TECHNOLOGICAL CHANGES AND SKILLS NEEDS IN THE AGRI-FOOD SECTOR OF SERBIA: ORGANIC FOODS

SUMMARY REPORT

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INTRODUCTION

This summary report[1] forms part of a broader study on the technological changes and skills needs of the Western Balkan agri-food sector, conducted by the European Training Foundation (ETF). The aim of this summary report is to examine the potential of organic food production in Serbia from the perspective of skills supply and demand.

The study aims to inform a foresight exercise on technological changes and skills needs in the organic food sector of Serbia. The purpose of the foresight exercise is to identify concrete skills related measures to support the accelerated development of the sector in preparation for the single market.

OVERVIEW

Organic farming is an agricultural method that aims to produce food using natural substances and processes. Producing organically means respecting rules on organic farming designed to promote environmental protection, maintain biodiversity and build consumer trust in organic products. Organic farming rules also encourage a high standard of animal welfare and require farmers to meet the specific behavioural needs of animals. In 2021, the EU adopted an action plan for the development of organic production with the joint aims of supporting both production and consumption and further enhancing sustainability in line with the European Green Deal, the Farm to Fork Strategy and the Biodiversity Strategy.

EU citizens increasingly value organic produce. Based on the 2020 Eurobarometer survey on EU agriculture and the Common Agricultural Policy (CAP), citizens believe that organic produce is more likely to comply with specific rules on pesticides, fertilisers and antibiotics (82 % agreed), is more environmentally friendly (81 %), and is produced under stricter adherence to measures regarding animal welfare (80 %). According to the survey, 56 % of citizens recognise the organic logo, in comparison with 27 % in 2017.[2] The retail sales of organic produce in the EU doubled between 2015 and 2020.

The share of agricultural land under organic farming in the EU is growing rapidly. Over the period from 2012 to 2020, its share increased by more than 50 %. On average, albeit with substantial variation across EU Member States, organic farms in the EU are larger than conventional farms and tend to be run by younger farm managers. The European Commission has set a target of at least 25 % of EU agricultural land being under organic farming by 2030.

In Serbia, the share of land under organic farming is growing at a faster rate than the EU average. Between 2011 and 2019, arable land under organic farming increased five-fold from 3 008 ha to 15 915 ha while organic meadow and pasture areas nearly doubled with an increase from 3 327 ha to

[1] This report was prepared by Pirita Vuorinen, ETF. The contents of this summary report are the sole responsibility of the ETF and do not necessarily reflect the views of the EU institutions.

[2] EC (2022). Europeans, Agriculture and the CAP 2022. Available here

5 350 ha.[3] According to the study entitled *Organic production in Serbia: 2020 at a glance*[4], field crops (industrial plants, cereals, fodder, medicinal and aromatic plants) were produced on 9 074 ha, accounting for 57 % of total arable land. This was followed by fruit production on 5 324 ha (33.5 %), while vegetables were being grown on just 184 ha, accounting for just 1.15 % of total arable land. In 2019, the total amount of land under organic farming in Serbia was 0.61 % of utilised agricultural land compared to the EU-27 average of 9.08 %.[5]

For the purpose of this study, the market niche for organic foods was analysed through the lens of four broader NACE classification groups:

- crop and animal production, hunting and related service activities (A1);
- fishing and aquacultures (A3);
- food produce manufacturing (C10);
- and beverage manufacturing (C11).

The table below represents the main administrative indicators for Serbian companies operating in these sectors.

[3] IPARD (2022). IPARD III Programme for the Republic of Serbia for the period from 2021 to 2027. Ministry Of Agriculture, Forestry And Water Management. Available here.
[4] Simić, I. (2021). Organic production in Serbia: 2020 at a glance. Belgrade: National Association Serbia Organica. Available here.
[5] Eurostat (n.d.), available here.

TABLE 1. ADMINISTRATIVE DATA ON THE NUMBER OF COMPANIES, GROSS VALUE ADDED, TURNOVER AND EMPLOYEES – ORGANIC FOOD

Year	No. of persons employed	Turnover per person employed – in EUR thousands	Gross value added per person employed – in EUR thousands	No. of companies
A1 Crop and animal production, hunting and related service activities				
2017	25,100	N/A	N/A	N/A
2018	24,664	N/A	N/A	N/A
2019	22,860	N/A	N/A	N/A
2020	22,300	N/A	N/A	N/A
A3 Fishing and aquaculture				
2017	1,325	N/A	N/A	N/A
2018	1,315	N/A	N/A	N/A
2019	1,393	N/A	N/A	N/A
2020	1,269	N/A	N/A	3,380
C10 Manufacture of food products				
2017	63,957	85.7	14.4	2,917
2018	65,717	84.1	14.8	2,909
2019	67,850	83.6	15.3	2,897
2020	68,796	87.4	17.0	2,876
C11 Manufacture of beverages				
2017	7,663	135.3	28.7	351
2018	8,168	139.0	31.4	388
2019	8,054	144.2	30.9	426
2020	8,455	114.3	29.0	455

Source: BRA.

