greater number of trees producing edible yields [27]. Even so, some low-income communities continue to support the use of foraging to supplement their nutrient intake. In one study that focused

on predominantly Black communities in Atlanta Georgia, the largest public food forest (a forest-like, community-managed food garden), “Urban Food Forest at Browns Mill”, was found to not only provide a space for residents to forage their food, but also create a stronger sense of community well-being [28].

While the food-gathering literature is abundant, research on hunting tends to be more limited to locations with abnormally high rates [24,29], especially when factoring in research that looks at hunting through the lens of gun culture, in some cases sidestepping the food angle of the practice entirely (e.g., [30]). Nonetheless, studies continue to find that wild meat not only plays a role in nutrition, but also in financial security for those areas with hunting opportunities. In West Africa, researchers found that most bushmeat was used within the house of the harvester, with a smaller percentage being sold or gifted to other locals [29]. This not only decreased the likelihood of consuming commercial meat, but also reduced household expenses on meat and increased potential for selling [29].

Nielsen et al. [24] conducted a large study of wild meat consumption in the Global South. They found that wild meat was most important to low-income households, although there was a weak relationship between the total income of these households and wild meat-based income [24]. This implies that wild meat is used mostly for nutritional purposes/personal consumption rather than to procure additional income for families [24]. They also found that reliance on wild meat had an inverse relationship with domestic animal reliance, with households that focused heavily on wild meat consumption showing very low reliance on livestock, often due to the inability of these households to afford these resources [24].

The practices of both hunting and gathering are quite diverse across global communities, with much of this being explained by each individual community’s access to food and nutrition. While some people in food-secure areas engage in foraging as a hobby, cultural practice, or social activity, others rely on wild foods to combat poverty, malnutrition, and food insecurity. In the following sections, we will explore these issues further.

#### 4.2. Nutrition

While usually not the primary source of food in the contemporary world, wild food foraging can supplement diets in spaces where food is less accessible, whether that be due to living in a food desert, not having sufficient financial resources, along with a variety of other factors. In some places, people of all ages struggle to meet the daily recommended intake of certain nutrients unless this intake is supplemented by wild foods. In the Baringo District of Kenya, for example, it was found to be impossible to meet iron requirements without the addition of wild foods, particularly during the dry season [31]. Even with the addition of wild foods, nutrient targets for zinc and iron were still missed in infants throughout the year, showing that additional approaches to increase nutritional outcomes need to be taken due to overall deficiencies in many people’s diets [31].

As commercial farming and protected lands become more widespread, people’s relationship with wild food changes in turn. In areas where there are substantial amounts of these forms of land use, wild foods become less available to the average individual and, in some cases, can lead to negative nutritional impacts [32]. In Laos, for example, the shift to more agricultural-based land use was intended to create further food access but instead it had a negative impact; increased rice intake came at the expense of a more traditional diet made up of wild meat, insects, vegetables, and fruit [32,33]. Despite the increased income resulting from expanding cash crop production, research shows that this does not always make up for the nutrient deficiencies that are the result in the change in diets [32]. As land use changes occurred and reliance on forest-based foods has been minimized, the impact of decreased access to the greater nutrient density of wild plants and animals has proven problematic in the face of greater dependence on commercial goods [32,33].

### 4.3. Food (In)security

According to the Food and Agriculture Organization (FAO; [34]), there are four dimensions that must be simultaneously fulfilled for a community to be considered food-secure. Not only must food be (1) available (i.e., enough food is produced locally and globally to adequately feed the entire population), but it must also be (2) both physically and economically accessible (3) on a regular, stable basis while also (4) providing sufficient energy and nutrients to community members [34]. In some definitions, food *preference* is also considered. In these cases, food security is diminished when the available foods are not aligned with the preferences of those who are eating it, meaning that people could theoretically have access to food yet remain food-insecure [35]. When one or more of these dimensions remains unmet, one strategy that some choose to employ is incorporating wild food sources into their diets.

