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Article

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Economies

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Suggested Citation: Borda, Áron József; Sárvári, Balázs; Balogh, Jeremiás Máté (2023) : Generation change in agriculture: A systematic review of the literature, *Economies*, ISSN 2227-7099, MDPI, Basel, Vol. 11, Iss. 5, pp. 1-15,
<https://doi.org/10.3390/economies11050129>

This Version is available at:

<https://hdl.handle.net/10419/328754>

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Generation Change in Agriculture: A Systematic Review of the Literature

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Abstract: Today, the replacement of the ageing agricultural population is a global challenge in many food-producing countries. This article aims to provide an overview of generational change in agriculture based on the literature in international economics published in recent years, using a systematic review of the scientific literature. Research has identified several factors as barriers to agricultural generational change. Young people are less motivated to take over family farms. Farming does not offer them sufficient income, and the working conditions are not ideal. Access to land is severely limited worldwide, and the market bargaining power of the younger generation is low. Administrative burdens are also a barrier to the generational renewal of farms. The effects of climate change also have the potential to discourage next-generation farmers. Financial support for generational change in agriculture could be one solution to all these problems. Furthermore, generational change can be enhanced by the modernization of farms, providing farmers with access to land, and making a positive difference to their income, all of which will increase the motivation of young farmers.

Keywords: agriculture; generation change; ageing farmers; generation renewal; young farmers



Citation: Borda, Áron József, Balázs Sárvári, and Jeremiás Máté Balogh.

2023. Generation Change in Agriculture: A Systematic Review of the Literature. *Economies* 11: 129. <https://doi.org/10.3390/economies11050129>

Academic Editors: Monica Roman and Zdenka Zakova Kroupova

Received: 17 March 2023

Revised: 7 April 2023

Accepted: 15 April 2023

Published: 23 April 2023



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1. Introduction

In recent years, agriculture has contributed 4% of the global gross domestic product (GDP). The global food and agriculture sector is estimated to be worth more than 8 trillion USD and employs more than 25% of the total population (World Bank 2022). By 2050, the world population will be 9.7 billion, as predicted by the United Nations (2022). In addition to the increasing number of people, agriculture will face serious challenges. The continued decline in arable land and the increase in water shortages will demand more efficient agricultural production techniques. The spread of quality food in high-income countries will play a vital role in the future. Therefore, agriculture must feed more and more people with less available land in a more sustainable and efficient way. Furthermore, there is another global problem in agribusiness, namely the ageing farmer population. According to the 2017 US Census of Agriculture (USDA 2019), the average age of farmers was 57.21 years, which is 1.2 years higher than in the 2012 survey. In the case of Europe, in 2016, the percentages of farmers at least 65 years old were around 35%, while the young generation (under 40 years old) was just 11%. The average age in 2004 was 49.2 in the EU, and then ten years later, in 2014, the average age was much higher at 51.4 (European Commission 2021). In developing countries, this phenomenon is also becoming increasingly documented. HelpAge International (2014) reported that there is a general trend of increasing the percentage of older farmers and decreasing the number of younger farmers in rural areas around the world. Consequently, the ageing of the farmer population arises as a global problem. The purpose of this research is to analyze generational change

in agriculture through a systematic review of the international economics literature for the period 1990–2022.

2. Methodology

To perform a comprehensive review of the generational change in the agriculture sector, an extended search was conducted using the following online databases: [Web of Science](#) (2022a, 2022b) and [Scopus](#) (2022a, 2022b) for the selected period from 1990 to 2022. For the phrase ‘generation change’, there is a more sophisticated term: ‘generation renewal’. Due to that repetition, two searches were performed in both databases with the two different terms. Initially, the combination of keywords ‘generation change’ and ‘young farmer’ (search string: TITLE-ABS-KEY (generation and change) AND TITLE-ABS-KEY (young AND farmer) were used, and the search had to appear in the title, keywords, or abstract of the sources. Moreover, the other phrase ‘generation renewal’ was also researched, as previously, but the second word ‘change’ was replaced by ‘renewal’. Thus, the search string was the following: TITLE-ABS-KEY (generation AND renewal) AND TITLE-ABS-KEY (young AND farmer). The authors concentrated only on scientific journals, economic literature, and materials written only in English. The research was restricted to materials published between 1990 and 2022. The first initial search (using ‘generation change’) obtained 90 entries, plus the second phase (‘generation renewal’) resulted in 22 entries. Of 90 articles, 48 were duplicates, and 6 were double duplicates (appeared twice in two Scopus and two Web of Science research); thus, these articles appeared in both databases (Web of Science and Scopus) in the case of both keywords used. Following this process, 66 articles were analyzed in terms of the topic and accessibility. To ensure that only relevant articles are included in the final analysis, the authors performed an independent selection and then met to discuss the approval of potentially conflicting articles. Nine articles were dropped from the data because their full texts were not written in English (only their abstracts were available in English), and some of them were not relevant to our research. After the first, deeper screening, 2 articles were excluded due to the irrelevance of the topic (dealing with indigenous vegetables and genetic erosion). After all, a total of 55 articles are included in the final analysis. Figure 1 provides an overview of the selection process.

