HUMAN CAPITAL AS A DEVELOPMENT FACTOR OF ORGANIC AGRICULTURE IN THE REPUBLIC OF SERBIA

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ARTICLE INFO

Original Article

Received: *19 March 2024*

Accepted: *20 April 2024*

doi:10.59267/ekoPolj2402485T

UDC 005.96:631.147(497.11)

Keywords:

Organic agriculture, human capital, development, sustainability

***JEL**: Q, J24, Q01*

ABSTRACT

Authors explore the role of human capital in organic agriculture in Serbia. Through semi-structured interviews with 64 individual farmers holding organic production certificates, key aspects of human capital, including education level, language proficiency and ICT usage were analyzed. Findings reveal a disparity between conventional and organic farming in terms of computer literacy and ICT utilization, underscoring the need for targeted interventions to enhance technological adoption in organic farming. Moreover, the study identifies the importance of membership in agricultural associations for organic farmers, facilitating knowledge exchange and market penetration. The results suggest that human capital plays a pivotal role in driving advancements in organic agriculture, with implications for the sustainability and growth of the sector in Serbia. This underscores the necessity for future research to go deeper into human capital dynamics and their implications for sustainable agricultural development.

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Introduction

Organic agriculture has gained significant attention and importance in recent decades as a sustainable agricultural production system. Initially described as an alternative to conventional farming methods by Beauchesne and Bryant (1999), organic farming transcends the simple dichotomy of old versus new methodologies. Krause and Machek (2018) emphasize that organic agriculture has increasingly been given both academic and general attention and significance. It is commonly perceived as a revival of ancient farming techniques, yet as Cifrić (2003) points out, it is distinct from mere "rustic farming." He notes that while rustic farming is inherently ecological and sustainable, involving holistic lifestyle and societal aspects, organic farming should not be seen as a mere reversion to preindustrial or traditional life.

Organic agriculture should be viewed as a social innovation, challenging the prevailing industrial agriculture paradigm and enabling diverse benefits such as increased employment opportunities on family farms, efficient production on small land plots, and the development of closed-loop systems utilizing natural energy and processes. This approach expands upon rustic practices by integrating scientific advancements to ensure ecological integrity, thereby addressing not just the nutritional value of food but also aligning it with lifestyle choices, as suggested by Lowe et al. (2008). For the transformation of rural agriculture into well-sustainable agriculture, organic farming might become a panacea that can build a plinth for sustainable agriculture, reimburse conversion costs, and maintain the sustainability of the soil (Sahu, Pradhan, 2023; Soni et al., 2022; Dipesh, Sagar, 2022).

Organic agriculture has to reach the stringent requirements of a sustainable production system. As Tomaš Simin et al. (2019) argue sustainability in organic farming encompasses economic, social and environmental dimensions. Katić et al. (2010) and Milić et al. (2018) further emphasize that organic farming, more than any other type, significantly contributes to environmental protection and sustainable principles. Shin et al. (2024) and Gamage et al. (2023) perceive that sustainable agriculture, including organic farming, offers a potential remedy for addressing environmental pollution.

The evolution of organic agriculture involved pioneers who initially shared their knowledge informally, which later led to the formation of supportive organizations and a gradual acceptance within legal and market frameworks, illustrating a shift from marginalization to mainstream acceptance (Tomaš Simin, Glavaš-Trbić, 2016). Research, which is usually an important factor of agricultural development, played only a minor part in this case (Padel, 2001).

Producers are switching to an organic production system for various reasons. The first organic producers emphasized a healthy lifestyle, as well as escape from the cities and a different lifestyle, while today's producers are mainly driven by higher profits. Aeberhard and Rist (2008) state that organic agriculture is supported by subventions in many countries today.

The trajectory of acceptance of organic agriculture progressed in phases: in phase one,

the organic movement was stimulated by pioneers (or innovators according to the diffusion of innovations theory) (Tomaš Simin, Janković, 2014) who developed new ideas and concepts and did not necessarily follow the common lifestyle. They often faced misunderstanding for their opinions and ideas. Phase two is followed by increase and various types of incentives and phase three marked production area increase (Tomaš Simin, Glavaš-Trbić, 2016). Today, organic agriculture is governed by legislation, has a good market position, is widely accepted by society and organic farmers are no longer viewed as outsiders.