Many case studies around the globe have highlighted the importance of wild foods in local food security. Areas within countries such as the United States [26,36], Jamaica [37], Uganda [38], Brazil [39], and many more have community members who regularly utilize wild foods to make up for a broader lack of food access. In a study by Ahmed et al. [36], findings showed that those who reported food insecurity were more likely to engage in hunting. In another by Erskine et al. [40], the researchers found that wild food collection was significantly higher in years with worse crop outcomes than those in which food was plentiful. Even still, some individuals and communities refuse to eat wild foods, even if they are food-insecure. This often comes because of the stigmatization of these foods as “food of the poor” [41] (p. 1299).

Climate change is disrupting food growing and collection processes, which may increase food insecurity in areas that rely upon wild foods to supplement their diets [37]. Consumption of wild food, particularly native species, often depends on geographic and meteorological shifts in their range of availability [25]. The impacts of climate change, such as increasing temperatures and changes in precipitation, can shift native ranges of species and make certain forms of life less likely to survive. In one northern Canadian community, for example, residents feared that higher temperatures and drought-like conditions would dry up a local lake, which residents were heavily reliant on for both personal nutrition and commercial fishing [42]. Should climate change continue to shift weather patterns over time, those who rely on wild foods may further struggle with food insecurity, as those foods may no longer be available in the quantities they used to be. Similarly, as agriculture continues to expand and more land is dedicated to the cultivation of crops, changes in land use can destroy environments conducive to wild foods [32]. This will increase the nutritional and financial strain on those who rely on foraging and/or hunting for nutrition, as these land use changes will force them to look elsewhere for food.

### 4.4. Cultural Perspectives and Shared Knowledge

Not only are wild foods often considered a sustainable way to supplement the nutritional intake of consumers' diets, but they can also play a crucial role in creating and maintaining culture. The procurement and preparation of certain wild food items symbolize the passage of traditional knowledge, with younger family members being educated by those from older generations [36]. This wealth of knowledge is more common in older individuals living in remote areas who have had extensive experience with edible plants due both to advanced age and greater connection to the environment outside of urban centers; despite some of these urban centers having similar biodiversity to more remote areas, knowledge of these resources appears less widespread in cities [43]. Nevertheless, other studies found that duration of residence and educational level had little impact on the knowledge of species [44].

Wild foods provide a way to maintain culture, but culture also plays an important role in maintaining the use of foods. To protect communities that play an important role in both local and global food systems, programs have been created to attempt to bring attention to these areas. One such program labels these communities Globally Important

Agricultural Heritage Systems (GIAHSs). For sites labeled as GIAHSs, the program focuses on three levels of intervention: (1) global, which includes international awareness and education, (2) national, which emphasizes acknowledgment of the GIAHS in country-wide policy, and (3) local, which disseminates information about conservation and adaptation at a local level [45]. These interventions seek to protect and restore these areas so that they can continue to provide food to a global population [46]. Cultural knowledge plays a major role, as the program acknowledges the importance of the longstanding Indigenous perspectives that have allowed these systems to thrive [46].

In unprotected areas with fewer young people, transmission of wild food collection, preparation and consumption knowledge has diminished, decreasing the likelihood that certain plants will be used in the future due to their unknown status among youth [47]. In other cases, a lack of interest can also lead to the deterioration of tradition. In places where mass tourism has increased dependence on the food industry, younger generations have become detached from their foraging-based heritage, leading to decreases in knowledge transmission [43,44]. In some cases, as the cost of living continues to rise, younger community members have also found themselves needing to work to support their family, rather than spending their days on the land collecting food and exchanging cultural knowledge, which is no longer lucrative enough. Younger individuals now often spend time at work earning money to buy food from local stores [45]. While in the past, foraged foods were viewed as staple foods that were a necessary part of daily life, younger generations often view foraging as a social activity that allows them to celebrate their heritage and diversify their meals [47].

