Organic Farming

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Because agriculture is a key source of environmental pressures, the need to urgently reduce the impacts of agricultural activities on biodiversity, freshwater and marine pollution, greenhouse gas and ammonia emissions, and soils has been recognized by the European Union. Thus, three of the post-2020 Common Agricultural Policy (CAP) objectives concern the environment and climate change. More specifically, a substantial contribution is scheduled to mitigate climate change, foster sustainable development and efficient management of natural resources, protect biodiversity, enhance ecosystem services, and preserve wildlife habitats and landscapes. These challenges can be addressed by the adoption of more sustainable agricultural production systems such as organic farming.

organic farming conversion decisions determinants of acceleration market policy

1. Specification of the Benefits of Organic Farming

Some researchers highlight the multiple benefits of organic farming. For example, Horrillo et al. [1] found that greenhouse emissions in four types of organic livestock farming are lower than those from conventional farms, while the levels of carbon sequestration are noticeably higher. Cattell Noll et al. [2] note that organic crop and animal production can reduce global nitrogen pollution, while Borsato et al. [3] report that organic viticulture can be applied without incurring economic losses and with better preservation of natural capital. The environmental benefits of organic viticulture are linked with the water and carbon footprints, pesticide and fertilizer management, organic matter content, soil compaction and erosion, and landscape quality. A more precise quantification of the total environmental consequences was conducted by Zaher et al. [4]. They found that the ecotoxicity effects per kilogram of potato production were reduced by approximately three orders of magnitude in a US organic case study farm as compared to average conventional production.

Apart from the above mentioned benefits, organic agriculture can promote more compassionate treatment of animals, while it can also provide important benefits to human health [5]. For example, Welsh et al. [6] note that contaminant levels in food, such as antibiotics and pesticides, were undetectable in organic samples but were identified in conventionally produced milk samples, with multiple samples exceeding the federal limits. In addition to this, synthetic growth hormones were also detectable in conventionally produced milk. Though the scientific evidence remains scarce [7], some recently published studies highlight [5][8] that organic food seems to be healthier compared to conventional food due to the fact of its higher content of bioactive compounds and polyunsaturated fatty acids. Moreover, organic food has lower cadmium content and other unhealthy substances, such as pesticide residues, which are linked with gut microbiota dysbiosis, immune-related disorders, toxicity in humans, and negative impacts on cognitive development in children.

Some indirect effects can be also attributed to organic products such as the health outcomes closely linked to the eating habits of organic consumers. For example, the diet of organic consumers is often richer in fruits, vegetables, legumes, and whole grains and lower in meat intake. Such a dietary pattern leads to a lower incidence of metabolic diseases such as cardiovascular diseases and diabetes mellitus type 2. In addition, the greater content of dietetic fiber in organic food may have a positive effect on gut microbiota and health, because the risks for some diseases and allergies are reduced [7], and it also demonstrates a potential beneficial effect on obesity among adults. It is also important to note that the diet of organic consumers, which involves less animal-based food products, has an indirect environmental benefits. Such a diet enables the carbon footprint and land use to be further reduced [9][10].

2. The Organic Conversion

Given the benefits organic farming creates, it could be argued that organic food supply is a response to the European policy target for the environmental impact of agriculture to be reduced [11][12]. This enables certain environmental consequences to be minimized and, thus, agriculture to contribute to the 12th Sustainable Development Goal (UN) of responsible consumption and production [13] being achieved. Taking into account the above presented benefits, the more widespread organic food production and consumption is, the higher the contribution of the agro-food sector to achieving this goal.

2.1. The Diffusion of Organic Farming

Selected statistical data [14] indicate that organic farmland increased by 65% between 2008 and 2018 in the EU, with organic farmland shares ranging among countries. Organic livestock also increased during the same period. For example, the populations of organic sheep and poultry increased by 67.8% and 127.9%, respectively. In regard to total organic food sales, it was noticed that they increased by 121% in the EU, reaching EUR 37.4 billion (EUR 97 million globally). Although the rates of diffusion appear to be high, the spread of organic farming cannot be considered satisfactory, because only 7.7% of the EU's farmland was organic on 2018. Thus, the question arises of "how will organic farming expand from this low level to 25% in 2030" as required by European policy [12]. The question becomes even more important for the whole Earth, where only 1.5% of the world's farmland was organic in 2018 (71.5 million hectares), while more than double the environmental footprint is expected by 2050, because food consumption is expected to double. The urgency of a change becomes further apparent, because any increase in food expenditure by 1% is followed by an increase of 1.4% in the environmental footprint [11][14][15].

The phase of production has the greatest negative environmental effect among the sub-sectors of the agro-food supply system. Its greenhouse gas emissions contribute to about 65% to 85% of the total system's emissions [16]. Thus, a great reduction in the total environmental consequences of food supply can be achieved if the number of organic farmers as well as the diffusion of organic farming activities substantially increase worldwide. Following the EU policy target [12], such a conversion should lead to at least a tripling of the organic farmland by 2030. Given that the organic farmland increased by only 65% in the last decade, it is questionable whether this goal can be achieved.

