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Review

The Agri-Food and Mountain Products Market: Insights beyond the COVID-19 Pandemic

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Abstract: Food security is one of the main concerns in the context of a global crisis such as the COVID-19 pandemic. The reduction in people's mobility determined changes in consumers' behavior and underlined the need for the re-organization of the food supply chains. This paper aims to summarize the effects of the COVID-19 pandemic on the global, Romanian and mountain food markets, as well as to discuss the mountain agriculture potential and the food democracy model. The trend in the post-pandemic era is heading toward the digitalization of agriculture and food distribution, with great attention on product sustainability. People are more and more aware of healthy food and the environmental impact of this sector. Many studies revealed the need for specific policies to counteract the effects of the pandemic on food quality and security and on the economic welfare of people. In the post-pandemic period in mountain areas, there is a need for the valorization of food products that originate from here since they have great health and financial potential. Supporting mountain agriculture could ensure the production of high-value products, which are generally preferred by consumers. The COVID-19 pandemic contributed to the re-orientation of consumers towards local and organic foods. Future research regarding the efficiency of the programs and policies implemented in some mountain areas after the pandemic is necessary.

Keywords: COVID-19 pandemic; traditional foods; mountain products; food policies; food system resilience

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1. Introduction

Humanity has survived throughout its evolutionary history, from the Paleolithic period or the Stone Age to the Neolithic or the agricultural age, continuing on to the industrial age and culminating at the beginning of the XXI century. At this time, there was a revolution of cybernetic and informational systems, causing famines, and on a global scale, anthropocentric economic crises that mankind produced [1]. This style of living has certainly been harmful, both for the environment and for the human species [2]. Among the problems that occurred, the rise of the sea and ocean levels since 1990 by 10–20 cm [3] and the melting of glaciers, which registered values of about 28 billion tons of ice melted between 1994 and 2017, must be mentioned [4]. Also, soil fertility has decreased greatly in recent decades due to the advanced modernization of agricultural activities, and more than 35% of arable land has been degraded due to uncontrolled anthropogenic activities [5].

In this context, what are the implications for humanity? An answer can be given: since the emergence of humanity until today, man has learned to adapt. Going through an extreme event can be traumatic, but at the same time, it creates opportunities to design new

valuable mechanisms for society at present. It can be said that the COVID-19 pandemic has introduced new adaptations, new changes, or better said, the beginning of an era of change [6], creating the opportunity to evaluate systems, traditions, and values. The pandemic started and caused restrictive measures to be taken by governments, such as social distancing, isolation, and restrictions on space circulation, highlighting, from the beginning, the vulnerability of the food system and its slowdown. In the context of food security, this fact has caused fear all over the world. During the COVID-19 pandemic, hunger levels in the world increased in just one year from 8.4% to around 10% [7]. The largest undernourished populations are in Africa and Asia; at the end of 2020, they represented around 700 million more severely affected people compared to those in 2019 [8]. This number has increased by approximately 100 million on these two continents. The COVID-19 pandemic has had many effects on various aspects of life and disturbed all sectors, including agriculture and food [9]. The agri-food systems changed continuously under the pressures of the COVID-19 pandemic and climate change, and the actual concern is focused on viable solutions for the sustainable development of this sector [10,11].

There is great potential for the food industry, especially if we take into account the rural and especially mountainous landscape. Small family farms represent a huge potential for modeling and transforming local food systems. The mountainous areas are characterized by highly heterogeneous farms. Applying differentiated policies specific to these areas would allow for an increase in this type of farming and ensure the raised potential of traditional biocultural food.

There are some studies presenting the predilection of consumers for online shopping [12,13] and for local organic food [14]. In addition, the changes in the food market during and after the COVID-19 pandemic have been evaluated, and some directions were evidenced: transparency and the tradability demand from consumers, the sustainable development of the agri-food system, the support of traditional and authentic foods, and digitalization for enhancing communication between actors [15]. However, it is important to evaluate all these aspects in the mountain context, which presents many more particularities compared to those of lowland areas and cities. Other studies reported the increased interest of consumers in organic foods [14] obtained in less-polluted areas and without agrochemicals and additives. Mountain products usually meet these criteria since they are made on a smaller scale via extensive systems. Thus, it is important to outline the advantages of these products that may contribute to food security and the local economy. Based on the existing literature, some hypotheses can be noted:

1. The COVID-19 pandemic changed consumers' behavior related to agri-food mountain products.
2. Mountain products have an important potential for the development of the communities and the satisfaction of consumers' demand for organic foods.

To our knowledge, the impact of the COVID-19 pandemic on mountain farmers, the product market, and consumers has not yet been assessed, but there is the premise that farmers, in general, must produce regardless of the context. They are the first ones who have to produce food since this is their basic activity, besides the proper functioning of the food chain being ensured. There is a gap in the literature regarding the synthesis of the mountain agri-food products market in the post-pandemic context. Furthermore, there is no review paper presenting consumers' behavior related to mountain products during the COVID-19 pandemic and post-pandemic eras. Such a synthesis would be helpful for institutions to design and adopt food policies specific to mountain areas. Furthermore, this information could help mountain farmers and producers to adapt their marketing strategies and food quality to the consumers' demand. Thus, the aim of this review was to summarize the main characteristics of the global and Romanian post-pandemic food market, as well as to underline the potential of mountain products and mountain agriculture in this context. The paper comprises six sections apart from the introduction, methods, and conclusion: the first section presents the food market in the post-pandemic period at global level and in Romania; the second section is related to the evolution of the mountain products market in

the post-pandemic era; the next section presents the importance of mountain products and a case study supporting their potential; the last section presents the food democracy as a model of food governance in the post-pandemic era.

2. Materials and Methods

Scientific publications were considered from the existing literature indexed in databases such as Web of Science, Scopus, and Google Academic. After reading the abstracts, papers that did not align with the aim of this research were eliminated. A total of 93 articles and reports were included in this review after a thorough assessment of the abstracts and the provided information. Only papers in English were considered and the complete papers not available were excluded. The keywords used for the search included: *agri-food system, *COVID-19 pandemic, *post-pandemic, *food system resilience, *sustainable development, *mountain products, *food policy, *mountain agriculture, *food democracy.