#### 4.5. Sustainability

Despite the positive impacts that foraging can have on communities, it can also wreak havoc on local environments and species. In particular, in cases where certain species become highly sought-after or competitively foraged, local ecologies can deteriorate [48]. While regular foragers sometimes have a code of ethics, not all foragers consider preserving wild food spaces [26]. The kneejerk reaction may be to put stricter regulations on wild food foraging; however, increased regulation and the creation of new policies can impede gathering habits [49]. This increases the tendency towards the colonization of conservation, denying some who rely on wild food sources their right to use nature as needed for their health and nutrition [50]. Some researchers decry the practice of bureaucratizing natural resources, claiming it damages the bond between humans and nature and forces the natural world to take on the qualities of property [49]. These concepts are especially important when considering Indigenous land use. Making food collection a legal issue could have discriminating impacts on Indigenous cultures who have traditions and customs that may expand beyond any legal land boundaries [51].

In some situations, wild foods may be more sustainable than cultivated foods. In previous studies, researchers have estimated that food demand will double by 2050 [52]. If that is the case, current food production levels simply will not suffice. The sustainability of modern-day food cultivation has been called into question, with particular attention being given to soil erosion and nutrient loss [53]. While crop diversification has been proposed as a potential solution and has succeeded in some ways [53], one cannot be sure that this would be a sufficient way to protect the soil during times of increased demand. Increased education and usage of wild foods may be one way to supplement the food supply while also keeping the sustainability of land in mind. Nonetheless, those living near urban areas should practice caution when utilizing these resources. Experienced foragers emphasize the importance of avoiding food collection near well-traveled roads, in chemically treated fields, or within a mile of oil operations [26]. Knowledge of health concerns both in the context of pollution and (mis)identification of species is key to ensuring that foragers remain safe. Some researchers suggest that these conversations about sustainability, food knowledge, and folk history be integrated into school curriculum. This would allow not

only for these ideals to be passed down onto future generations, but would also facilitate the avoidance of homogenization of food systems [48].

In the case of wild meats versus livestock, some argue that wild meat may also be a more sustainable option [54]. While livestock production is sometimes cited as a way to help meet the demands of a growing population, these systems are also a significant source of greenhouse gas emissions [55]. At the same time, hunting can be detrimental to local fauna. In a study conducted on wild meat in the Global South, Nielsen et al. [24] found that 76% of the communities studied felt that wild meat availability had declined over the past five years, with most people attributing this fact to overexploitation of resources by locals. While livestock production does contribute to greenhouse gasses, wild meat hunting can sometimes cause irreparable damage to local species. Both approaches have their drawbacks, but the positive aspects that each food source provides suggests a deeper examination of how to regulate and streamline these processes to be more sustainable and less destructive to the environment is necessary. One of the most promising paths forward appears to be engaging with Indigenous groups to discuss their historical uses of wild foods. Through trust and open communication, conservation organizations and Indigenous communities can create a way to move forward that is rooted in the successes of the past [51].

## 5. Discussion: The Future of Wild Foods

In our overview of the wild food literature, we touched on scholarship that highlights the role of wild foods in supplementing consumers' diets for nutritional purposes, in reducing overall food insecurity, in maintaining shared cultural traditions and knowledge, and in contributing to environmental sustainability. Wild foods appear to be a promising avenue to assist in fostering healthy, sustainable, and equitable food systems.

As we noted earlier, the just-in-time supply chains that have been developed by large agribusinesses during the green revolution, and still exist today, are prone to shocks and disruptions due to the length and specialization of the supply chains [17]; not to mention that the just-in-time approach is preferred by global capitalism. Events like the COVID-19 pandemic and the Russian invasion of Ukraine have demonstrated the fragility of global supply chains and highlighted the importance of the search for healthy, sustainable food-sourcing alternatives to global agribusinesses. We would also like to note here that, while our review is predominately framed from a perspective which views wild foods as part of an alternative food system, this is not always the case. For some communities, wild foods are not an alternative food system, but rather, part of their community's "conventional" food system. While not a panacea for food insecurity and undernutrition, wild foods represent another tool as we look to create food systems rooted in places' agroecological and cultural realities. The hunting and gathering of wild foods also keep traditional knowledge and culture alive for many who regularly incorporate wild foods into their diets. This knowledge is often passed on to the next generation, continuing the transfer of cultural knowledge and traditions. These cultural aspects of wild food consumption also help strengthen local food systems, as bonds are built around collecting and consuming wild foods. Finally, we believe wild foods can help make food systems more equitable. Here, again, the cultural aspects of wild food collection and consumption are important because they add equity into the local food system, as there is a collective aspect to eating traditional foods that involves sharing, inclusion, and helping the community overall [20]. Furthermore, as Fleming and Mix [26] note, most foragers of wild foods follow a code of conduct that includes not harvesting endangered plants, only foraging what you need (i.e., leave some for others to forage), and avoiding federal preserves and private lands. If more consumers could practice the restraint and collective vision of many hunters and gathers of wild foods, food systems would become more equitable.