2.2. Farmers' Conversion Decisions

The economic, environmental, and social issues of organic farming, combined with the low level of its diffusion, the heterogeneity of conditions worldwide, and the social and policy interest have encouraged many researchers to explore the factors that can affect decisions made by farmers related to the conversion of conventional farming activities to organic [17][18][19][20][21][22][23][24][25][26][27][28][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52][53][54][55][56][57][58][59][60][61][62][63][64][65][66][67][68]. Each of the studies identified a limited number of factors, while few of them extended the exploration in more than one country [51]. Such a fragmentation of the knowledge does not enable sufficient information to be provided to public authorities aiming at the diffusion of organic farming to be accelerated. A study that integrates as many factors as possible, which impact on farmers' decisions to convert worldwide, into a framework is a challenge.

3. Methodology

The present review is conducted in an integrative way, following Torraco's [69] definitions and recommendations. Such an "integrative review" focuses on ideas and results extracted from the individual papers, only a few details of which are provided. To understand how the farmers' organic conversion decisions are influenced by various factors, in a first step, we searched for a theoretical framework. As is above noted, after the initial review of each abstract, we proceeded with an in-depth review to identify decision determinants. Then, the theoretical framework was developed that links farmers' organic conversion decisions with the external farm business environment [70][71][72]. The determinants of farmers' organic conversion decisions identified worldwide were next integrated into the framework, and organized in sets and sub-sets of factors.

4. Organic Conversion Decision Framework

We adopted the framework of Zagaria et al. [72], because it enables the numerous sets of factors that have previously been examined to be integrated into a common theoretical foundation. Following this framework, farmers first update their characteristics based on their perception of changes to the external farm environment; they then select to convert conventional farming activity to organic activity based on its capacity to meet their goals. Lastly, they implement the selected organic conversion with repercussion to internal and external characteristics. Thus, internal and external variables directly determine the adoption and implementation. These variables can be distinguished into two groups. In the first group, the factors of the external farm business environment are included. Changes to these factors can be caused by public interventions [15][29][53][66], but farmers cannot control them in the short term. The second group includes all of the other factors that constitute the internal farm business environment. Changes in these factors can be caused both by the farmers themselves and by the policy. The framework we built is shown in the Figure.

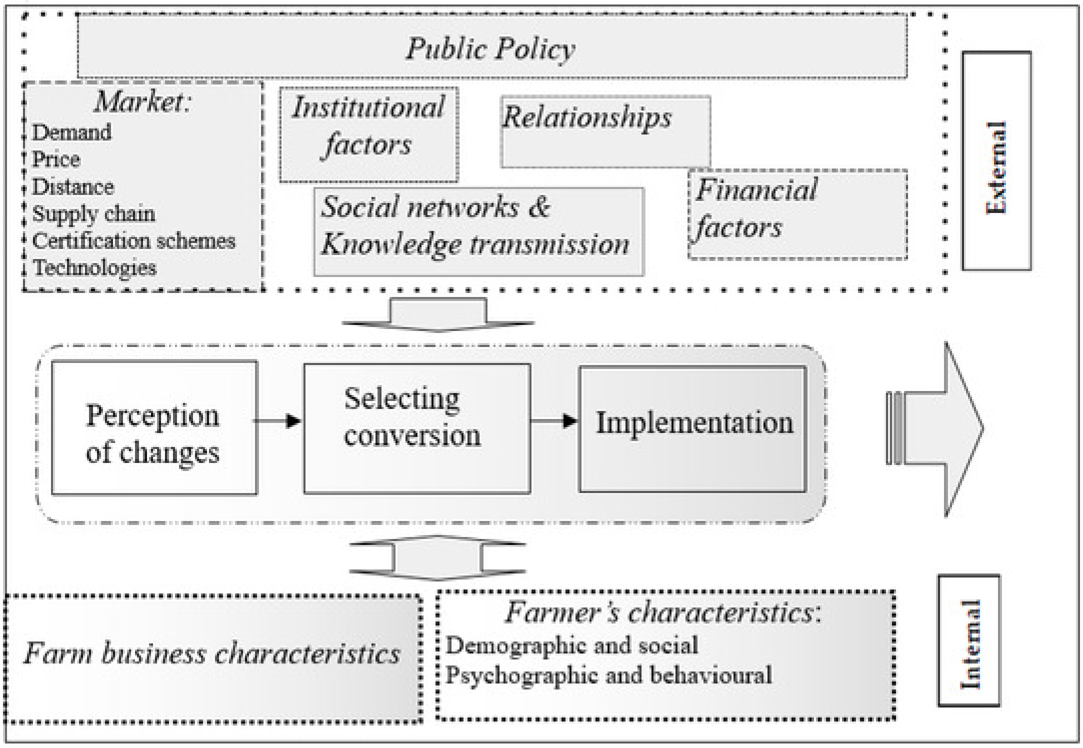

Figure 1. Farmers' organic conversion decisions framework. Sets/sub-sets of factors effect farmers' decisions to convert conventional farming activities into organic activities.

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