A bibliometric analysis was conducted by using VOSviewer software (version 1.6.19, Leiden University). A map based on textual data (Figure 1) was generated using data from reference manager files with RIS extensions, specifically drawing from titles and abstract sections. The full counting method was selected, with a minimum requirement of a term occurring at least three times.

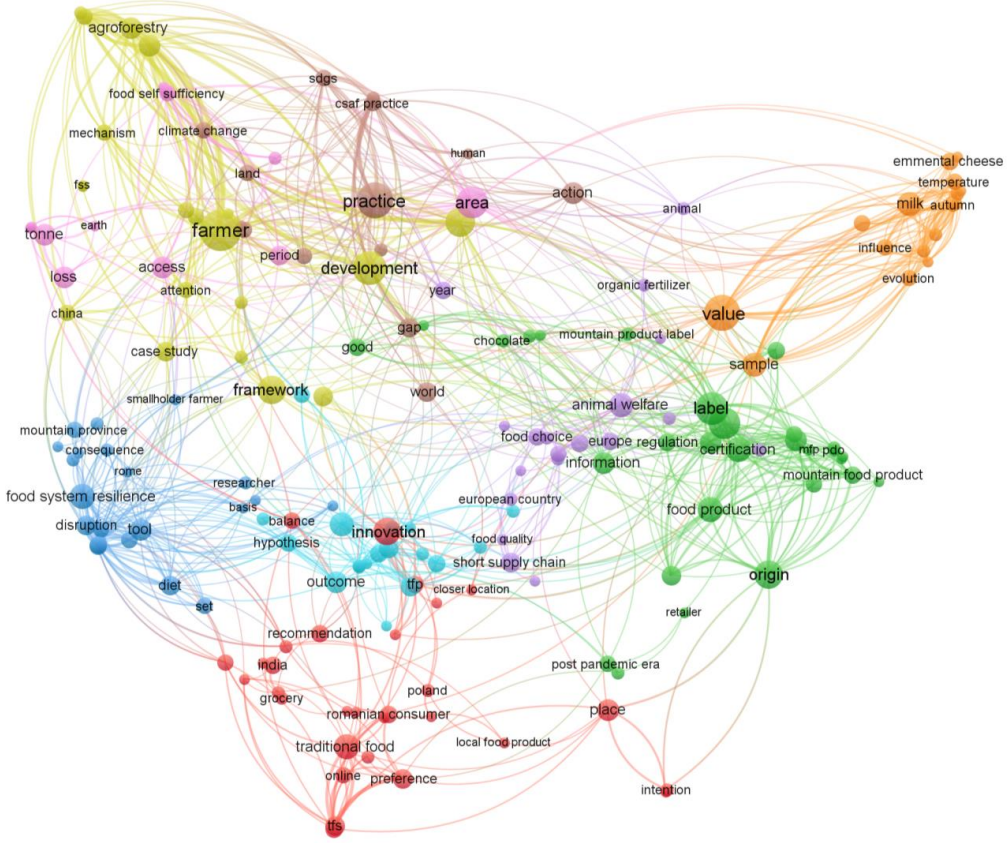

Figure 1. Key elements network map.

The keywords related to the COVID-19 post-pandemic situation of the food system and mountain products were grouped into 11 clusters. The largest cluster, represented with a red color, contains the most important elements related to the topic, with 30 items. It is followed by the dark green cluster, comprising 29 items. The third cluster comprised 21 items, in dark blue, followed by the fourth cluster with 20 elements in light green, the fifth cluster with 19 items in purple, the sixth cluster with 18 items in turquoise, the seventh cluster with 16 items in orange, the eighth cluster with 14 items in brown, and the last one with 12 elements in pink.

The second map generated highlights the most significant authors who contributed to the topic (Figure 2).

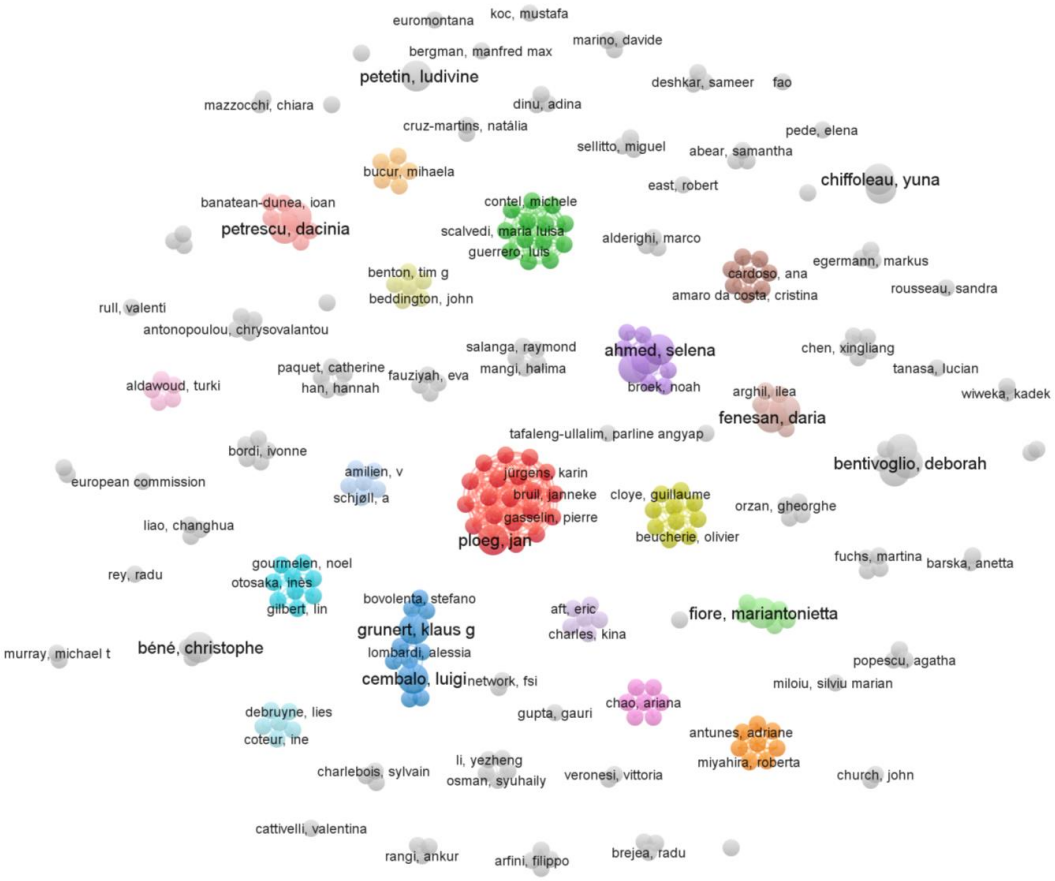

Figure 2. Map of the authors concerned about the COVID-19 post-pandemic food market.