In this type of production, economic and technological results are largely influenced by human capital. Pindado et al. (2018) states that farmers need to become more entrepreneurial in order to compete in modern agriculture. Human capital in agriculture can be defined as the education, experience, skills and knowledge that person (farmer) have and can use in order to perform certain tasks (Dimov, Shepherd, 2005; Vesala, Vesala, 2010; Unger et al., 2011). Bearing in mind Beckers (1975) distinction between general and specific human capital, Dimov and Sheperd (2005) conclude that general human capital refers to knowledge and skills acquired through formal education and work experience, while specific human capital refers to knowledge and skills with application limited to certain activities as organic agriculture is.

The socio-economic characteristics of the actors greatly influence the development of this type of production. Combined with natural resources and sustainability it can be said that sustainable use of natural resources cannot be achieved without educated and skilled human capital (Zafar et al., 2019; Ahmed et al., 2020). Overall, human capital can be seen as a critical determinant of success in organic agriculture. By investing in education, training, and skill development programs tailored to organic farming, stakeholders can enhance human capital and drive the continued growth and sustainability of organic agriculture. Also, Leduc et al. (2023) investigated which factors and values influenced producers to decide for a certain type of production in France, Ireland and Sweden and other EU countries.

According to data from the Ministry of Agriculture, Forestry, and Water Management of the Republic of Serbia, as reported by Simić (2020), organic farmers in Serbia fall into two main categories. The first group consists of independent producers who carry out certification. They sell their own organic products. The second group consists of cooperatives operating under group certification as per the Organic Farming Act. These cooperatives maintain contractual relationships with export companies, provide production materials, cover certification costs, and offer other necessary support. This cooperative model has proven successful, with a significantly higher number of farmers involved compared to independent producers (see Table 1)

Table 1. The number of organic farmers in the Republic of Serbia from 2010 to 2022

Year	Organic farmers – certificate holders	Cooperants	Total
2010	137	n.d.a.	137
2011	323	n.d.a.	323
2012	237	836	1,073
2013	258	970	1,228
2014	291	1,575	1,866
2015	334	1,955	2,289
2016	390	2,404	2,794
2017	434	5,719	6,153
2018	500	6,206	6,706
2019	534	5,727	6,261
2020	596	5,513	6,109
2021	616	n.d.a.	616
2022	651	5,650	6,301
*n.d.a. – no data available			

Source: Simić I., 2020 and MAFWM, 2024

Researching human capital in organic agriculture is crucial for several reasons. Firstly, understanding the education, skills, and experience of individuals involved in organic farming helps to identify areas for targeted training and capacity-building initiatives. This, in turn, enhances the adoption and implementation of sustainable farming practices, ultimately contributing to the overall success and viability of organic agriculture systems. Secondly, by examining the socio-economic characteristics of organic farmers, the development of policies and support programs will be influenced. Additionally, studying of human capital function in innovation and adaptation within the organic agriculture sector allows for the identification of strategies to foster continued growth and resilience in the face of changing environmental and market conditions. Overall, research on human capital in organic agriculture is essential for promoting the long-term sustainability, productivity, and competitiveness of organic farming systems.

The aim of this study is estimation of the human capital influence on the development of organic agriculture, particularly focusing on factors such as farmers' education levels, language proficiency, access to information and technology, as well as their participation in agricultural associations. Also, the study aims to provide insights into how human capital shapes the organic production practices in the Republic of Serbia.

Materials and methods

Research results were obtained by means of a semi-structured interview. The choice of conducting semi-structured interviews in this research was deliberate and essential for several reasons. Firstly, semi-structured interviews allow for flexibility in questioning, enabling researchers to delve deeper into specific topics while maintaining a degree of structure to ensure consistency across interviews. This approach is particularly advantageous in exploring the multifaceted nature of organic agriculture, as it

provides the opportunity to probe participants' experiences, perspectives and practices comprehensively. Additionally, the attitudes of the producers were mainly examined with the help of survey and closed-ended questions (Sweikert, Gigliotti, 2019).