Regarding the representation of continents considered in the selected economics literature, Europe or the European Union (29) was the most popular continent analyzed on the topic of agricultural generation change, followed by the Asian (15) continent (China, Indonesia, the Philippines, Thailand, India, Papua New Guinea, and Israel), and the African (7) regions (Ghana, Nigeria, Malawi, and Senegal). However, North America was not mentioned; South America (2) and Australia (2) appeared twice. In the case of the European Union, 13 articles investigated generational change in Central and Eastern European countries (Romania, Hungary, the Czech Republic, and Moldavia), 3 in Southern Europe (Greece, Portugal, and Spain), 12 in the Western European region (Austria, Germany, Norway, and Ireland), and 1 in the Baltics (Latvia). Finally, 7 articles explored generational change in Romanian agriculture, 3 articles investigated this phenomenon in the Czech Republic, and another 3 did so for Spain. Furthermore, changes in agricultural generation were also analyzed in Hungary, Norway, Ireland, the UK, Portugal, Austria, Latvia, Greece, and Germany. Figure 2 shows the continents discussed in the literature.

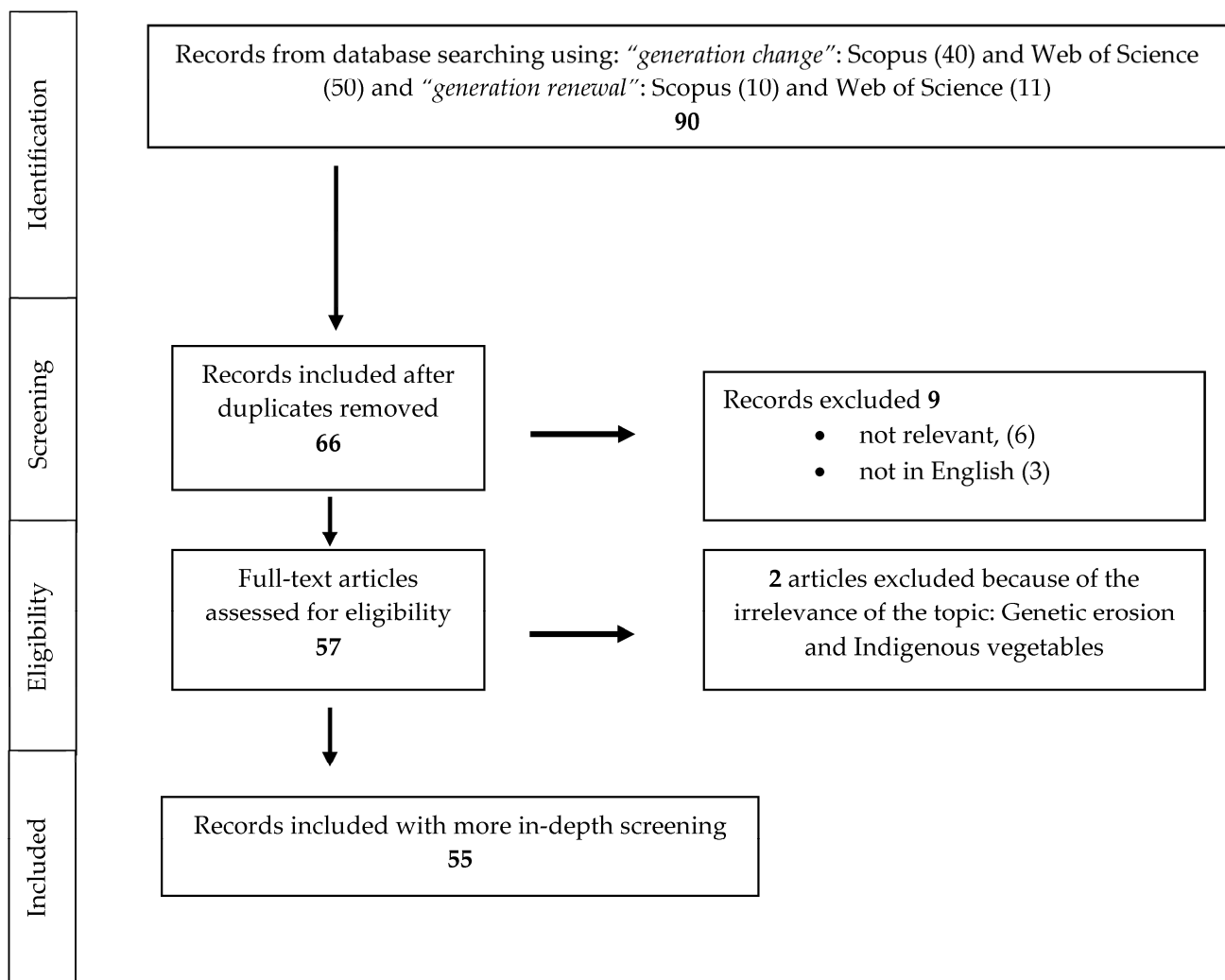


Figure 1. The literature selection process follows the PRISMA¹ guidelines. Source: Own composition.