The number of papers related to the food market in the post-pandemic era included in this study is depicted in Figure 3, and the papers are grouped based on their publication year. The highest number of papers was published after 2019.

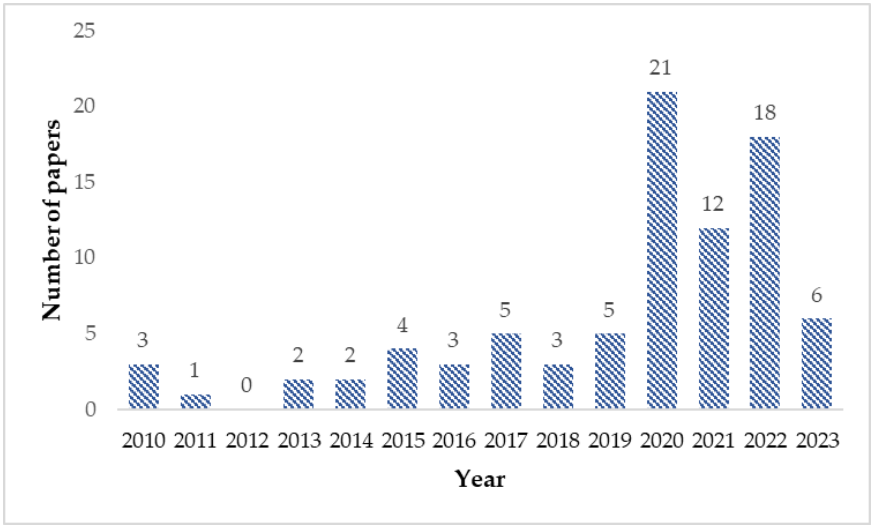

Figure 3. Number of papers related to the topic considered in this review and published between 2010 and 2023.

3. Post-Pandemic Food Market

3.1. The Global Post-Pandemic Food Market

The achievement of the second Sustainable Development Goal (SDG) which aims to eliminate hunger by 2030, encountered complications due to the COVID-19 pandemic. The food system requires immediate transformation to become sustainable. In this context, the UN Food Systems Summit (FSS) aimed to "launch bold new actions, solutions and strategies to deliver progress on all 17 SDGs, each of which relies on healthier, more sustainable and more equitable food systems" [16]. It is crucial to support mountain farming beyond industrialized agriculture because people in these areas possess essential knowledge on sustainable livestock management [17]. One-third of the global food production is managed by smallholder farmers, yet they face challenging working conditions that do not allow them to earn enough income [17]. Hubeau et al. [18] summarized the pathways for food system transformation, along with the necessary strategies and actions:

- Promoting innovations and chain-wide partnerships: establishing sustainability definitions for particular food chains, supporting financial innovations, and creating novel distribution and business models [18];
- Supporting food system efficiency and resilience: establishing sustainability standards, product differentiation, developing innovative food products, integrating modern technology, implementing risk management systems, and diversifying markets [18];
- Closing mineral cycles and valorizing by-products: enhancing the relationship between agriculture and the food industry, efficiently using energy heat sources, and valorizing waste [18];
- Promoting renewable resources: increasing the use of renewable sources and reduction the use of depletable ones [18];
- Increasing transparency and promoting equitable relationships within the agri-food system: supporting demand-driven production, cooperation with authorities to design/implement/supervise sustainable added value, and assessing the code of conduct in the agri-food system [18];
- Supporting co-creation related to sustainable practices: developing community practices, linking best practices to innovation and research, and creating communications platforms for agri-food actors and authorities [18];
- Valorizing food by raising community involvement: disseminating sustainable practices, communicating with consumers, enhancing working conditions within the agri-food system, and encouraging co-creation within the organization [18].

The priorities addressed by the summits held in 2021 included the following: "the development of inter-governmental and global institutional mechanisms to provide credible and authoritative consensuses on scientific evidence to support decisive and effective policies; the improvement of research efficiency and linkages across various scientific fields such as climate, natural resources, food, health, and nutrition, to support multi-sectoral policies; the implementation of robust synthesis and assessment processes to strengthen the legitimacy of scientific advice through transparency that incorporates the perspectives of low- and middle-income countries" [19]. There is a pressing need to translate the research findings into policies within the agri-food system and to develop national solutions that can be adapted to the global context by intensifying international cooperation [19]. The aspects for cooperation (namely target-setting, enhancing the promotion and use of science to govern practice), as well as the principles for engagement between public and private entities, should be thoroughly investigated, defined, and evaluated from a financial perspective [19].

After more than two years since the global health crisis began, with its repercussions affecting all areas, the food market, a fundamental component of our current society, has undergone significant changes and is unlikely to return to its initial state. In the pre-pandemic context, the food market was gradually experimenting with digitization. The market for food products relied heavily on in-person shopping, as consumers preferred to see, touch, taste, and smell fresh products and personally select their favorite items. While

traditional trade of these products remains the most preferred choice, the online market share has been steadily growing in recent years. However, during the pandemic and the post-pandemic period, this shift accelerated significantly [20]. One of the reasons for this change in behavior during the pandemic was the raised popularity of the internet and the proliferation of smart devices, which facilitated the slow but sure transition to digital commerce for food products. Furthermore, the modification of lifestyle and consumption patterns, coupled with the time-saving convenience, contributed to the growth of online food shopping [20]. As a result, the population became accustomed to this shift and formed a habit of continuing to engage in online trading for traditional food products, even in the post-pandemic period.