Moreover, semi-structured interviews facilitate a more interactive and dynamic exchange between the researcher and participant, fostering a deeper understanding of the subject matter. By allowing participants to express themselves freely and elaborate on their responses, researchers can gain nuanced insights into the complexities of organic farming practices, including the challenges, motivations and decision-making processes involved.

In terms of conducting semi-structured interviews, the process typically begins with the formulation of a set of open-ended questions that cover key themes or topics of interest. These questions serve as a guide for the interview while allowing room for spontaneous exploration of additional areas as they arise during the conversation. Researchers often adapt their questioning based on the responses provided by participants, probing further into areas of interest or seeking clarification on specific points.

The interviews themselves are usually conducted in-person, as was the case in this research, to facilitate rapport-building and a more natural flow of conversation. Prior arrangements are made with participants via phone communication to schedule the interviews at mutually convenient times. During the interviews, researchers employ active listening skills to ensure participants feel heard and understood, while also maintaining a neutral and non-directive stance to encourage openness and honesty.

The research methodology employed semi-structured interviews to gather insights from agricultural farmers holding organic certification in Serbia. Specifically, the study focused on individual farmers, excluding cooperatives. Notably, the research concentrated on farms already certified, rather than all others. The study encompassed 64 participants, representing approximately 15% of all certificate holders, and took place between March and November 2019. Conducting semi-structured interviews necessitated direct visits to the farms, arranged via phone communication. On average, interviews lasted about an hour, though some extended due to participants' willingness to elaborate on their farming practices, revealing valuable insights into their perspectives. Subsequently, collected data underwent coding and was transferred into a database for analysis, utilizing SPSS software for statistical analysis and data presentation.

The statistical methods used in the presented research include descriptive statistics and inferential statistics. Descriptive statistics were employed to summarize and describe the participants' main characteristics. These statistics include measures such as percentages, means, and standard deviations.

Inferential statistics were used to analyze relationships and general conclusions about the broader population. For example, inferential statistics were utilized to examine associations between variables, such as the relationship between education level and knowledge of foreign languages or the association between association membership and perceived benefits. Additionally, inferential statistics was used to assess differences between groups.

Results and Discussions

Jansen (2000) states that present-day organic farmers differ from their counterparts in the previous century or in earlier phases of the rise and development of organic production. In the 1960s and 1970s, organic farmers most often came from urban areas and had no previous experience in agricultural production. Their reasons for entering the "organic world" were chiefly ideological and expressed a form of protest against industrial society and what it stood for. Recently, organic farming has increasingly come to reflect an integral way of thinking of rural community which is trying to redefine agricultural production and make it acceptable and more sustainable for the environment. Consequently, the characteristics of present-day organic farmers differ from those of the pioneers of this type of production.

Related to that, Seufert et al. (2023) in their research identified three core groups of organic farmers - wealthy "hobby farmers"; poorer "noncertified farmers"; and middle class "export farmers". They conclude that these types of producers differ in lifestyle, motivation, commitment to this production system and satisfaction with their choice.

The research conducted in the Republic of Serbia included 64 participants or individual farms which hold a certificate of organic production. The most of the studied sample were male (73.4%), while the rest were female. However, the opinion often expressed in the literature on this subject is that women are more prone to organic farming. In his study, Jansen (2000) claims that "although it appears that, to date [until the time of the publication], no one has documented this phenomenon quantitatively, many observers agree that women's participation is remarkably higher in organic farming than in conventional farming." For both organic and conventional sectors, it has been observed in literature that it is women who have spearhead the shift to more sustainable agricultural systems which are more environmentally-friendly (Meares, 1997; Chiappe, Flora, 1998; Hall, Mogyorody, 2007). The care about the environment and consumers' health is seen as parallel to the role that women have in society as those who protect and care for the people in their community (Jansen, 2000). However, this is not currently the situation in Serbia in this production system.