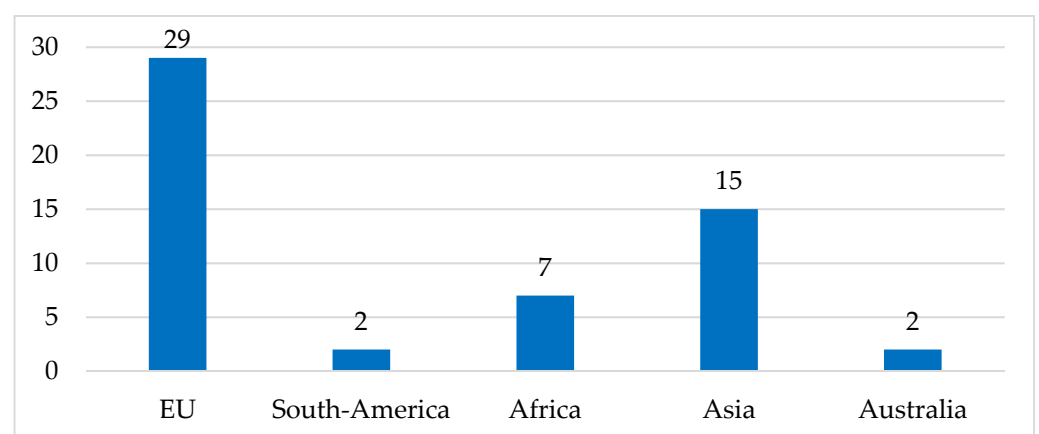


Figure 2. Frequency of the continents analyzed by the articles. Source: own composition.

Figure 3 illustrates the articles in terms of the year of publication. Most studies were published between 2020 (9) and 2018 (9) on the topic of agricultural generation change, followed by 2021 (7) and 2022 (5). The results demonstrate that this topic has become more popular and more thoroughly researched since 2016.

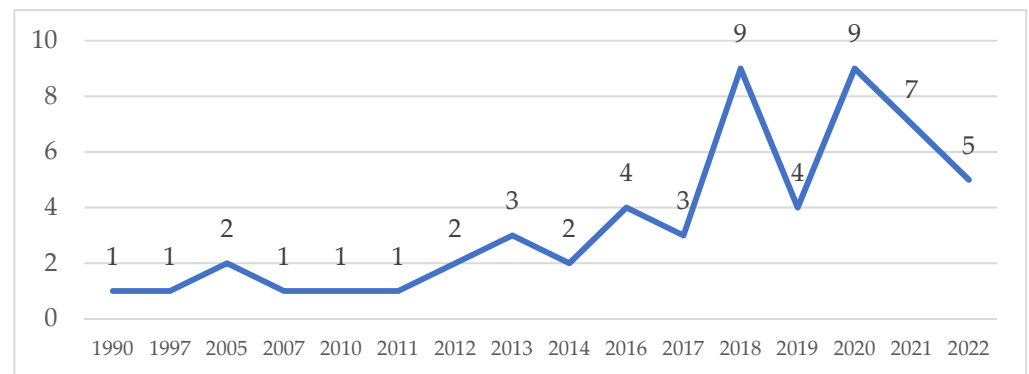


Figure 3. Frequency of articles by year of publication. Source: Own composition.

After the first in-depth screening, five main research fields were identified among the articles screened (Figure 4). From selected materials, 12 articles highlighted the generational change in agriculture (changing fatherhood, agricultural generational renewal, farm transfer between generations, and farm succession), and 13 are written about family farms. Moreover, 22 studies researched the point of view; however, only 4 articles focused on the old generation of farmers. Regarding generational renewal, the modernization of farms (including digitalization, using robots, precision farming, etc.) was the main topic of 4 articles. Apart from the main topics, secondary topics such as climate change, the European Union's Common Agricultural Policy, land mobility, and the agricultural labor market are also considered important.

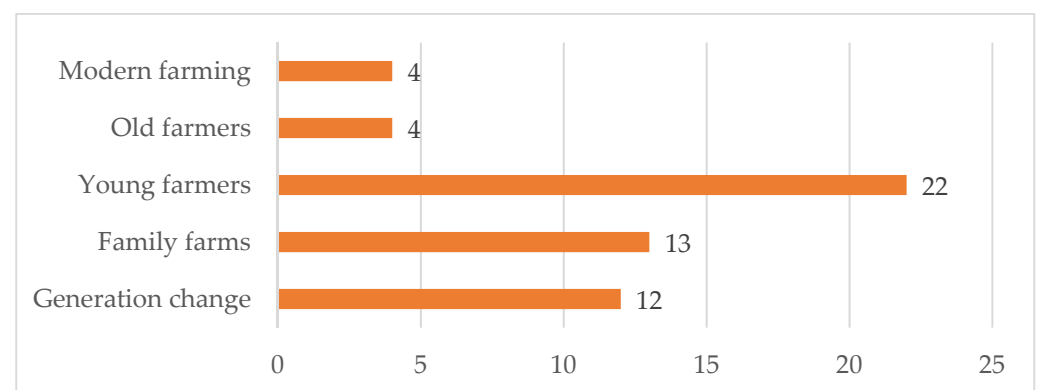


Figure 4. Frequency of the articles by main topics. Source: Own composition.