Online shopping offers great flexibility in meeting various needs while eliminating the queues, the traffic jams, and increased costs. During the pandemic, a period characterized by uncertainty, many people felt safer avoiding trips to the local grocery store and physical contact with others. Stay-at-home recommendations and restrictions significantly boosted online demand [12]. Consumers have two options for buying food online: "the business-to-consumer (B2C) model or the online-to-offline (O2O) models" [21]. In the B2C model, which is a traditional online shopping model, people make purchases on various web pages and receive their parcel within a few days (usually 3–10), while the O2O is a newer approach that combines online shopping with local businesses, where people buy the desired food online and eat it offline [22]. During the COVID-19 pandemic, the food delivery system experienced significant growth, with consumers utilizing third-party O2O platforms and/or mobile applications to find restaurants and access a wide variety of food products [21]. Li et al. [21] identified various factors influencing consumer behavior during the pandemic, including technical and practical aspects, system related characteristics, emotional and subjective factors, individual characteristics, products or service quality, risk management, social influences, and food properties. Nielsen et al. [23] conducted a study on consumer behavior related to food values, purchases, and eating habits during the COVID-19 pandemic and concluded that the dieticians should consider the mental and emotional status of individuals, as well as the period of lockdown, when providing dietary guidance. Furthermore, the authors recommend supporting local food products to promote healthy eating habits, sustainable development, and enhanced food systems resilience in the post-COVID-19 era [23]. Consumer choices regarding food were found to be influenced by health, social, and psychological factors, with an increased preference for organic food, self-cooking tendency, health, and food quality and safety being reported [24]. Liao et al. [25] revealed that consumer demand for traceability information led to raised government implications in pandemic control efforts, subsidies, higher demand, improved traceability, enhanced human welfare, and increased consumer satisfaction.

The global food security chains were significantly impacted by the COVID-19 pandemic, resulting in substantial disruptions that sent shockwaves throughout the entire supply chain, from manufacturing to the commercialization stage [26]. In their paper on "Food security and disruptions of the global food supply chains during COVID-19", Alabi & Ngwenyama [26] proposed solutions to increase the resilience of global food security chains: they recommended decentralization of the system, the use of commerce platforms, adoption of cloud-based technology, achieving end-to-end supply chain visibility, and the application of Industry 4.0 principles. Priyadarshini & Abhilash [27] put forward suggestions to enhance resilience in the post-COVID-19 era in India: improving digitalization and internet connectivity for local retail and shops in both cities and villages, providing functional foods and immune supplements to the economically disadvantaged population through government programs already implemented, and marketing of "planetary healthy nutrition" to control food insecurity and improve nutrition security, guaranteeing long-term sustainability in the food industry. In the post-pandemic period, innovations in the food industry should be considered. Some of these innovations relate to the Industry 4.0 instruments, such as the Internet of Things, internet and communication technologies, and blockchain technology, while others relate to novel ingredients and technologies like

lab-produced meat, plant-based meat substitutes, and the utilization of a wide range of by-products [28]. Additionally, the use of supplements to bolster the immune system to support the recovery of COVID-19 patients, the digitalization and integration of artificial intelligence in the food production, and education efforts aimed at emerging technologies and accelerating initiatives are key directions for enhancing food system sustainability in the post-pandemic era [28]. Serrano et al. [13] concluded that food delivery services and the take-out system were vital for restaurants during the pandemic. The authors recommended retaining technological solutions found for online and in-person food industry such as: improving e-commerce food platforms and delivery services, facilitating contactless cards payments, digitalizing services (such as online reservations, digital menus, QR code use), implementing food and beverages traceability, and using air purifiers [13]. Furthermore, the stringent food quality control practices that were adopted during the pandemic to reduce virus spread and enhance consumer trust should be kept for an extended time [13]. Guiné et al. [14] studied consumer behavior in Portugal and Turkey and found that people prefer to buy organic vegetables, fruits, dairy products, and wild fish from captures mainly due to the absence of chemical pesticides and fertilizers, the smaller environmental impact, the positive effects on health and farmer welfare, the convenience of proximity to home, awareness of the sustainability of organic food, and its perceived higher value.

Food system resilience is defined as "something more akin to flexibility, the ability to respond to disruption in a way that leaves the functioning of the entire food supply chain system unaffected" [29]. Various strategies proposed by the research community to increase food system resilience in the post-pandemic period are presented in Table 1. The assessment of food chain resilience can involve the consideration of multiple indicators, including household food insecurity access measures, the degree of household dietary diversity, z-score, the presence of mycotoxins after harvest, post-harvest mass losses, losses of nutritive compounds in food, the presence of agro-chemicals in agri-food products, price volatility indices, food by-products [30], etc. The adoption of agroecology in mountain areas and the preservation of agrobiodiversity can contribute to bolstering the resilience of the agri-food system [31].

Table 1. Strategies to increase food system resilience in the post-pandemic era.

Region	Focus	Proposed Strategy	References
Worldwide	Impact of the COVID-19 pandemic on food security and resilience of local food systems	- acquiring capacities like assets, savings, etc. - access to insurance; - improved access to information for stakeholders - better cooperation between community members; - higher inclusion level and greater expectancies and self-efficacy of the community actors; - evaluation of the potential ripple effects when a part of the food system is affected.	[30]
India	Suggestions to increase agri-food system resilience after the COVID-19 pandemic	- marketing of healthy diet habits; - valorization of underutilized wild crops; - development of decentralized heating, ventilation, air conditioning systems based on regenerable energy for food storage; - encouraging proper crop diversification with price assurance; - digitalization of the agri-food system; - promotion of nutraceuticals, functional foods, and herbs consumption; - encouraging volunteering and local food production.	[27]