Like other researchers, we believe it is essential to oppose conceptualizations that pit "wild" and "cultivated" food sources against each other, preferring instead to think about these environments as existing along a "wild–cultivated continuum" [56]. Figure 1



illustrates that food environments are more nuanced than the dichotomous wild/cultivated distinction allows. The figure, for instance, gives space to recognize, in terms of policy and practice, those hybrid zones that demonstrated both cultivation and wildness, such as home gardens and guerilla gardens. (While not listed in Figure 1, so-called guerilla gardening involves raising food on land that gardeners do not have legal rights to and can include acts of “seed bombing” where seeds are planted and perhaps never tended to again [57]). When conceptualized as such, wild foods are less “the” solution to food security and human flourishing than yet another variable practice to promote as we seek agrifood systems rooted in the agro-cultural-ecological conditions of a place.



**Figure 1.** Food environments. Reproduced from [56] Creative Commons license: <https://www.frontiersin.org/journals/nutrition/articles/10.3389/fnut.2024.1343021/full> (accessed on 17 August 2024).

The cultivated/wild dichotomy helps obscure the path to (or from) healthy, sustainable, and equitable food systems. We argue that, while wild foods realistically cannot be the solution to all the problems of the global capitalist food system, they can help increase nutrition and decrease food insecurity in communities, and the values of sustainability and equity that are often part of wild food use can be extended to larger food systems. However, we are claiming that all those involved in wild food procurement and consumption are noble, follow the code of conduct and care about healthy, sustainable, equitable food systems. Some overharvest, hoard locations and use wild foods for a source of income. Conversely, not all cultivated food is bad, unsustainable and part of inequitable food systems controlled by large agribusinesses. Numerous examples of sustainable local food systems across the globe are based primarily around cultivated foods. Rather, the issue at hand is constructing alternative food systems that are healthy, sustainable and equitable. We believe that wild foods have an essential role to play in these alternative systems alongside sustainable and equitably cultivated foods.

We also do not wish for our argument to be taken as assuming that market policies and the green revolution have silenced all forms of agrifood resistance. Movements like MST in Brazil and the Via Campesina demonstrate this is not the case, as those attached to these networks continue to be influential voices in this discussion. Agrifood systems are an amalgamation of competing values and concerns. This includes not only global

market policies, corporations, and capital that seek to compress time and space [58] but also networks of resistance that, as in the case of Via Campesina, can operate at multiple scales [59]. Wild food fits within this tapestry not only because it offers another source of food and contributes to the just-in-case resiliency mentioned earlier. But also, those engaged with wild foods can be something other than farmers, fishers, pastoralists, rural workers, or ranchers. Wild food helps to expand the tent as those movements seek to enroll participants. Those engaged in wild food cultivation—“cultivation” in the sense of building and nurturing communities of practice that go beyond hunger alleviation—should see themselves as part of food *systems* struggles.