Regarding the methodology used for the articles, both quantitative (25) and qualitative (21) analyses were popular among scholars. In total, 9 articles used both methods at the same time in their studies. Figure 5 shows frequency of the methodology chosen by the literature. In 30 cases, the authors conducted interviews, mostly in-depth interviews, with average respondents of 20–30 people, and this method was used for almost every case study. Survey data was analyzed using statistical methods, but this quantitative tool was also used for national-level data analyses. On the contrary, the authors applied the techniques of focus groups (4), fieldwork (3), and statistical modelling (5). Thus, it is suggested for those who want to investigate the generational change in agriculture, using both qualitative and quantitative methodologies for a comprehensive and high-quality analysis. In the selected sources, no systematic literature review was found; therefore, this identifies the research gap and justifies the need for this study.

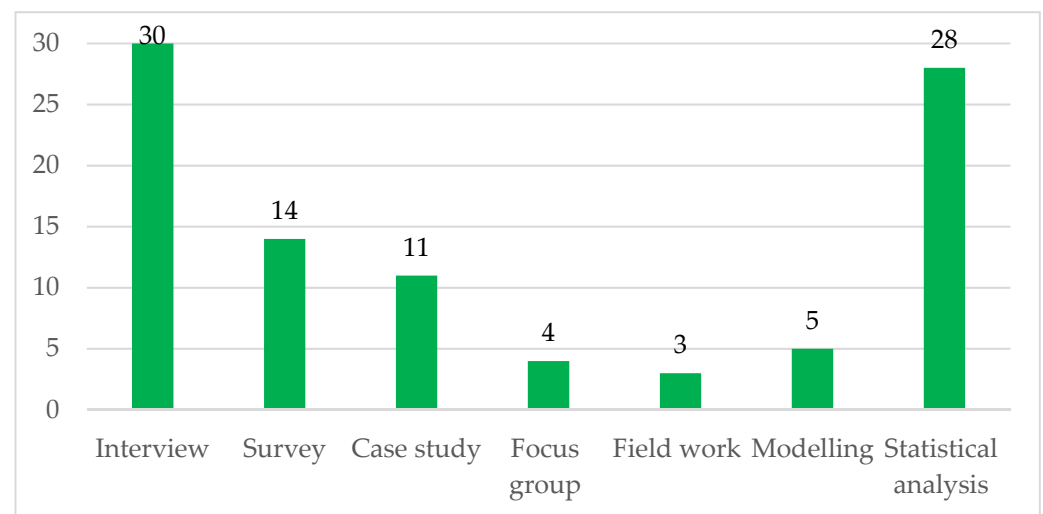


Figure 5. Frequency of the methodology applied in the articles. Source: composition.

3. Results

In general, the analyzed literature does not paint a positive picture of agricultural generational change and the future of young farmers. Family farms have been a fundamental pillar of rural society around the world for decades; in contrast, all articles report that the farming community in the region they study is ageing and the number of farms is declining. Bertolozzi-Caredio et al. (2020) identified farm succession in marginal areas of Spain as a process of three steps: familial recognition of children's success, willingness to take over the farm, and effective takeover of the farming business.

Many studies all over the world have mentioned the decline in the number of young farmers and the lack of newcomers. There are a variety of reasons for this, which will be analyzed in more detail below, as well as the main barriers to generational change.

3.1. Barriers to Generational Change

The most significant barrier to generational change in agriculture is a lack of motivation, for several reasons (such as working conditions, a lack of money, land mobility, etc.), in line with most of the articles analyzed. Young people do not want to work in a sector where work conditions are inadequate and 'dirty' work must be performed (Lorenzen and Lorenzen 2011). Additionally, they are not motivated due to their low earning potential. Other industries can offer them more attractive prospects (Kondo 2021; Bosselmann 2012). Today, the young generation is much more mobile than their ancestors, so there are more learning opportunities, which means that fewer are willing to return home and farm after finishing their education (Farrell et al. 2021). However, motivation is positively affected by the spread of new agricultural technologies (for instance, drones, milking robots, automatic steering tractors, etc.). Modernization has the potential to attract the interest of young people (Guerra 2018). Furthermore, research conducted in Norway has shown that close family ties have a positive effect on young farmers' motivation to take over the family business (Brandth and Overrein 2013).

Finally, Coopmans et al. (2020) suggest that it would be particularly essential to prepare farm successors psychologically for the challenge ahead and to provide coaching to help them deal with the practical problems associated with generational change in Europe.

3.2. Family Factor in Generational Change

According to Plana-Farran and Gallizo (2021), family ties and the emotional factor have a compelling motivational power in relation to young people taking over family farms in Catalonia, Spain. The existence of a sense of belonging and commitment positively influences potential successors.

[Brandth and Overrein \(2013\)](#) observed a significant transformation of fatherhood in Norway, which has a major impact on agriculture. Although the older generation raised their children with the awareness that they would probably take over the farm, this has now changed. In the past, families that traditionally farmed always had someone to continue farming. People also had time to spend with their children, work together, and learn from each other. The report of the study participants revealed that older people learned the profession by working with their ancestors since childhood. In turn, this has changed in today's modern world. Fathers today believe it is important that their children not only be raised by them but also possess the skills and competencies that modern society requires. The general change in fatherhood also has the highest impact on the succession of family agricultural businesses.