Table 1. *Cont.*

Region	Focus	Proposed Strategy	References
North America	Impact of the COVID-19 pandemic on food security and global food supply chains	- digitization of global food supply chains; - a good balance between the existing governmental policies for COVID-19 pandemic effects diminishing and creation of a long-term base for food supply chains resilience; - development of online shopping platforms; - end-to-end supply chain transparency; - Industry 4.0 instruments application; - use of cloud technology to increase interoperability and data management; - system decentralization to reduce transport and storage costs and to diminish environmental impact.	[26]
Europe	Sustainable food supply chains contribution to agri-food system changes in the actual context	- combination of short with long food supply chains; - increase community's self-sufficiencies.	[32]
Latin America	Food policy after the COVID-19 pandemic in areas of indigenous people	- increase community access to public goods such as novel technologies, irrigation systems, roads, transport, etc.; - accessibility of financing programs, and productive resources; - development of local biodiversity; - food quality control; - development of food marketing instruments; - development of consumer's feed-back instruments.	[2]
Italy	Roman Solidarity Purchasing Groups' contribution to food system resilience during the COVID-19 pandemic	- implementation of Solidarity Purchasing Groups to increase products handling flexibility and local producers' remuneration.	[33]
China and United States	Resilience of household food system in the COVID-19 pandemic context	- increase agri-food system sustainability; - reducing food losses and waste.	[34]
China	Evaluation of food system resilience during the COVID-19 pandemic	- promotion of traditional and ecological products; - support of wild food environment; - implementation of ecological agriculture by supporting landscape diversity; - production and consumption of local agri-food products.	[35]

Throughout history, physical shopping has been regarded as a pleasant experience with its inherent advantages. However, when we analyze the cost–benefit ratio, online commerce maintains its advantages. Buying groceries online, especially in our increasingly busy and fast-paced world, remains the easiest and quickest alternative for obtaining groceries. It is highly unlikely that people will abandon this habit once they have become accustomed to these conveniences, and over time these practices will become deeply ingrained habits [36]. The COVID-19 pandemic and post-COVID-19 period continue to reshape the food market permanently. There are several directions outlined for the post-pandemic era, as illustrated in Figure 4: a growing demand for transparency, encompassing an end-to-end perspective to satisfy discerning consumers and assess critical aspects in the food industry; the promotion of sustainable development and purpose-driven consumption that impacts the environment, society, and human health; emphasis on authenticity by promoting traditional and high-quality authentic products; increased digitalization to optimize the interaction between consumers and the seller [15].

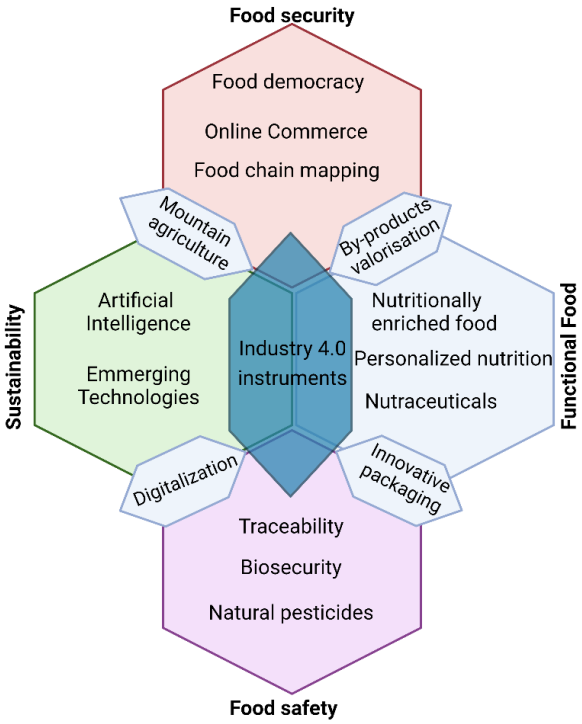

Figure 4. Directions outlined after the COVID-19 pandemic in the food sector.

However, farmers alone may lack the capacity to address the challenges of sustainable agri-food system development, thus it is necessary to create effective public–private partnerships across the agri-food value chain [37]. Hege et al. [38] asserted that urgent measures must be taken by authorities and community members to promote collaborations among stakeholders in the food chain, to provide financial support for healthy foods, encourage policy flexibility in nutrition programs, and develop community-based models involving various stakeholders.

3.2. The Romanian Post-Pandemic Food Market

Today, there is a growing awareness among the population about the importance of a healthier lifestyle, which is increasingly reflected in the interest in a more natural and healthier diet [39]. Historically, the food market has been negatively affected during pandemics and epidemics, often resulting in disastrous consequences for food consumption [40]. The COVID-19 pandemic had particularly adverse effects, especially for financially disadvantaged individuals, impacting food security. The food system comprises farmers, processors, traders, distributors, and consumers, with these key actors interacting across various stages of the food chain, including production, storage, processing, distribution, and transport [30,41,42].

Short supply chains are viewed as innovative and in a continuous process of reinvention [32]. Since the communist period, short supply chains have served as a survival solution for urban populations. During that era, people sourced their supplies from relatives, friends, or small farmers in the countryside, benefiting both sides [43]. Today, this system is well-established and can be defined as a "system of production, processing and marketing aimed at ecologically sustainable means and methods that govern economic, social, environmental and health benefits for local communities" [44]. The current COVID-19 health crisis through which we have all lived did not have as detrimental an impact on the food market. On the contrary, it proved to be functional due to the presence of these short supply systems within local communities.

The crisis situation fostered trusting relationships between local producers and end consumers, which will likely contribute in the future to food safety and security. Moreover, food produced and supplied by small local producers and marketed through these short

chains is perceived as a healthier alternative [44,45]. Existing literature in this field reports and analyzes the success factors of short supply chains with all types of products, particularly dairy products [46]. Most authors have identified the primary critical success factor in the short food supply chain as the traditional specificity of local brands, the natural and ecological aspects, direct and reciprocal relations between producers and consumers, safety and traceability, specific local craftmanship, culinary and cultural heritage, cooperation, and consumer health assurance [47]. In a study by Burlea-Schiopoiu et al. [48], the impact of food delivery applications on Romanian consumers' behavior was examined, and the authors recommended the implementation of consumer loyalty strategies, underlying the great visibility of such applications reflecting the consumers' empathy and loyalty driven by their convenience and money-saving characteristics.