In 2020 in Serbia, there were 2 876 enterprises with 68 796 employees engaged in manufacturing organic food (C10) and 455 enterprises with 8 455 employees engaged in manufacturing organic beverages.[6]

Out of the total number of organic food manufacturers in 2020, the largest number were engaged in the processing and preserving of fruit and vegetables (54.46 %), followed by manufacturers of other food products (46.53 %). There are only a few organic manufacturers engaged in the manufacture of grain mill products, starches and starch products and the manufacture of bakery and farinaceous produce (5.94 %).[7]

Export of organic produce from Serbia is continuously growing and represents an important share of overall exports.[8] Recent analyses show that the value of exports of Serbian organic produce has increased fifteenfold in the past ten years. Exports increased by 53 % in 2021compared to 2020 and

[6] Eurostat. (2022). Industry by employment size class (NACE Rev. 2, B-E).
[7] Eurostat (2023). Processors of organic products by NACE Rev. 2 activity (C).
[8] Development Agency of Serbia (RAS). (2022). *Invest in Serbia agri-food*. Belgrade: Development Agency of Serbia. Available here.

amounted to a total of EUR 57.4 million.[9] Exports consist mainly of organic produce requiring low-grade processing, raw materials and semi-finished products and berries.[10] Most organic produce is exported to the EU, namely to Germany, the Netherlands and France.

SKILLS DEMAND

The most sought-after profiles for companies engaged in the manufacture of organic produce and for manufacturers of organic produce included agronomists, agricultural engineers, food technologists, food safety specialists and food technicians. Companies producing functional foods mainly sought employees with a third-level education in medicine, pharmacy and biology. Employees in functional foods are tasked with supporting the sale of functional food produce by offering tailor-made advice to customers, thereby representing important added value.

Based on the ISCO/ESCO classifications, several occupations address the demand for these skills as shown in the table below (Table). All of these occupations are generally classified within the ISCO group 2 (professionals), with some classified under ISCO group 3 (i.e. technicians and associated professionals).

TABLE 2. RELEVANT TECHNICAL OCCUPATIONS IDENTIFIED BY COMPANIES

• soil scientist (2133.11) • agricultural scientist (2132.1) • agronomist (2132.2) • agricultural engineer (2144.1.2)	• food technologist (2145.1.4) • food safety specialist (2263.2) • food technician (3119.5) • agricultural technician (3142.1)

Source: Evidence taken from interviews and ESCO classification of skills, qualifications and occupations.

The above-mentioned occupations require different levels of education, i.e. the occupational profiles of agricultural technician and food technician usually fall under ISCED levels 4 or 5. Some profiles require at least a bachelor's degree (ISCED level 6), i.e. agronomist, agricultural engineer, agricultural scientist and soil scientist, while food technologist and food safety specialist profiles correspond to ISCED level 6 or 7.

In all cases, the companies were seeking established professionals substantial experience in the academic field that could be recruited either locally or from abroad (i.e. in terms of functional food). They had to be able to fill the core team's knowledge gaps in the organic certification process (organic sector) and/or in sales and marketing and project management (in both the organic and the functional food sector). As part of their plans for scaling abroad, companies were looking to develop internationally, possibly with the support of external foreign experts. At the local level, companies engaged in functional food were open to recruiting undergraduates with a relevant background in the aforementioned disciplines, as well as in the areas of sport and physical education. For lower-level positions, formal education was not mandatory. Specifically, this was the case with the organic sector

[9] Ministerie van Landbouw, Natuur en Voedselkwaliteit, The Netherlands. (2020). Dutch expertise and Serbian potential: progress in the digitalization of the agri sector in Serbia. Available here.
[10] Simić, I. (2021). Organic production in Serbia: 2020 at a glance. Belgrade: National Association Serbia Organica. Available here.

where companies were seeking farmers without specific qualifications but who had knowledge of basic organic farming practices and techniques as well as the ability to apply their knowledge.