3.3. Education and Knowledge Transfer

Today, the younger generation has more learning and educational opportunities, affecting generational change. This is linked to urbanization and internal migration, as today the mobility of people is greater than before. [Farrell et al. \(2021\)](#), investigating Irish agriculture, mentioned that young people who leave the farm due to further education have a chance of returning if they receive different subsidies in agriculture to start organic farming. The study developed by [Popa and Turek Rahoveanu \(2021\)](#) while researching Olt County in Romania found that education plays an important role in the decision to abandon, start, or continue farming. Young farmers with higher levels of education are more likely to seek subsidies for new investments and establish farms. According to [Popescu \(2019\)](#), productivity is associated with farmers' education in Romania, and young people are interested in strengthening their level of knowledge to improve their skills. Many studies have analyzed the increasing education levels of farmers and how education helps young people in generational change in African (Malawi, Senegal, Nigeria, and Ghana) and Asian agriculture (Sri Lanka, South India, Thailand, Papua New Guinea, and China) and plays a vital role in the development of rural areas ([Gapuz and Gapuz 2013](#); [Elahi et al. 2022](#); [Osterhoudt 2018](#); [Seck et al. 2005](#); [Ariyo and Mortimore 2012](#)). Investments in education give young people a chance to try other jobs, which is not conducive to generational change in British agriculture ([Chiswell and Lobly 2018](#)). Finally, [Csizmadý et al. \(2021\)](#) concluded that the socio-cultural aspects of sustainability can be developed through intergenerational knowledge transfer in agriculture. They highlighted the importance of involving young locals in wine traditions and teaching them tacit knowledge about agriculture in Hungary.

3.4. Urban Migration of Young People

One of the main barriers to generational change is the migration of young people to cities. There are many opportunities for youth to work outside of agriculture. Due to urbanization, only a few young people who reside in rural areas want to work on a farm. This is because working in agriculture is considered physically demanding, and young people desire better working conditions. The boom in industrialization has also contributed to the exodus from agricultural areas worldwide. Agricultural work is often considered 'dirty', which is the reason why people migrate to cities to find more attractive jobs and careers ([Buliga-Stefanescu and Necula 2018](#); [Jansuwan and Zander 2021](#); [Yamamoto 1997](#); [Lorenzen and Lorenzen 2011](#); [Sponte 2014](#); [Swindell 2019](#)). [White \(2020\)](#) points out that young people who generally leave farms would have good ideas to improve agriculture in Asian rural small-farmer households, such as seeking financial support, improving access to land, and encouraging income diversification.

3.5. Digitalization and Modern Farming Practices

[Heider et al. \(2021\)](#) stated that one of the other barriers to generational change in Spanish agriculture is the lack of modernization and development. According to [Chiswell and Lobly \(2018\)](#), older farmers also have difficulty delegating farm management tasks in the EU, while [Koczberski and Curry \(2016\)](#) concluded the same in Papua New Guinea.

They find it challenging to delegate more responsibility to their successors. This naturally places young people at a disadvantage. Modernization and new technologies are solutions to this problem, as the digitalization of administration allows young people to be more involved in the daily running of the farm.

Adopting innovative practices (using robotics, drones, farm management software, and more sustainable farming practices) would encourage the younger generation to take over farms and improve the viability of farms (Farrell et al. 2021).

Modernization and information technology can improve working conditions in agriculture and make the sector more attractive to young people. Research has consistently found that young people are more likely to develop the economy through agriculture, and financial support is crucial to this (Chiswell 2018; Karttunen et al. 2016; Widiyanti et al. 2018; Yang 2013; St Aisyah et al. 2020). As a whole, digitalization has a significant positive impact on generational change in agriculture.

3.6. Sustainability and Climate Change

Studies confirm that the younger generation is more aware of climate change. They show a greater willingness to use renewable energy and adopt sustainable farming practices in Pakistan, Malawi, and Finland (Elahi et al. 2022; Lindsjö et al. 2021; Karttunen et al. 2016). Additionally, Farrell et al. (2021) suggested that the move to organic farming is cited as a motivating factor for them. However, research shows that uncertainty caused by climate change leads to demotivation among the younger generation. In Ghana and India, this is one of the reasons why young people do not want to continue working in agriculture (Dhanya et al. 2022; Mariwah et al. 2019).

3.7. High Administrative Burdens, Low Income of Farmers, and a Weak Bargaining Position

First, several European studies (e.g., in the Czech Republic) have highlighted the administrative burden as a barrier to generational change (Pechrová and Simpach 2018, 2020; Simpach 2017). Second, most articles concluded that low income in the agricultural sector is a significant barrier to generational change. The young generation is leaving agriculture due to low wages, as highlighted in Brazilian agriculture (Steward 2007). Moreover, the income security of old farmers is not high in this sector because some agricultural sectors are more labor-intensive compared to the industrial sector and services. Farming couples contemplating retirement now face unprecedented challenges as they age, with the younger generation reluctant to follow (Downey et al. 2017). Older farming couples are being pressured to develop a new script for ageing. In Australia, this is also causing significant tensions between families, particularly around individual constructions of retirement (Downey et al. 2016). In Thailand, the older generation does not tend to give up farming due to a lack of income (pension), but a healthier lifestyle involving less physical activity would be better for them (Jansuwan and Zander 2021). In connection with the topic of the low income of farmers, there is another barrier that the new generation will have to confront, namely, their low bargaining position. Some articles have concluded that young people are in a weaker position in business negotiations, sometimes referring to the young generation as a new actor on the market in countries such as Ghana, Indonesia, and Romania. Therefore, agricultural policies should support them to strengthen their position and bargaining power in the market (Mariwah et al. 2019; Nainggolan et al. 2020; Popa and Turek Rahoveanu 2021; White 2020). Meanwhile, diversification of the farmers' income would reduce the risk of a low income. Research has found that young people are more likely to seek other sources of income in parallel to the general income from agriculture. An additional income source could be agrotourism, especially in Romania, as mentioned by Galluzzo (2016); Nemenyi and Rosser (2010); Popa and Turek Rahoveanu (2021); Voronina (2018); Lorenzen and Lorenzen (2011).