Table 2 shows the age structure of the participants. The largest number of participants is the ages of 51 to 60 whereas the least number of participants are under 30 or over 60 years of age. According to these findings, majority of Serbian organic farmers are middle-aged. Most of these producers were engaged in conventional agriculture and then switched to organic production or they had another profession before this. Again, not so in line with mentioned characteristic of organic farming pioneers in today developed countries. Related to this, Liu et al. (2019) argue that farmers' age is a significant barrier when talking about conversion to organic agriculture.

Table 2. Age structure of organic farmers in the Republic of Serbia

Characteristic	Number	Percentage
21-30 years old	5	7.8
31-40 years old	12	18.8

Characteristic	Number	Percentage
41-50 years old	19	29.7
51-60 years old	21	32.8
Over 60 years old	7	10.9
Total	**64**	**100.0**

Source: Authors' research

When researching human capital, the educational structure must be taken into account as one of the important influencing factors. According to the level of education, it can be stated that a half of the participants, or 33 of them (51.6%), have higher education. The other half, numbering 30, finished high school (46.9%). One participant had education up to year 8 only. The largest number of participants does not have education in the field of agriculture whereas only 14% had formal education in this field, with the majority of them having graduated from agricultural high school. The precise distribution of participants according to their formal education in agriculture is shown in Table 3.

In his study, Jansen (2000) states that frontrunners of present-day organic farming are most commonly younger people (which was not confirmed by our research) who have a higher level of education than conventional farmers. For the development of organic production, it is very important to include as many young people with higher education as possible who are ready to get an education, invest in their knowledge, as well as adopt and apply new technologies in practice. That approach is often not accepted by a wider community and is very often not sufficiently grounded in practice and comes with a degree of risk. Experience has shown that more educated individuals accept this form of agriculture more easily and quickly, with all these requirements, which entails all advantages and risks associated with alternative technology.

Table 3. The characteristics of organic farmers in the Republic of Serbia according to formal agricultural education

Characteristic	Number	Percentage
Attended or finished agricultural high school	7	10.9
Attended or finished two-year agricultural college	1	1.6
Attended or graduated from the faculty of agriculture	6	9.4
A student in agriculture – in the process of schooling	1	1.6
No formal agricultural education	49	76.6
Total	**64**	**100.0**

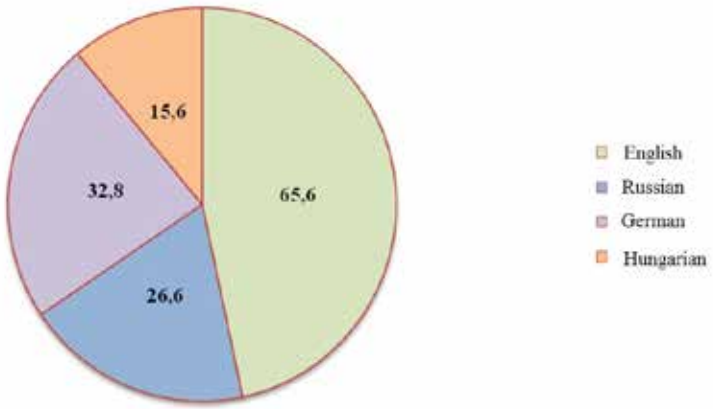
Source: Authors' research

An essential aspect of human capital is farmers' proficiency in one or more foreign languages. Mastery of a foreign language holds significant importance for organic farmers for several reasons. Firstly, the relatively recent adoption of organic production practices in Serbia, coupled with enduring opposition from conventional agricultural circles and scientific communities, has limited the dissemination of technical expertise associated with this mode of production. Consequently, organic farmers often find themselves grappling with challenges independently. Moreover, the underdevelopment

of organic farming in Serbia results in farmers lacking access to information regarding new technologies aligned with organic principles, potentially leading to suboptimal yields. With a scarcity of written resources available in the Serbian language, including online platforms dedicated to organic farming, farmers resort to alternative methods for acquiring knowledge. Consulting foreign literature, websites, and engaging in international forums emerge as primary avenues for accessing information, underscoring the necessity of foreign language proficiency in navigating the evolving landscape of organic agriculture.