**Author Contributions:** Conceptualization, M.A.L., M.S.C., M.M.S.; writing—original draft preparation, M.M.S., M.S.C., M.A.L.; writing—review and editing, M.M.S., M.S.C., M.A.L. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

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

## References

1. FAO. *The State of Food and Agriculture 2021. Making Agrifood Systems More Resilient to Shocks and Stresses*, 1st ed.; FAO: Rome, Italy, 2021; Available online: <https://openknowledge.fao.org/items/552896c3-03be-4b36-a8aa-0cffc2bfc70d> (accessed on 24 August 2024).
2. Carolan, M. *The Real Cost of Cheap Food*, 3rd ed.; Routledge: New York, NY, USA, 2024.
3. McGreevy, S.R.; Rupprecht, C.D.; Niles, D.; Wiek, A.; Carolan, M.; Kallis, G.; Kantamaturapoj, K.; Mangnus, A.; Jehlička, P.; Taherzadeh, O.; et al. Sustainable agrifood systems for a post-growth world. *Nat. Sustain.* **2022**, *5*, 1011–1017. [CrossRef]
4. Long, M.A.; Gonçalves, L.; Stretesky, P.B.; Defeyer, M.A. Food Insecurity in Advanced Capitalist Nations: A Review. *Sustainability* **2020**, *12*, 3654. [CrossRef]
5. Lappe, F.; Collins, J. *World Hunger: Twelve Myths*, 1st ed.; Grove Weidenfeld: New York, NY, USA, 1986; p. 49.
6. Gonzalez, C. Trade liberalization, food security, and the environment: The neoliberal threat to sustainable rural development. *Transnat'l L. Contemp. Probs.* **2004**, *14*, 419–498.
7. de Janvry, A.; Sadoulet, E. A study in resistance to institutional change: The lost game of Latin American reform. *World Dev.* **1989**, *17*, 1397–1407. [CrossRef]
8. Vollrath, D. Land distribution and international agricultural productivity. *Am. J. Agric. Econ.* **2007**, *89*, 202–216. [CrossRef]
9. Khoury, C.; Jarvis, A. The Changing Composition of the Global Diet: Implications for CGIAR Research, CIAT Policy Brief International Center for Tropical Agriculture, Cali, Columbia, No 18, November. 2014. Available online: [https://ciat.cgiar.org/wp-content/uploads/2014/11/policy\\_brief\\_global\\_diets.pdf](https://ciat.cgiar.org/wp-content/uploads/2014/11/policy_brief_global_diets.pdf) (accessed on 10 August 2024).
10. Stepp, J.; Cervone, S.; Castaneda, H.; Lassetter, A.; Stocks, G.; Gichon, Y. Development of a GIS for global biocultural diversity. *Policy Matters* **2004**, *13*, 267–270.
11. Smith, E.A. On the coevolution of cultural, linguistic and biological diversity. In *On Biocultural Diversity: Linking Language, Knowledge and the Environment*, 1st ed.; Maffi, L., Ed.; Smithsonian Institution Press: Washington, DC, USA, 2001; pp. 95–117.
12. Nabhan, G. Native American crop diversity, genetic resource conservation, and the policy of neglect. *Agric. Hum. Values* **1985**, *11*, 14–17. [CrossRef]
13. Nabhan, G. *Enduring Seeds: Native American Agriculture and Wild Plant Conservation*, 1st ed.; University of Arizona Press: Tucson, AZ, USA, 1989.
14. Nazarea, V. *Heirloom Seeds and Their Keepers: Marginality and Memory in the Conservation of Biological Diversity*, 1st ed.; University of Arizona Press: Tucson, AZ, USA, 2005.
15. Colicchilo, T.; Kessler, E. How to Crisis-Proof Our Food System. *Politico*, 13 May 2020. Available online: <https://www.politico.com/news/agenda/2020/05/13/how-to-crisis-proof-our-food-system-254798> (accessed on 9 August 2024).
16. Moscoso, P. How to Future-Proof Supply Chains. *Forbes*, 27 July 2021. Available online: <https://www.forbes.com/sites/iese/2021/07/27/how-to-future-proof-supply-chains/?sh=b2c98d220f24> (accessed on 9 August 2024).
17. Golhar, D.; Stamm, C. The just-in-time philosophy: A literature review. *Int. J. Prod. Res.* **1991**, *29*, 657–676. [CrossRef]
18. Roscoe, P.; Townley, B. Unsettling issues: Valuing public goods and the production of matters of concern. *J. Cult. Econ.* **2016**, *9*, 121–126. [CrossRef]
19. Carolan, M. Just-in-case transitions and the pursuit of resilient food systems: Enumerative politics and what it means to make care count. *Agric. Hum. Values* **2023**, *40*, 1055–1066. [CrossRef]