3.8. Land Mobility

According to the literature, one of the main barriers to generational change is limited access to agricultural land. The land market is very competitive, especially in the European Union, and land prices are not favorable for newcomers. Those who want to increase the size of their family farm also face difficulties, such as the administrative burden (strict legislation regulating the purchase of land); moreover, there is an intensively competitive land market characterized by inflated land prices that is true for both the EU and Asia (Conway et al. 2020; Ramos 2005; de Haan et al. 2020; Yamashita and Morisawa 2020). Besides, Heider et al. (2021) found that land has become fragmented over the years due to succession processes, increasing transaction costs, and bureaucratic burdens. Meanwhile, Nemenyi and Rosser (2010) suggest that farmland has a robust social value because, in many cases, families have emotional ties to the land and thus part with it with a heavy heart, a factor that also affects land mobility.

3.9. Supporting Measures and Main Barriers to Generational Change

Most of the articles that we have reviewed analyze the barriers and policy solutions (supporting measures) for generational change in European agriculture. Support measures and main barriers to generational change can be grouped as economic, educational, and social factors (Table 1).

Table 1. Summary table of supporting measures and main barriers to agriculture generational change
Source: Own composition based on the selected literature.

Supporting Measures	Main Barriers
Economic and financial factors	
<ul style="list-style-type: none"> Financial incentives to improve access to land and to encourage income diversification Subsidies for beginning farmers Rural development funds Modernization, digitalization, and adoption of innovative practices (robotics, drones, farm management software) Income diversification (e.g., agrotourism) Administration simplification An early pension system can encourage retirement of ageing farmers Support of organic production, short supply chains, and sustainable farming practices 	<ul style="list-style-type: none"> Difficult access to arable land Resources needed for initial investment Low disposable income of farmers Low pension of old farmers Low bargaining position of farmers on the market High administrative burdens Labour-intensive sector Vulnerability and risks caused by changing weather conditions and climate change
Education system	
<ul style="list-style-type: none"> Improving agricultural education system (increasing qualification level, developing higher education programs for farmers, and knowledge transfer) 	<ul style="list-style-type: none"> Children of farmers leave farms to pursue education and employment elsewhere Young people have more possibilities to study at universities and have more opportunities to find work outside the agricultural sector
Social and individual factors	
<ul style="list-style-type: none"> Strengthening family roots (family relationships, emotional factors) Need for associations of young farmers (a common representation of interests) Continuing training and workshops for young farmers 	<ul style="list-style-type: none"> Lack of motivation of young generation Changing attitudes of their parents (less time for children, difficulty delegating farm management tasks) Greater understanding of interactions between sustainable food systems, changing land use, gender, and generational inequalities in rural spaces is needed Bad and dirty working conditions ('working in the mud', 'working with animals')

Buliga-Stefanescu and Necula (2018) conclude that in Romania subsidies target certain agricultural sectors, such as vegetables; however, supporting measures are needed because there is a decreasing number of youths in agriculture. According to Galluzzo (2016) and Marcu (2014), support for the young generation of Romanian farmers has been successful in income diversification. Farmers have a significant need to diversify their production and specialize in agrotourism. Similarly, the Young Farmers Scheme introduced in Greek agriculture is considered a useful tool to create more jobs for regional, agricultural-oriented economies. This policy stimulates regional output, which is helpful for generational renewal; it can increase rural welfare and maintain social and economic cohesion (Gkatsikos et al. 2022).

Considering agriculture in Ireland, Farrell et al. (2021) suggest that policy makers should focus on potential returning successors of farms. Targeted support that incentivizes the returning successor could attract those back into farming activity who have left to pursue education and employment elsewhere. Guerra (2018) argues that there is an optimistic prospect for young farmer projects in Portugal, which is related to the contributions of this new generation of farmers, which is progressively better qualified, motivated, and a natural enabler of innovation. However, this program alone cannot help combat ageing and depopulation in agriculture. Lastly, Korzenszky (2019) suggests an extrafamilial farm succession process as a generational renewal in Austria. It can be a resolution for young people as new entrants to have access to land and for older generations to see that their work will not be lost. It offers the potential to reverse the increasing age imbalance in agriculture. Meanwhile, despite subsidies for young farmers in Latvia, the age profile of farm managers has deteriorated and land consolidation continues; however, without this, the situation would be much worse (Nipers and Pilvere 2020). In the Czech Republic, taking over a farm from parents and starting a new business is complicated due to a lack of available land and financial and administrative burdens. Whatever measures are taken should help young farmers overcome these types of entry barriers. It is also worth noting that financial support did not itself succeed in attracting young people to livestock production (Šimpachová Pechrová et al. 2018).