In terms of business services and related occupations, the companies interviewed expressed demand for project managers, sales managers, sales assistants, shop managers, specialised sellers and market vendors as these occupations play crucial role in direct selling of goods to customers across various marketplaces. They also emphasised the importance of marketing skills, i.e. by highlighting profiles such as marketing managers, digital marketing managers, marketing consultants or marketing assistants. Food regulatory advisors were in particular demand in order to ensure compliance with food safety regulations and provide guidance on regulatory matters. Among the soft skills which are lacking were communication skills, knowledge of English and certain specific personality traits.

Based on the ISCO/ESCO classifications, the following occupations are relevant for these skills (Table). The occupations identified are classified mainly within the ISCO group 1 (managers). Some of the occupations are listed in ISCO group 2 (professionals) while some are classified under ISCO group 5 (service and sales workers).

TABLE3. RELEVANT BUSINESS SUPPORT OCCUPATIONS IDENTIFIED BY COMPANIES

• project manager (1219.6) • sales manager (1221.3.2.1) • sales assistant (5223.4) • fruit and vegetables shop manager (1420.4.23) • marketing manager (1221.3.2) • marketing consultant (2431.10)	• marketing assistant (2431.10.3) • digital marketing manager (1221.5) • food regulatory advisor (3257.2) • fruit and vegetables specialised seller (5223.7.19) • market vendor (5211.1)

Source: Evidence from interviews

According to representatives from the companies interviewed, the main channel for searching for new employees was through personal recommendations or LinkedIn ads. There were no links with either secondary and post-secondary educational institutions (VET) or business knowledge providers, the National Employment Service or similar stakeholders. The companies had no role in the current effort of the state in bringing business, associations, educational institutions and other stakeholders together to craft new educational standards via its Sector Skills Council for Agriculture, Food Production, Forestry, Fishery and Veterinary sectors

SKILLS SUPPLY

Vocational education and training

According to a recent study entitled “Organic farming in North Macedonia, Bulgaria, Serbia and Croatia”, elementary agricultural education is offered in 33 state-funded secondary agricultural schools in Serbia.[11] The school curriculum for organic agricultural production was developed in 2010 and was introduced into agricultural high schools starting from 2012/2013 as an optional subject (organic vegetable and crop production, organic fruit production and organic livestock production) as part of the

[11] Organic Agriculture Innovation Platform. (2020). *Organic farming in North Macedonia, Bulgaria, Serbia and Croatia*. Skopje: Forum CSRD. Available here.

school curriculum for agricultural technician programmes.[12] Each year, secondary agricultural schools open about 1 000 positions for the agricultural technician programmes. For the school year 2022/2023, 1 070 positions were opened of those 32 in dual education.[13] There is no available data on the number of students enrolled in these programmes.

Trained secondary agricultural schools teachers are cited as some of the major strengths of the organic and functional food niche.[14] As a result of educational reforms in line with the Bologna Process, new courses, either mandatory or elective, have been introduced in accredited curricula in secondary and higher education in Serbia, such as Organic Crop Production, Organic Livestock Production, Organic Fruit Production, Organic Production Economics and others. During the implementation of curricula in 33 state secondary schools in agriculture, students can acquire knowledge of basic biotechnical methods and operations in organic agricultural production. These courses are offered as part of standard education in agricultural schools.

Intermediary organisations

Most active associations and business intermediaries in this niche include Terra's association and Open University in Subotica, the Centre for Organic Production in Selenča and the Association Vitas in Ruma. Novi Sad hosts several prominent clusters such as Vojvodina Organic Agriculture Cluster, Agro Cluster of Serbia, Vojvodina ICT Cluster, Serbia Does Apples and Panonian Bee Cluster. Other associations include the "Lužničke rukotvorine" in Babušnica, "Luka znanja" in Novi Sad, the Business Association ICT Cluster of Central Serbia in Kragujevac, as well as the National Association Serbia Organica, Belgrade and the National Alliance for Local Economic Development NALED, Belgrade.

Non-formal education relevant for this niche is mostly aimed at farmers and is conducted by non-governmental organisations such as the following: Terra's association, Subotica; Open University, Subotica; Centre for Organic Production, Selenča; Vojvodina Organic Agriculture Cluster, Novi Sad; Association Vitas, Ruma; Agro Cluster of Serbia, Novi Sad; Association "Lužničke rukotvorine", Babušnica; "Luka znanja", Novi Sad, as well as through national associations including the National Association Serbia Organica, Belgrade and the National Alliance for Local Economic Development NALED, Belgrade.[15]

Training provided is often project-based, donor-driven (funds and content) and tends to lack continuity. It is aimed at current and potential organic farmers, as well as unemployed women, young people and consumers. However, some organisations such as Serbia Organica have also implemented an organic internship programme aimed at undergraduates finishing bachelor's or master's studies and/or at graduates. They have also been involved in the upskilling of staff in different institutions, i.e.