20. Bharucha, Z.; Pretty, J. The roles and values of wild foods in agricultural systems. *Philos. Trans. R. Soc. Lond.* **2010**, *365*, 2913–2926. [[CrossRef](#)] [[PubMed](#)]
21. Petersen-Rockney, M.; Baur, P.; Guzman, A.; Bender, S.F.; Calo, A.; Castillo, F.; De Master, K.; Dumont, A.; Esquivel, K.; Kremen, C.; et al. Narrow and brittle or broad and nimble? Comparing adaptive capacity in simplifying and diversifying farming systems. *Front. Sustain. Food Syst.* **2021**, *5*, 564900. [[CrossRef](#)]
22. Das, A.; Gujre, N.; Devi, R.J.; Mitra, S. A review on traditional ecological knowledge and its role in natural resources management: North East India, a cultural paradise. *Environ. Manag.* **2023**, *72*, 113–134. [[CrossRef](#)]
23. Synk, C.M.; Kim, B.F.; Davis, C.A.; Harding, J.; Rogers, V.; Hurley, P.T.; Emery, M.R.; Nachman, K.E. Gathering Baltimore’s bounty: Characterizing behaviors, motivations, and barriers of foragers in an urban ecosystem. *Urban For. Urban Green* **2017**, *28*, 97–102. [[CrossRef](#)]
24. Nielsen, M.R.; Meilby, H.; Smith-Hall, C.; Pouliot, M.; Treue, T. The Importance of Wild Meat in the Global South. *Ecol. Econ.* **2018**, *146*, 696–705. [[CrossRef](#)]
25. Barnett, G. *Foraging Kentucky: An Introduction to the Edible Plants, Fungi, and Tree Crops of the Southeast*; University of Kentucky Press: Lexington, KY, USA, 2024.
26. Fleming, O.M.; Mix, T.L. Wild Food Foraging in Oklahoma: A Pathway to Creating Imagined Foodways and Foodscapes. *Sustainability* **2024**, *16*, 4175. [[CrossRef](#)]
27. Bunge, A.; Diemont, S.A.W.; Bunge, J.A.; Harris, S. Urban foraging for food security and sovereignty: Quantifying edible forest yield in Syracuse, New York using four common fruit- and nut-producing street tree species. *J. Urban Ecol.* **2019**, *5*, juy028. [[CrossRef](#)]
28. Gaither, C.J.; Aragon, A.; Madden, M.; Alford, S.; Wynn, A.; Emery, M. “Black folks do forage”: Examining wild food gathering in Southeast Atlanta Communities. *Urban For. Urban Green.* **2020**, *56*, 126860. [[CrossRef](#)]
29. Schulte-Herbrüggen, B.; Cowlshaw, G.; Homewood, K.; Rowcliffe, J.M. The Importance of Bushmeat in the Livelihoods of West African Cash-Crop Farmers Living in a Faunally-Depleted Landscape. *PLoS ONE* **2013**, *8*, e72807. [[CrossRef](#)]
30. Yamane, D. The sociology of US gun culture. *Sociol. Compass* **2017**, *11*, e12497. [[CrossRef](#)]
31. Termote, C.; Raneri, J.; Deptford, A.; Cogill, B. Assessing the potential of wild foods to reduce the cost of a nutritionally adequate diet: An example from eastern Baringo District, Kenya. *Food Nutr. Bull.* **2014**, *35*, 458–479. [[CrossRef](#)] [[PubMed](#)]
32. Broegaard, R.B.; Rasmussen, L.V.; Dawson, N.; Mertz, O.; Vongvisouk, T.; Grogan, K. Wild food collection and nutrition under commercial agriculture expansion in agriculture-forest landscapes. *For. Policy Econ.* **2017**, *84*, 92–101. [[CrossRef](#)]
33. Krahn, J. Cooking Up: Dietary change in Lao upland kitchens. *Perspect. Lao Dev.* **2003**, *1*, 4–14.