Regarding Asian examples, Firman et al. (2019) revealed that in Indonesia, the number of family members has a significant effect on successor decisions to continue family farming. Therefore, social factors tend to influence the successor's decision to sustain family dairy farming. Young Indonesian coffee producers are also advised to receive support to confirm their position on the market. To do this, they should join an association to synchronize their production and sales (Nainggolan et al. 2020). In Thailand, a higher pension could help farmers maintain a better standard of living after retiring. Short- and long-term policies are needed to support older farmers, improve their living standards after retirement, and attract young people who return to agriculture (Jansuwan and Zander 2021). In Bali, there are organizations that can help allocate to family farms the available labor and manage the available seasonal workers (Lorenzen and Lorenzen 2011).

A moderate number of studies have analyzed generational change in African agriculture. Shokeid (1990) revealed the reluctance of farmers to allow their youth to share in the village resources or let their own children stay on with them in a father-son farm partnership in community research in the Atlas Mountains in the Maghreb in North Africa. Based on the result of the study by Lindsjö et al. (2021), sustainable agricultural intensification will remain low until the financial support of young farmers and access to lending receive special attention from policy discourses in Malawi. Finally, Mariwah et al. (2019) underline that through farmer associations and cooperatives in Ghana, young farmers can strengthen their bargaining positions on the market. On the whole, a greater understanding of the complex interactions between sustainable food systems, land use change, and gender and generational inequalities in rural spaces is needed in African agriculture.

Regarding the aforementioned problems, all the studies concluded that young farmers and agricultural generational renewal could greatly benefit from policy changes and financial support (Table 1). This could also provide a solution to the problem of access to land,

decrease administrative burdens, strengthen bargaining positions, reduce vulnerability and climate-related risks, and increase the income from agricultural activity. Targeted financial support and new regulation would help gain access to the highly competitive land market and increase the market power of the new-generation of young farmers. Furthermore, subsidies for the diversification of agricultural activities would also have a positive effect, as they would increase stocks and financial security. In addition, the older generation should be encouraged in order to receive an adequate pension and to increase their willingness to transfer the farm to the younger generation.

3.10. Policy Implications

At first, almost every author refers to financial subsidies that are crucial to helping the young generation take over family farms. However, there are other financial possibilities, such as the Guarantee Fund, that provide a discounted interest rate on investment loans with a higher rate of support to younger farmers. In addition to all this, it should be noted that financial support in and of itself did not attract young people to livestock farming, as Šimpachová Pechrová et al. (2018) have shown. There are many advantages for other farming sectors, as indicated by the support for generational change. There is empirical evidence that generational renewal policies stimulate local GDP, create new jobs (and not only in the agriculture sector), and increase production output (Gkatsikos et al. 2022). On the one hand, young people have more opportunities to study and work outside of agriculture. As education becomes more widely available at a higher level, young people have migrated away from agriculture and the countryside into the cities and never turned back. On the other hand, higher education and professional training can be supporting factors for agricultural generational change. Popa and Turek Rahoveanu (2021) suggested that younger farmers who are better educated are more likely to seek investment support. Moreover, the social and cultural aspects of sustainability become tangible through the transfer of knowledge between generations of family wineries (Csizmadý et al. 2021). Another important finding is that it may be worth encouraging the return of successors to farms. Targeted support (financial and legal) that incentivizes the returning successor could attract those back into agriculture who have left to pursue education and employment elsewhere. This is potentially a broader way forward for policy that identifies different types of successors and targets support specifically to their needs (Farrell et al. 2021). As previously mentioned, the weak bargaining power of young farmers is suggested to be another significant obstacle. This can be solved by supporting sustainable farming practices, organic production, and short supply chains, which can increase farmers' income (Farrell et al. 2021). There is a need for associations where young farmers can join, learn, and work together, and thus have greater power and position on the market, as highlighted by Popa and Turek Rahoveanu (2021). The difficulties of land purchase are not only the question of financial background but also the issue of administrative and legal burden, as Pechrová and Šimpach (2018) have identified. Plana-Farran and Gallizo (2021) point out that the succession process should be supported by various financial subsidies, discounts, or by simplifying administration. Summarizing the different support measures, we assumed that providing access to land for young farmers was the most important. There will be fewer and fewer people in the world working in agriculture, and it is also undeniable that the sector is ageing. In the future, many farms could be left without successors and, therefore, stop producing food, which increases market concentration and dominance. Farms without successors create new opportunities for young people from other sectors and companies to start farming. If young, well-educated, enthusiastic, environmentally committed people want to work and develop a farm after finishing their studies or build a modern farm from scratch, the first and most important thing for them will be the resources (land, capital, technology, and knowledge). Policymakers should ensure that more young people with higher agricultural qualifications have access to land so that agriculture can also develop on a large scale globally. As we have written before, young people are more concerned about

sustainability, and they are committed to modernization that can contribute to low-carbon, sustainable agriculture.

To conclude, all types of these policy tools are essential to keep young farmers in agriculture and to preserve small-scale family farms. However, the success of these tools differs from country to country. While a wide range of instruments is applied in the EU (from economic and financial incentives to education and social policy), in Africa and Indonesia, access to lending, farmer's associations and cooperatives, strengthening bargaining positions, and handling generational inequalities are more articulated compared to financial drivers.

