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УДК 338.4

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SAFE FOOD INNOVATIONS IN LATVIA

Introduction. The provision of food to the population is a priority of any country; it is also a matter of national security. Nowadays in developed countries, food security plays a decreasing role; a more important matter is whether the food produced by the intensive agricultural production system is safe and harmless. Organically produced food is a good alternative to that produced conventionally, yet this system requires innovations that could increase productivity and efficiency in the exploitation of resources.

The main part. Conventional and organic farming patterns available in the scientific literature have been researched by a number of authors, e. g. Adamovičs A., Kreišmane Dz., Gaile Z., Hodge I. D., Riordan P., Macdonald D. W., Ponisio L. C., M'Gonigle L. K., Mace K. C., Palomino P., Kremen C., Lapiņš D., Tuomisto H. L., Turka I. (Tuomisto H. L. et al., 2012) and others, while innovations have been investigated by Agwu E. A., Dimelu M. U., Dimza V., Dognon M., Gann D., Madukwe M., Neimanis M., Salter A., Sauka A., Zelgalvis E., (Agwu, A.E. et al., 2008) and others.

Organic farming techniques are based on maintaining the sustainability of the ecosystem through establishing a maximally closed production cycle, completely excluding the application of synthetic fertilisers and pesticides and reducing environmental pollution as much as possible. For these reasons, such food is safer and risks for human health are lower (Sertificēšanas un testešanas centrs, 2017). In contrast, *conventional farming* uses chemically synthesised plant protection and fertilisation products and raises livestock intensively; it also involves a high level of mechanisation and minimum labour consumption (Dažādas saimnieklošanas metodes, 2017). Food produced under conventional farming is the cheapest.

In Latvia, new technological solutions in food production and various innovations increasingly emerged after joining the European Union; for example, the average grain yield was 2.43 t/ha in 2004, while in 2015 it reached 4.49 t/ha. Conventional farming in Latvia started its winning streak, yet it made environmental and ecological problems more acute. The way of thinking of individuals began changing, and organic farming techniques became increasingly popular. Some insight is given by Figure 1 that shows changes in the proportion of primary environment-friendly and safe food in the total agricultural output in Latvia over the last three years.

In the period from 2014 to 2016, the proportions of most organic food products in the total agricultural production were less than 5%. Exceptions were honey, the output of which increased from 15.4% to 30.3% over this period and milk, the production of which reached 9.9%. Output in all the presented food groups tended to increase, except for meat.

Prior to 2004, there were registered more than 1 000 certified organic farms in Latvia. After joining the EU, the farms received extra financial assistance from the EU Funds for their modernisation and herd enhancement, and payments for the utilised agricultural area were paid as well. The payments for organic farms were higher and served as compensation for lower yields. At the end of 2016, there were registered 4 147 organic farms in Latvia, even though this was a relatively small number, as the number of economically active farms in the agricultural sector of Latvia totalled approximately 80 000.

The problem of establishing processing enterprises for organic food has become increasingly urgent. The number of such food processors is showed in Table 1. Processing organic food results in products of higher value-added, in which an important role is played by innovation.

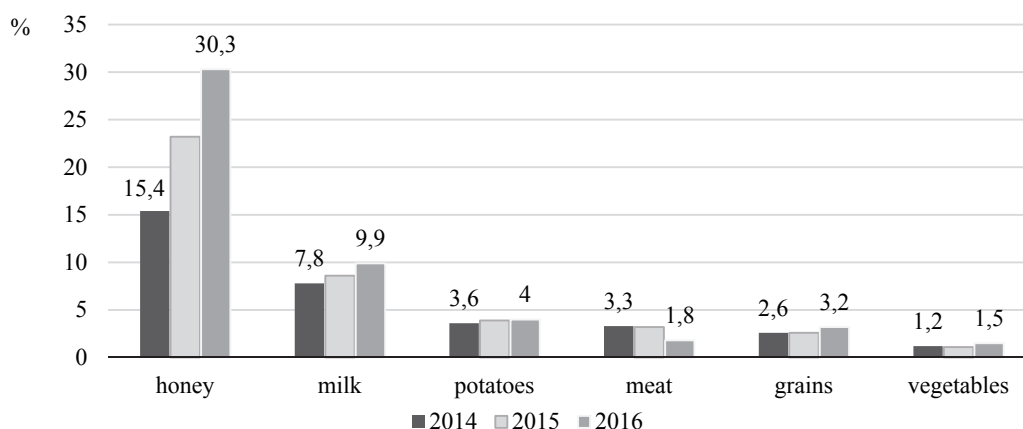


Figure 1 — Proportion of organic produce in the total agricultural production in Latvia in the period 2014—2016

Source: authors' construction based on Latvijas lauksaimniecība..., 2016.

Table 1 — Number of organic food processing enterprises by food category in Latvia in the period 2009—2016

Number of processing enterprises by food category	2009	2010	2011	2012	2013	2014	2015	2016	Average growth rate, %
Production of meat and meat products	6	5	6	13	14	17	16	22	25.81
Processing of fruits, berries, vegetables and potato	15	18	18	27	31	47	60	67	25.11
Production of vegetable oil and fat of livestock origin	2	2	2	2	3	2	2	2	2.38
Production of milk and dairy products	13	17	19	15	17	22	24	24	10.47
Production of milled products, starch	7	4	4	5	7	6	11	12	14.32
Production of bread, flour confectionery	3	5	7	8	9	8	13	17	30.80
Production of other food products	13	30	33	39	44	44	89	97	40.43
Production of feeds	0	0	0	0	2	2	3	3	0.00
Support and retail trade enterprises	5	54	56	58	61	72	72	78	145.54
TOTAL	64	135	145	169	193	264	290	322	—

Source: authors' calculations based on Bioloģiskās lauksaimniecības produktu..., 2014, Latvijas lauksaimniecība..., 2016 and Food and Veterinary Service registers, 2016.