34. FAO. An Introduction to the Basic Concepts of Food Security. Available online: [https://www.fao.org/fileadmin/user\\_upload/eufao-fsi4dm/docs/concepts\\_guide.pdf](https://www.fao.org/fileadmin/user_upload/eufao-fsi4dm/docs/concepts_guide.pdf) (accessed on 24 August 2024).
35. Pinstrup-Andersen, P. Food security: Definition and measurement. *Food Secur.* **2009**, *1*, 5–7. [[CrossRef](#)]
36. Ahmed, S.; Wayne, T.; Stewart, A.; Shanks, C.B.; Dupuis, V. Role of Wild Food Environments for Cultural Identity, Food Security, and Dietary Quality in a Rural American State. *Front. Sustain. Food Syst.* **2022**, *6*, 774701. [[CrossRef](#)]
37. Campbell, D.; Moulton, A.A.; Barker, D.; Malcolm, T.; Scott, L.; Spence, A.; Tomlinson, J.; Wallace, T. Wild Food Harvest, Food Security, and Biodiversity Conservation in Jamaica: A Case Study of the Millbank Farming Region. *Front. Sustain. Food Syst.* **2021**, *5*, 663863. [[CrossRef](#)]
38. Ojelel, S.; Mucunguzi, P.; Katuura, E.; Kaudidi, E.; Namaganda, M.; Kalema, J. Wild edible plants used by communities in and around selected forest reserves of Teso-Karamoja region, Uganda. *J. Ethnobiol. Ethnomed.* **2019**, *15*, 3. [[CrossRef](#)]
39. de Medeiros, P.M.; dos Santos, G.M.C.; Barbosa, D.M.; Gomes, L.C.A.; da Costa Santos, E.M.; da Silva, R.R.V. Local knowledge as a tool for prospecting wild food plants: Experiences in northeastern Brazil. *Sci. Rep.* **2021**, *11*, 594. [[CrossRef](#)]
40. Erskine, W.; Ximenes, A.; Glazebrook, D.; da Costa, M.; Lopes, M.; Spycckerelle, L.; Williams, R.; Nesbitt, H. The role of wild foods in food security: The example of Timor-Leste. *Food Secur.* **2015**, *7*, 55–65. [[CrossRef](#)]
41. Padulosi, S.; Amaya, K.; Jäger, M.; Gotor, E.; Rojas, W.; Valdivia, R. A Holistic Approach to Enhance the Use of Neglected and Underutilized Species: The Case of Andean Grains in Bolivia and Peru. *Sustainability* **2014**, *6*, 1283–1312. [[CrossRef](#)]
42. Spring, A.; Carter, B.; Blay Palmer, A. Climate change, community capitals, and food security: Building a more sustainable food system in a northern Canadian boreal community. *CFS/RCÉA* **2018**, *5*, 111–141. [[CrossRef](#)]
43. Bortoloto, I.M.; de Mello Amorozo, M.C.; Neto, G.G.; Oldeland, J.; Damasceno-Junior, G.A. Knowledge and use of wild edible plants in rural communities along Paraguay River, Pantanal, Brazil. *J. Ethnobiol. Ethnomed.* **2015**, *11*, 46. [[CrossRef](#)] [[PubMed](#)]
44. de Oliveira, L.Z.; Albuquerque, U.P.; Peroni, N.; Araújo, E.L. Do socioeconomic characteristics explain the knowledge and use of native food plants in semiarid environments in Northeastern Brazil? *J. Arid. Environ.* **2015**, *115*, 53–61.
45. FAO. GIAHS: Globally Important Agricultural Heritage Systems Strategy and Approach. Available online: <https://www.fao.org/giahs/background/strategy-and-approach/en/> (accessed on 24 August 2024).
46. Koohafkan, P.; Aliteri, M.A. *Conserving Our World’s Agricultural Heritage*; Food and Agriculture Organization of the United Nations: Rome, Italy, 2010.
47. Cucinotta, F.; Pieroni, A. ‘If you want to get married, you have to collect virdura’: The vanishing custom of gathering and cooking wild food plants on Vulcano, Aeolian Islands, Sicily. *Food Cult. Soc.* **2018**, *21*, 539–567. [[CrossRef](#)]