Social distancing rules imposed during the COVID-19 pandemic have boosted online shopping around the world, driving the digitalization trend. In 2020, online products purchases rose by 30% compared to 2019, while retail sales decreased by 17.9% [49]. This trend has been most notable in the food supply chain [50]. Furthermore, digital technologies have been successfully employed by farmers to satisfy the changing preferences of consumers or even restaurants [49]. Romania also experienced a major increase in online deliveries during the pandemic and the post-pandemic period, rising by over 30% [51,52]. Around 44% of Romanians made online purchases during the pandemic, with Romania ranking a lower position in the European Union compared to the Netherlands, Denmark, and Sweden with respective figures of 94%, 92%, and 89% [53].

Several authors investigated the importance of traditional products in the context of the COVID-19 pandemic and consumer preferences for purchasing them. Key factors influencing consumer behavior during the COVID-19 pandemic with respect to traditional products were: the effect on health, the ease of online purchasing, the taste, the effects on the environment, contribution on the local or national economy [50]. The production and consumption of traditional foods are often linked to geographical identity [54]. For example, in the Dorna area, the Emmental type cheese is known as "Schweitzer de Dorna" [55]. Authenticity and origin are typically the hallmark qualities of traditional products, which simultaneously contribute to their cultural and economic renown, thus supporting local agricultural economies [56]. Traditional products are regarded as a model of identity, culture, and heritage passed down through generations, making significant contributions to the sustainable development of rural mountain areas [57]. The Romanian village associated with food traditions is closely connected to archaic production methods, featuring specific local ingredients and recipes that contribute not only to the local economy but also to the environmental preservation [58]. Consequently, the pandemic period spurred the search for these products directly from the producers or farmers.

There is a clear need to implement government programs to support mountain farmers. However, it is worth nothing that the role of farmers in decision-making entities within the traditional food supply chain in mountainous areas is relatively weak. Despite being the primary providers of raw product, they often rely on other actors in the supply chain for selling their products.

4. Mountain Food Market in the Post-Pandemic Period

Worldwide, food consumers are experiencing an increasing awareness of the food they eat and the water they drink, along with their health effects [59]. This heightened awareness has led to a shift in the modern lifestyle, where consumers are no longer inclined to favor processed foods laden with numerous additives. Instead, there is a growing interest in mountain food products due to their natural characteristics and high nutritional quality [60,61]. Certified mountain products hold significant market potential (Figure 5) and have gained substantial attention from consumers in recent years. These products offer a more complex sensory and nutritional profile, delivering benefits not typically found in other products, with their quality being largely influenced by the environment, climate, and processing conditions [62].

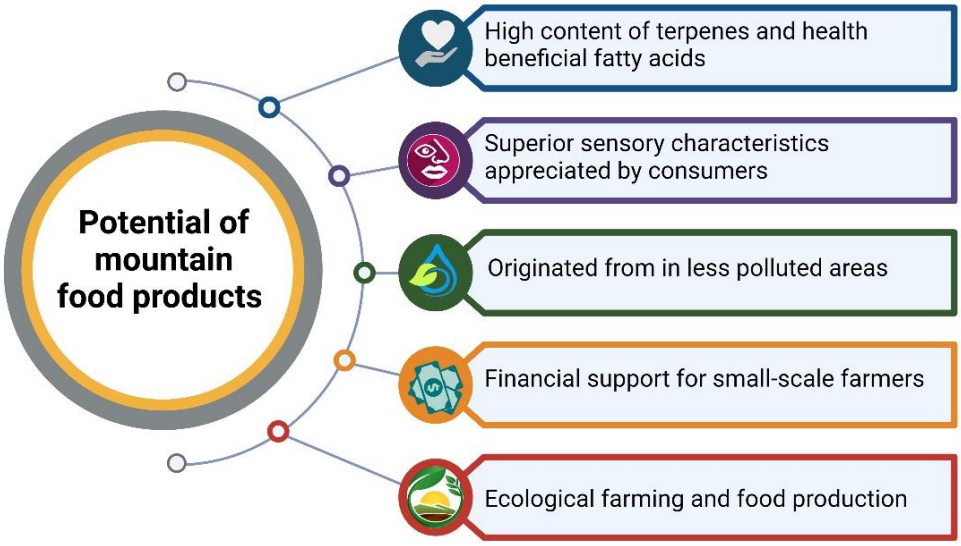

Figure 5. Potential of mountain food products for sustainable development of food system.

Sustainable Development Goal (SDG) 2.4 underscores the importance of ensuring "sustainable food production and resilient agricultural practices by 2030" [63]. The pandemic has boosted the vulnerabilities of mountain communities, whose main occupation is agriculture. Kumar et al. [63] investigated the vulnerability of small farmers in mountain areas in India, considering the pandemic and other challenging circumstances. Their findings highlight the pressing need for policies aimed at enhancing ecosystem resilience in mountainous regions. They also recommend harnessing artificial intelligence to improve efficiency and assist mountain farmers in addressing various challenges in different contexts (Figure 6).

Govinda Gowda [64] conducted a study on the effects of COVID-19 pandemic in Bangalore, India, and concluded that people were significantly affected by the economic consequences of the pandemic, rather than medical issues. This highlights the necessity for policies aimed at mitigating the economic and financial difficulties in the post-COVID-19 period. A case study conducted in the Mount Bromo region, Indonesia, reported that the small-scale farmers developed a mechanism to raise their welfare and secure their family's economic situation during the COVID-19 pandemic through a rational choice: people owning small land diversified their workplaces by doing off-farm and non-farm activities, others focused on livestock raising, while some individuals even provided support services for tourism [65]. In the mountain province of the Philippines, people faced income lowering, limited farm inputs, deterioration, and oversupply of vegetables during the pandemic [66]. To help farmers overcome these difficulties, the authors proposed solutions such as community trainings, quality control of the local food, trainings in food processing and preservation to reduce food waste and to ensure food safety, and the establishment of a local food storage facility or a food bank for preserved food [66].