4. Conclusions

The research addressed generational change in the agricultural sector through a systematic review of the relevant literature (55 articles) published in recent years. Data sources were obtained from Scopus and Web of Science databases, and the literature was screened and selected using the PRISMA guidelines. Most of the articles have investigated the problem of generational change in European agriculture (in the European Union); however, this topic is considered a global issue that occurs in many agricultures (e.g., South American, Asian, Australian, and African) all over the world. The researchers used both qualitative and quantitative methodologies for the analysis. Since 2016, there have been increasing numbers of articles on the topic. As a result of the research, several barriers (high administrative burdens, low income and pension, and weak bargaining position) and supporting measures (digitalization, sustainable farming practices, financial incentives, income diversification, agricultural education, and associations of young farmers) have been identified that either discourage or encourage the renewal of the agricultural generation.

Our paper provides a structured set of incentives and trends that influence generational change in agriculture. First, the literature highlighted that the working conditions in agriculture do not have the social respect and comfort demanded by the young generation. Besides, it was found that fatherhood has changed a lot compared to the past, and this has negatively influenced generational change. Parents used to have more time to work together with their children, meaning that they could teach them during the activities. Furthermore, it was confirmed that the family factor plays an important role in motivating young farmers to consider this profession (Brandth and Overrein 2013). As education becomes more widely available at a higher level, there has been a migration of young people away from agriculture and from the countryside into the cities. The widening gap between the skills demanded by urban and rural life limits the transmission of agricultural knowledge from one generation to another during life. However, there are some exceptions, as certain young people benefit from the financial support of agricultural policies and can return to work on family farms after finishing their higher education. This indicates that, in some cases, higher education transforms rural lives into urban ones and hinders young people from restarting their previous rural lives. However, this decision also depends on personal preferences and special circumstances, for example, personal decisions, financial situations, and family relations (Farrell et al. 2021). On the one hand, low income (for both young and old farmers) was mentioned as one of the main barriers to generational change by most of the authors. Furthermore, an important limiting factor is a low pension for the older generation, which slows the retirement of the ageing farmers (Jansuwan and Zander 2021). The difficulty of accessing land and its high prices were also highlighted in several studies. Most authors mentioned financial support as a solution to most of the barriers. There are other financial possibilities, such as the Guarantee Fund, that provide a discounted interest rate on investment loans with a higher rate of support to younger farmers (Šimpachová Pechrová et al. 2018). Innovative practices (digitalization, information technology, robotics, and precision agriculture) can attract the younger generation to agriculture; furthermore, improving working conditions can improve the image of agriculture (Chiswell and Lobly 2018). Diversification of farmers' activities is a solution to financial problems. Targeted subsidies can help to start different but agriculture-related services,

such as agrotourism (Popa and Turek Rahoveanu 2021) or processed food products. The high administrative burden as a barrier was mentioned, especially in the case of Europe. Consequently, decision-makers should reduce the administrative burden (land purchases, farm inheritance, loans, and accessibility of subsidies) to make agriculture more attractive to young people (Pechrová and Simpach 2018). There is a huge need for young farmers' associations worldwide. The young generation, as a new entrant to the market, often complains that they have a weak bargaining position. Associations can help them harmonize their production and sales to strengthen their market position (Nainggolan et al. 2020). Climate change has a major influence on agriculture, and it is described by the authors as a negative motivating factor observed mainly in the semi-arid regions of South India, Ghana, and Africa (Dhanya et al. 2022; Mariwah et al. 2019). In addition, the increased willingness of young people to pay attention to climate change and sustainable land management practices is a positive aspect of this global problem. Young farmers are more committed to applying environmentally friendly farming practices; therefore, organic production and short supply chains can attract them and provide new opportunities (Farrell et al. 2021).

The contribution of this paper has been to provide an overview of recent studies on generational change in agriculture, focusing on young farmers and family farms through a systematic literature analysis. To our knowledge, the research is unique, as no similar analysis has been conducted before. The purpose of this study was to help young professionals and policymakers classify the main factors that hinder generational change in agriculture and identify support policies to address this problem. We provided recommendations for the agricultural sector and policymakers to encourage young farmers and accelerate generational renewal of ageing farmers. The first limitation is that the period from 2000 to 2022 was selected (before 2000, only two articles were found on agricultural generational change in economics). Another limitation concerns the data source of the systematic literature review: only the Web of Science and Scopus databases were selected since these include the highest quality of relevant articles. A further limitation is that only English-language articles were investigated. Finally, the selected literature focused on agricultural generational change occurring mainly on family farms. In the case of large companies and other types of businesses, the role of managers or management in selecting potential successors to fill leadership positions might be examined in the future.

Author Contributions: Conceptualization, Á.J.B.; methodology, Á.J.B. and J.M.B.; software, Á.J.B.; validation, Á.J.B. and J.M.B.; formal analysis, Á.J.B. and J.M.B.; investigation, Á.J.B. and J.M.B.; resources, Á.J.B.; data curation, Á.J.B.; writing—original draft preparation, Á.J.B., J.M.B. and B.S.; writing—review and editing, Á.J.B., J.M.B. and B.S.; visualization, Á.J.B.; supervision, J.M.B. and B.S.; project administration, J.M.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Note

- ¹ PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. It is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

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