48. Aziz, M.A.; Mattalia, G.; Sulaiman, N.; Shah, A.A.; Polesny, Z.; Kalle, R.; Sökand, R.; Pieroni, A. The nexus between traditional foraging and its sustainability: A qualitative assessment among a few selected Eurasian case studies. *Environ. Dev. Sustain.* **2022**. [[CrossRef](#)]
49. du Plessis, P.L. Hunting and Gathering Practices of the Anthropocene: In Conversation about Hunting-Gathering. *Etnofoor* **2023**, *35*, 127–132.
50. Vasquez, W.; Sunderland, T. The rights way forward: Reconciling the right to food with biodiversity conservation. *Oryx* **2023**, *57*, 370–378. [[CrossRef](#)]
51. USDA. Indigenous Stewardship Methods and NRCS Conservation Practices Guidebook. Available online: <https://efotg.sc.egov.usda.gov/references/public/va/IndigenousStewardship.pdf> (accessed on 24 August 2024).
52. Godfray, H.C.J.; Beddington, J.R.; Crute, I.R.; Haddad, L.; Lawrence, D.; Muir, J.F.; Pretty, J.; Robinson, S.; Thomas, S.M.; Toulmin, C. Food Security: The Challenge of Feeding 9 Billion People. *Science* **2010**, *327*, 812–818. [[CrossRef](#)]
53. Kumari, V.V.; Balloli, S.S.; Kumar, M.; Ranama, D.B.V.; Prabhakar, M.; Osman, M.; Indoria, A.K.; Manjunath, M.; Maruthi, V.; Chary, G.R.; et al. Diversified cropping systems for reducing soil erosion and nutrient loss and for increasing crop productivity and profitability in rainfed environments. *Agric. Syst.* **2024**, *217*, 103919. [[CrossRef](#)]
54. Zhu, S.J.; Mfuni, T.I.; Powell, B. Greater Attention to Wild Foods and Cultural Knowledge Supports Increased Nutrition Outcomes Associated with Agroecology. *Sustainability* **2024**, *16*, 3890. [[CrossRef](#)]
55. Monteiro, A.; Barreto-Mendes, L.; Fanchone, A.; Morgavi, D.P.; Pedreira, B.C.; Magalhães, C.A.S.; Abdalla, A.L.; Eugène, M. Crop-livestock-forestry systems as a strategy for mitigating greenhouse gas emissions and enhancing the sustainability of forage-based livestock systems in the Amazon biome. *Sci. Total Environ.* **2024**, *906*, 1167396. [[CrossRef](#)] [[PubMed](#)]
56. Zeitler, L.; Downs, S.; Powell, B. Adapting food environment frameworks to recognize a wild-cultivated continuum. *Front. Nutr.* **2024**, *11*, 1343021. [[CrossRef](#)] [[PubMed](#)]
57. Reynolds, R. *On Guerrilla Gardening: A Handbook for Gardening Without Boundaries*; Bloomsbury Publishing: London, UK, 2014.
58. Castree, N. The spatio-temporality of capitalism. *Time Soc.* **2009**, *18*, 26–61. [[CrossRef](#)]
59. Claeys, P. Vía Campesina’s struggle for the right to food sovereignty: From above or from below? In *Rethinking Food Systems: Structural Challenges, New Strategies and the Law*; Lambek, N.C.S., Claeys, P., Wong, A., Brilmayer, L., Eds.; Springer: New York, NY, USA, 2014; pp. 29–52.

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