In a study on consumers' behavior in of the Sibiu region of Romania, it was found that the main factors influencing people's buying decisions were related to food properties, origin, freshness, sensory profile, traceability, and reliability; young people were particularly awareness of health, and food composition [67]. During the COVID-19 pandemic, young people limited their interaction with others and experienced a certain level of stress and anxiety which led them to order food online [67]. The same authors asserted that short food supply chains can serve as examples of best practices for changing the food system to meet sustainability requirements. Research conducted by Covaci et al. [68] revealed that the COVID-19 pandemic stimulated the honey and apiculture products market, with the Manuka and mountain honey being preferred as people recognized the beneficial effects of honey consumption in the COVID-19 context. Cattivelli [69] presented a decision support system that calculates the food self-sufficiency cities in South Tyrol with urban gardens.

The study areas were selected based on the impact of changes in the food industry in the context of food insecurity and COVID-19 mobility. The results indicated that this tool can be used for food planning, determination of the 'foodprint' and land suitability, and achieving people's food self-sufficiency. One of its most important advantages is the framework created that encompasses all stages of the food chain and territorial characteristics, including the morphological and climatic properties of the area of implementation [69]. Restructuring the food industry in the mountainous area studied is necessary, along with the application of social innovation strategies in cooperation with the community members.

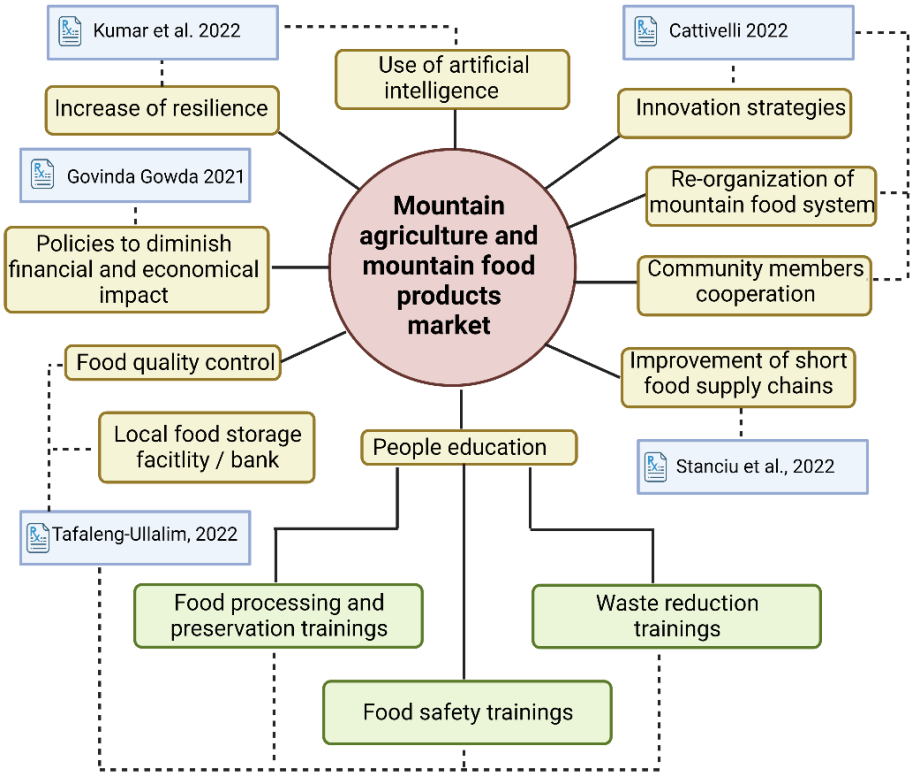

Figure 6. Strategies for the mountain agriculture and food market in the post-pandemic period [63–69].

5. Supporting Mountain Agriculture to Grow the Agri-Food Market with Healthy Products

The effective consumption of typical mountain products significantly contributes to the sustainability of local economies in mountain areas.. Consumers' preference for products with sustainable production characteristics consistently centers around key features: a mountain product label with "mountain product" certification, ecological certification, and specific information on animal welfare [70]. In the European Union, some products are certified as Protected Designation of Origin (PDO), or Protected Geographical Indication (PGI), the Guaranteed Traditional Specialty label (STG) or the optional term "Food from the mountains" [71]. These quality labels enable producers to preserve the integrity of traditional food and avert falsification, while also allowing them to convey products' quality attributes to consumers [72].

Incorporating territorial and traditional values, local food products contribute to the sustainable evolution of local economies, especially in most the developed areas within mountainous regions [73]. Unfortunately, in recent years, the environment, rural economy, and cultural heritage have been adversely affected by depopulation in mountains, leading to the destruction of pastures and meadows in these areas [70].

Consumers have developed an idealized perception that includes mountain green spaces, clean air, crystal clear waters, traditions and cultural identity, and traditional product processing, which leads them to choose traditional, healthy mountain products [74].

European mountain product certifications aim to promote the production boost in the economies of disadvantaged areas, especially in those mountain regions [75]. However, these certifications do not always fully align with the options available to producers in mountain areas; the high cost associated with PDO or IGP labels deters many farmers from adopting them [76]. That is why the European Union (EU) introduced the optional label "mountain product" which was regulated by the European Commission in 2012. The goal was to facilitate and promote the development of agricultural systems and mountain economies, as well as the sustainable development of the entire food chain [77]. Farmers who trade their products with the "mountain product" label have influenced and strengthened consumer behavior regarding ecological mountain products [78,79]. In the EU, more than a third of production with a geographical indication originates in mountain agricultural regions, with 50–75% being cheeses with the designation of protected origin DOP [76]. These cheeses are typical, inherent to the mountain territory, traditionally and historically produced by grazing animals in diverse natural mountain meadows and hayfields [70].

Mountain agriculture operates on a smaller scale compared to conventional agriculture, making it better suited to penetrate niche markets due to its more limited economic capacity [80]. The most suitable approach for farmers and local producers in mountain areas is to utilize the "mountain product" label, as it is the most recommended tool for entering the food market, offering the opportunity to launch these products and justify an adequate pricing [80]. Bentivoglio et al. [81] contend in their work that the mountain product label can support the local agricultural economy, enhance mountain territories, and protect the origin of mountain products, biodiversity, and the environment. The Euromontana association also asserts that mountain products contribute to traceability, biodiversity conservation, and environmental quality, while contributing to the connection of mountain products with environmental protection. Traditional mountain agriculture is perceived by consumers as a system that ensures animal welfare and holds significant interest [82,83].