In total (Figure 1), organic farmers in Serbia show a high degree of knowledge of foreign languages, with no participants claiming no knowledge of the given foreign languages.

Figure 1. Understanding of foreign languages by organic farmers in the Republic of Serbia (in %)



Source: Authors' research

Issues related to collaboration among agricultural farmers are more commonly associated with conventional farming practices (Pejanović et al., 2017). In contrast, organic farmers generally don't have reservations about working together and collectively entering the market. In fact, only one participant in our study wasn't affiliated with any agricultural association, cooperative, or organization. The majority of farmers are part of the Vojvodina Organic Cluster (VOK) (67.8%), Serbia Organica (43.8%), Organic NS (10.9%), Teras (14.1%) and local associations (46.9%). A significant 84.4% of all participants believe that being a member of such associations contributes positively to the productivity of their farms. The reasons for joining these associations and the benefits perceived by farmers are detailed in Table 4. Related to this, Blockeel et al. (2023) conducted a research on organic farming initiatives and their effect of smallholder farmers' sustainability in Sub-Saharan Africa. Their results show that the initiatives were able to trigger significant positive effects mainly for the environmental sustainability goals.

Table 4. Benefits of membership in an association, cooperative or organization

Characteristic	Number	Percentage
Better production results	54	84.4
Better information access	41	64.1
Exchange of experience	34	53.1
Joint market penetration	32	50.0
Other	9	14.1

Source: Authors' research

In the official statistical database of Serbia, there is no information on the use of ICT in organic production, which should be improved, bearing in mind the great importance this factor has on the development of organic production. According to the 2011 census, 34.21% of the population is computer-literate, with 44.09% of those living in urban areas and 19.84% in rural (i.e. other) areas (Table 5).

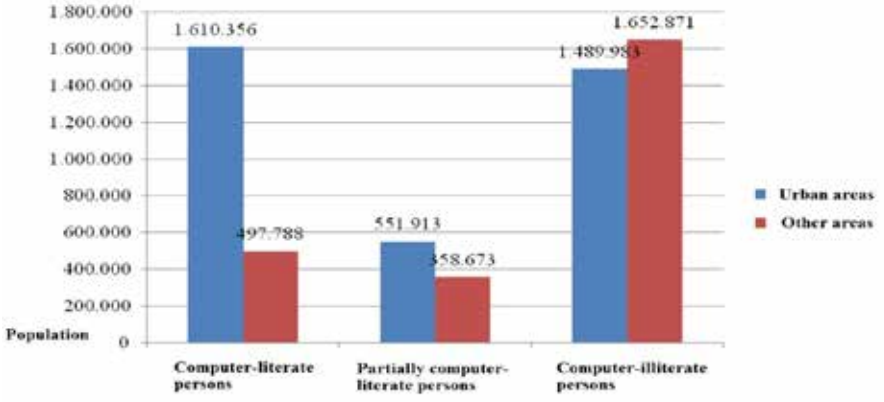
Table 5. The structure of computer-literate persons in the Republic of Serbia according to sex and type of area

	Computer-literate persons			Partially computer-literate persons			Computer-illiterate persons		
	Total %	Men %	Women %	Total %	Men %	Women %	Total %	Men %	Women %
Total	**34.21**	35.74	32.79	**14.78**	15.61	14.01	**51.01**	48.66	53.20
Urban areas	**44.09**	46.51	41.94	**15.11**	15.63	14.65	**40.80**	37.86	43.41
Other areas	**19.84**	20.93	18.75	**14.29**	15.58	13.02	**65.87**	63.49	68.24

Source: Statistical Office of the Republic of Serbia, Census 2011

The number of people who use computers is three times higher in urban than in rural areas. The discrepancy between urban and other areas is not as pronounced with regards to partially computer-literate and computer-illiterate persons (Figure 2).