[12] Organic Agriculture Innovation Platform. (2020). *Organic farming in North Macedonia, Bulgaria, Serbia and Croatia*. Skopje: Forum CSRD. Available here.

[13] Република Србија. Министарство просвете, науке и технолошког развоја. Прелиминарни план уписа ученика у средњу школу за школску 2022/2023.

[14] Simić, I. (2021). *Organic production in Serbia: at a glance 2020*. Belgrade: National Association Serbia Organica. Available here.

[15] Organic Agriculture Innovation Platform. (2020). Organic farming in North Macedonia, Bulgaria, Serbia and Croatia. Skopje: Forum CSRD. Available here.

professors of secondary agricultural schools, educators at pre-school institutions, agricultural extension advisors and certification bodies.[16]

Legal organisers of group certification also offer education to their cooperants in the form of continuous courses. Moreover, some local municipalities such as the City of Belgrade and Novi Sad organise training for potential future organic farmers as well as for organic producers. Other local administrations in Serbia organise such training only occasionally.[17]

Companies interviewed praised educational institutions for providing basic knowledge but underlined the importance of a specific orientation for those entering the industry. This is usually done through onboarding where the procedures and the length of the process may vary based on the individual capacities of both the trainers (e.g. company staff) and the new employee. There is no specific training which could be formalised within companies themselves. There is no cooperation with the National Employment Service (NES) or trade unions. Neither is there any joint organisation of training with other companies or educational institutions that also deal with such training.

Companies interviewed encouraged both online and offline education provided either by well-known international MOOCs or domestic providers. These courses are meant to assist employees in expanding their knowledge of the domain. However, companies do not acknowledge skills and experiences gained by candidates via non-formal training. There is no cooperation with hubs, although companies interviewed are up to date with relevant opportunities thanks to e-mail updates regarding various workshops.

Higher education and research

Higher education with subjects on organic farming and production are provided by accredited higher education institutions with the most established being the Faculty of Agriculture at University of Belgrade, the Agronomy faculty in Čačak at University of Kragujevac and some private institutions such as the Faculty for Biofarming in Bačka Topola or Educons University, for example. In 2010, the first bachelor's degree programme in organic agriculture was launched at the Faculty of Agriculture, University of Novi Sad,. Students are offered a variety of relevant subjects including agricultural machinery in organic farming and organic certifications. Notably, one of the electives focuses on functional food.

In 2010, the first bachelor's degree programme in organic agriculture was launched at the Faculty of Agriculture, University of Novi Sad,. Today, there are also accredited master's degrees in organic agriculture on offer at the Faculty of Agriculture of the University of Belgrade, the Faculty of Agriculture at the University of Novi Sad, as well as the Faculty for Biofarming in Bačka Topola, Megatrend University and the Faculty of Ecological Agriculture in Sremska Kamenica, Educons University. At Megatrend University, relevant courses include Plant Breeding and Seed Production in Organic Agriculture and Production and Processing of Ecological Food at the as part of the bachelor's degree

[16] Organic Agriculture Innovation Platform. (2020). Organic farming in North Macedonia, Bulgaria, Serbia and Croatia. Skopje: Forum CSRD. Available here.
[17] Organic Agriculture Innovation Platform. (2020). Organic farming in North Macedonia, Bulgaria, Serbia and Croatia. Skopje: Forum CSRD. Available here.

programme and Plant Protection in Organic Agriculture as part of the master's degree programme, for instance.

Brief insights into the curricula of the aforementioned third-level providers show that organic agriculture is well represented. However, there are important variations in knowledge supply with regard to ICT, economic aspects and management techniques in organic agriculture. Agricultural faculties should invest more resources in research activities. Equally, they should increase the mobility of professors who are likely to pay close attention to trends in the development of organic production from here on out.[18]

There are 16 research institutes specialising in supporting agri-food producers. The most established of these institutes are the Fruit Research Institute Čačak, the Institute for Agricultural Economics, the Institute for Science Application in Agriculture, the Institute for Vegetable Crops Smederevska Palanka, the Institute of Fields and Vegetable Crops Novi Sad, the Institute for Animal Husbandry and the Food Institute, Novi Sad.

[18] Ivanović, M., & Ivanović, B. (2016). Chances and obstacles for organic production in Serbia. Ekonomski Signali: *Poslovni Magazin*, *11*(1), 1-16. https://doi.org/10.5937/ekonsig1601001I