Case Study of the Bioalpin Cooperative in Tyrol

The potential of mountain food products is exemplified in the case study of the Bioalpin cooperative from Tyrol. The cooperative was founded in 2002 as a regional platform for organic food products sourced from small farms and it sells a complete range of mountain products by using its own brand, Bio vom Berg, which translates to "organic from the mountain" [84]. About 60% of the Bioalpin turnover is generated through the regional supermarket MPreis which primary stocks products from Tyrol and adjacent regions, giving preference to Bioalpin products over other organic brands. The Bioalpin cooperative offers a large range of food products like fruits and vegetables, eggs, cereals, meat products, honey, and herbs, with an emphasis on milk and dairy products [85]. The sales volume of Bioalpin increased from EUR 672 000 in 2003 to EUR 14 million in 2022 [84,86], making a substantial contribution to the local economy. The cooperative members are small dairy producers, producer groups, and individual farmers, with more than six hundred small-scale farms associated to Bioalpin. In addition to income coming from the cooperative, farmers also earn money from off-farm employment, public payments, and complementary direct sales [85]. The cooperative ensures access to a large retail chain and supports the functioning of artisanal factories. Thereby, Bioalpin not only gives financial benefits to small-scale farmers but also contributes to the development of a network of local processing and trading units that help the local economy [84].

The Bioalpin cooperative manages both the horizontal and vertical levels of the supply chain; the horizontal one ensures enough quantities of goods and the use of collective packaging, while vertical coordination implies price negotiations, established volumes, and retailer implication in the product range and innovation [84]. As an example, for dairy producers, horizontal coordination has the advantage of creating a collective identity and decreasing competition among members by specializing each dairy in a small number of product types carrying on the same collective label. This allows them to become more professional and to increase their specialized know-how. In vertical coordination, the

cooperative empowers members and users of the Bioalpin brand to negotiate the prices with MPreis as a function of the cost calculations [85].

The Bioalpin cooperative increased its network by applying a "multiplicative growth" base on long-term relationships, resulting in costs diminishing. Furthermore, the purpose of Bioalpin is to enhance conditions for all its participants, not to get the maximum profit [84]. By extending and increasing its turnover, the cooperative has enabled the development of the central hub in a professional way. This fact allows small farmers to focus on their own management and raises product differentiation [84]. This example of good practices in Tyrol could serve as a model that can be adapted in many other mountain areas in the world. It is important to document all the particularities of each region and develop support programs for traditional product manufacturing and trade. This case study underscores the significant potential of mountain products in contributing to regional economies and overall well-being.

6. Food Democracy—A Model of Food Governance in the Post-Pandemic Period

Given that the food system faced significant challenges during the pandemic, food security has been limited, partly due to long supply chains with little flexibility. A new system oriented towards food democracy offers opportunities for both consumer producers to participate in building food systems that are as sustainable as possible and support alternatives for how food is produced and consumed [87]. The term "food democracy" was created in 1999 by Lang [88]. Petetin [87] noted that food democracy creates the base for creating an alternative and transformative food system, to stimulate consumers to seek and choose sustainable food systems that reflect common values. The ability of individuals to make choices about where and how they purchase food reflects the degree of control that consumers can exert over food systems [89]. Due to the restrictions introduced during the COVID-19 pandemic, small family farms experienced significant growth, with demand surging for various products, especially among rural households [87]. Today, agricultural producers and small stores have demonstrated a great degree of resilience and adaptability to manage the increased demand. This alternative approach to food consumption, in which consumers have the opportunity to choose what they put on their plates, transforms them from "consumers" into "active citizens" and food democrats [90].

The food safety policy of many countries aim to design future global food security and safety policies and strategies based on the best and most nutritious foods, while discouraging unhealthy options through relentless promotion in the mass media [91]. Buying food directly from small local farmers reflects much healthier and more nutritious food consumption, with far-reaching implications for public health over the long term [87]. Engaging in activities such as gardening by growing different varieties of vegetables, raising poultry, rabbits, or other animals enhances food security and provides alternatives for individuals with varying incomes [92].

Food democracy offers the potential to restructure the food supply chain centered on dairy and regional products, fostering stronger networks between commercial and local farmers. Once the COVID-19 health crisis subsides, there will be a need to create new strategies to improve democratic agri-food systems. Governments should provide greater financial support to small family farms, as they play a crucial role in food security, revitalization of the cultural landscape, rural tourism, and recreational activities, which are job-generators activities. Small family farms also maintain a harmonious relationship with the environment, fostering greater biodiversity with more habitats, which enhances the rural landscape [93]. The COVID-19 pandemic promoted the transformation of food supply chains, making them more sustainable, resilient, and democratic, while the post-pandemic period created a powerful framework for a food democracy, with a focus on locally and regionally sourced food and the promotion of natural and healthy products' consumption [87].

7. Conclusions and Further Research Directions

People's established habits have been significantly affected by the COVID-19 pandemic. The emerge of the new coronavirus has instilled fear and prompted a shift from a normal lifestyle to a more protective one. This change in behavior has influenced consumer preferences, particularly towards online shopping, which offers various conveniences such as cashless transactions, home delivery, and access to a wide range of products that are no longer readily available. The current COVID-19 crisis should prompt us to explore the challenges and opportunities in order to make informed decisions about the future of agriculture and food systems. Many consumers have embraced online ordering and direct purchasing from manufacturers. In the future, small-scale producers will play a particularly important role in the production of healthy food, especially in mountain regions. These areas often rely on individual households for animal husbandry, and short supply chains for mountain products are emerging as a promising solution. These chains ensure a market where consumers are increasingly conscious of the quality of life, food security, safety, and overall food health. It is essential to develop food policies that support mountain agriculture, involving public authorities, producers, and community members. Private-public partnerships and financial aid for farmers would be helpful in supporting the shift toward sustainable agri-food systems. Further research should focus on evaluating the effectiveness of policies implemented in the post-pandemic period with the goal of enhancing food security and community resilience. Furthermore, mountain areas require closer examination as awareness grows regarding the availability of healthy and sustainable products in these regions.

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