Figure 2. Population distribution according to the level of computer literacy and the type of area in the Republic of Serbia



Source: Statistical Office of the Republic of Serbia, Census 2011

In contrast to the discouraging situation in conventional agricultural and rural areas in Serbia production in terms of computer literacy, more positive sides can be observed in this matter in organic production:

- Organic farmers typically possess at least a high school or college-level education, suggesting a basic proficiency in computer usage.
- Organic farmers heavily rely on ICT to access necessary information, necessitating proficiency in foreign languages.
- The certification process and maintenance of detailed production records in organic farming necessitate computer usage.

The research reveals that every participant in the study owns a computer in their household. Among them, the majority (60.9%) claim familiarity with advanced computer functions, while the remaining participants possess basic skills. Additionally, 84.4% of participants confirm using a computer to maintain production records on their property. Of these, the largest portion (45.3%) handle record-keeping themselves, while others either share the responsibility with household members or delegate it entirely. Further distribution details are provided in Table 6.

Table 6. The use of computer for keeping records of production on organic farms in the Republic of Serbia

Characteristic	Number	Percentage
Yes, I	29	45.3
Yes, someone else in the household	7	10.9
Yes, together	18	28.1
We do not keep records	10	15.6
Total	**64**	**100.0**

Source: Authors' research

As ICT usage is linked to the modernization and enhancement of production processes, a section of the interview focused on its correlation with production improvement and information acquisition. Participants varied in their methods of obtaining information for farm enhancement. Consulting experts and farmer associations emerged as the most common avenues. Conversely, breeding organizations were least utilized, a trend expected given the limited prevalence of organic animal husbandry in Serbia and the minor role such organizations play in organic farming. The mean values and standard deviations of responses are presented in Table 7.

Table 7. Answers to the question how organic farms in the Republic of Serbia obtain information

	Minimum	Maximum	Arithmetic mean	Standard deviation
Consultants	1.00	5.00	2.90	1.42
Experts	1.00	5.00	3.25	1.16
Associations	1.00	5.00	3.07	1.38
Breeding organizations	1.00	4.00	1.59	0.84
Neighbors	1.00	5.00	2.56	1.13

Source: Authors' research

Regarding the medium of information, of all channels of communication, organic farmers most frequently use the Internet, followed by journals. Listening to the radio or obtaining information from input dealers are the least frequently used channels of communication. Table 8 shows results about medium information used by producers.

Table 8. Answers to the questions about medium of information used by organic farms in the Republic of Serbia

	Minimum	Maximum	Arithmetic mean	Standard deviation
Television	1.00	5.00	2.70	1.04
Radio	1.00	4.00	2.15	0.91
Newspapers	1.00	5.00	2.71	1.04
Input dealers	1.00	5.00	2.31	1.11
Journals	1.00	5.00	3.29	1.30
Internet	1.00	5.00	4.48	1.08

Source: Authors' research

Due to the fact that the participants stated that their dominant and most frequently used medium of obtaining information was the Internet, we asked which of the following websites they most frequently visit: the website of the Ministry of Agriculture, Provincial Secretariat for Agriculture (Autonomous Province of Vojvodina), the website of any agricultural association and the website of the Agricultural Consulting Agency of Vojvodina. The results showed that the most frequently visited website is that of the Ministry of Agriculture. The exact figures are given in Table 9.

Table 9. Obtaining information via the Internet

	Minimum	Maximum	Arithmetic mean	Standard deviation
The Ministry of Agriculture	1.00	5.00	3.96	1.23
Provincial Secretariat for Agriculture	1.00	5.00	3.23	1.68
Agricultural Association	1.00	5.00	3.26	1.33
The Agricultural Consulting Agency of Vojvodina	1.00	5.00	2.34	1.50

Source: Authors' research

The findings of this study highlight substantial disparities in human capital between organic and conventional farming, particularly concerning computer literacy and ICT utilization in production. This discrepancy suggests a potential avenue for enhancing organic agriculture in Serbia. Building upon these insights, it is opportune to reflect on the conclusions drawn by Nathaniel et al. (2020), who underscore the significance of understanding human capital in the context of sustainable development and ecological impact. Given the pivotal role of human activities in ecological distortions, exploring and harnessing human capital in organic agriculture becomes imperative for advancing the sector.

Similar to the presented results, Kamau et al. (2018) in their research confirm that understanding the diversity of smallholder farms is key for the development of interventions, strategies and policies aimed at addressing the numerous challenges these farmers face as well as for those shaping the future of smallholder farming. Kamau et al. (2018) emphasizes that organic production was associated with higher realized incomes per unit of invested capital, producers were older farmers, holdings were larger, with legal ownership of land, greater gender equality and social connection, and others. Sarker and Itohara (2011) agree that a combination of social, human and physical capital is important in improving sustainable livelihood of small farmers which can be connected to organic farmers in developing and developed countries (together with Serbia).

Sapbamrer and Thammachai (2021) did a comprehensive study on factors influencing farmers' adoption of organic farming. The identified factors were systematized into the following groups: the group of factors related to the characteristics of the farmers and the household itself; a group of factors related to psychophysical and psychosocial characteristics of farmers; a group of factors related to the production system, costs and techniques; and a group of supporting factors of this production. Through these groups of factors, the authors describe the most common profile of an organic producer as a young woman with a high level of education, producers who own a farm and, in addition to this production, generate income outside of this production. As factors of extremely great importance for the further development and wider adoption of organic production, the authors single out advisory services, associations, cooperation between producers and supporting participants, as well as t he government support through various programs, education, financial assistance, credits, subsidies and other ways of motivation.

Conclusions

The findings of this study shed light on the intricacies of human capital within the sector of organic agriculture in Serbia. The research revealed significant differences in education levels, language proficiency, and ICT utilization between organic and conventional farmers. Notably, organic farmers exhibited a higher propensity for advanced education and foreign language skills, which are essential for navigating the evolving landscape of sustainable agricultural practices. Research shows that the computer literacy of farmers is of great importance in the development of this type of production, especially the participation of young people in this production who are more willing to educate and who are more computer literate. Organic farming in Serbia demonstrates potential for growth and innovation, particularly through leveraging the diverse skill sets and knowledge base of its practitioners.

Moving forward, it is imperative to continue exploring avenues for enhancing human capital within the organic agriculture sector. Initiatives aimed at providing farmers with access to advanced training, technological resources, and networking opportunities can have positive impact to sustainability and development of organic production in the Republic of Serbia. Moreover, fostering collaboration and knowledge-sharing among stakeholders, including government agencies, academic institutions, and agricultural associations, can facilitate the dissemination of best practices and innovative solutions. By investing in human capital development and creating an enabling environment for organic farmers, Serbia can have positive impact on sustainability, environmental protection and other aspects of this agricultural sector.

Further research on this issue in Serbia should focus on several key areas to advance our understanding and support the growth of the sector. Firstly, longitudinal studies tracking the evolution of human capital within organic farming communities over time would provide valuable insights into trends, challenges, and opportunities for professional development. Additionally, investigate into the efficacy of training programs, extension services and other types of education of actors in this sector. Also, researching the intersection of human capital with other factors such as access to land, market dynamics, and policy frameworks would offer a more holistic understanding of the drivers of success and barriers to entry in organic agriculture. Comparative studies between organic and conventional production practice could also clarify the contributions of human capital to sustainability outcomes and economic resilience. Lastly, research on innovative technologies and practices that leverage human capital to improve resource efficiency, biodiversity conservation, and climate resilience in organic farming contexts would be instrumental in shaping future agricultural policies and practices.

Some of the limitations of this research are:

- It is territorially limited only to the Republic of Serbia, which reduces the possibility of making general conclusions regarding this issue in this production sector;
- The input data used in the research is based on the self-reported data from participants, which may affect on objectivity of the results.

In conclusion, this study sheds light on the unique characteristics of human capital in organic agriculture in Serbia, highlighting its potential for improvement and underscoring the importance of further research in this area to foster sustainable development in agricultural practices.

Acknowledgements

This paper results from the project at Faculty of Agriculture in Novi Sad funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia, grant no 451-03-65/2024-03/200117

Conflict of interests

The authors declare no conflict of interest.

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