In the period 2009—2016, the number of food processors was volatile. In 2016, the largest number of food processors was registered in the category “Processing of fruits, berries, vegetables and potato” — 67, which could be mainly explained by the support policy for simple processing lines and an increase in the number of organic food producers. A lot of processors were registered also in the category “Production of other food products”, which involves the production of teas, spices and additives, sugared confectionary and the pre-processing, processing and packaging of honey and other bee-keeping products. The sharpest increase in the number of processors was observed in the category “Support and retail trade enterprises”. Such a sharp increase in the number of processors could be explained by an increase in the number of warehouses, shops, grain-drying facilities and other support structures.

The authors verified the following hypothesis: an increase in the number of food processors in the organic sector results in an increase in the amount of safe food available in the country as well. The results are presented in Figure 2.

As shown in Figure 2, there was a strong positive correlation between the independent variable — the number of food processors — and the dependent variable — the amount of processed organic produce as a percentage of the total organic production. The analysis revealed that an increase in the number of food processors by one unit resulted in an increase in the amount of processed organic produce by 0.012%. Innovation is a stimulating element in the manufacture of safe food and in broadening the assortment of the food products. Innovation has become the key factor of development, and it is an important factor in enhancing competitiveness (Ābeltiņa, 2009). The authors define the **term innovation** as the final result of an innovation, which could be an enhanced product or process that increases productivity

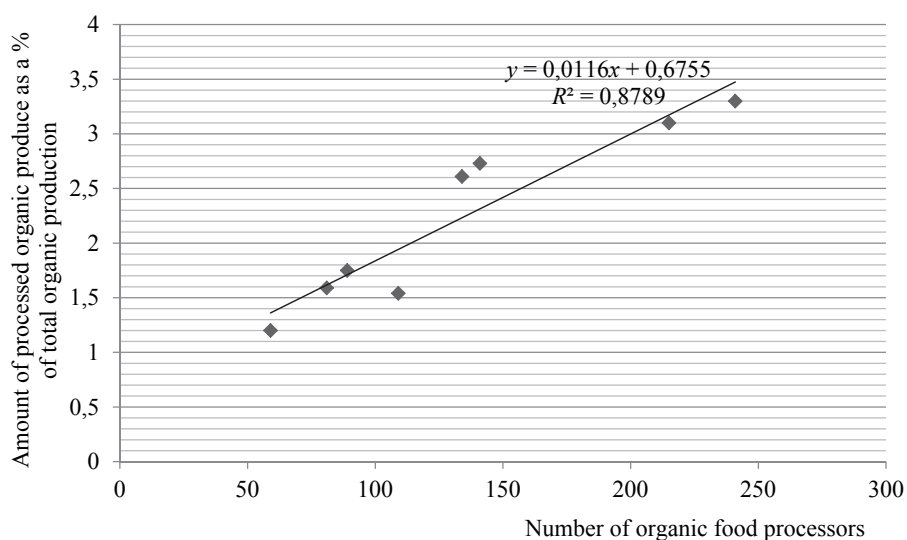


Figure 2 — Correlation between the number of organic food processors and the amount of available organic (safe) food

Source: authors' construction.

and involves significant efficiency enhancements; an innovation could be an enhancement in work organisation and in cooperation among employees engaged. This means that an innovation could be both technological and non-technological.

To identify how active in the introduction of innovations are those using organic farming techniques — the producers of primary food — in Latvia and what kind of innovations have been introduced on the farms in a five-year period, the authors conducted a survey of the organic farm owners in two regions of Latvia in 2016. In total, 83 agricultural holdings were surveyed, and the survey results are presented in Table 2.

Table 2 — Kinds of innovations introduced on organic farms in Latvia in the period 2010—2015

Kinds of innovations introduced	Product innovation	Process innovation	Marketing innovation	Organisational innovation
Number of farms that introduced an innovation in 2010—2015	6	96	26	16
As a percentage of the number of farms surveyed	7.2	115.7	31.3	19.3

Source: authors' calculations based on the survey, 2016.

The authors have distinguished four kinds of innovations: 1) product innovations that involve new goods, services and commercialisation ideas; 2) process innovations that represent technological solutions; 3) marketing innovations, which are new sales channels and new market segments; 4) organisational innovations that are made in the fields of administration, supply and sales. The data presented in Table 2 allow concluding that the development and innovative solutions of organic agricultural enterprises mainly focused on process innovations, introducing new technological solutions (96 instances), while product innovations were the fewest.

Conclusion. Primary food production is a matter of security for any country. In developed countries, as well as in Latvia, the output of food and the supply of it to the population are sufficient, yet an urgent problem is the production and supply of food grown organically and being harmless to health. An essential role in the production of safe food is played by organically grown and organically processed food. In primary food production, even though farmers considered their business development opportunities for their organic farms, their current innovative activity mainly focused on increasing the efficiency of the primary food production process rather than on producing products of higher value-added. Although the number of organic food processors tended to increase, the number of such enterprises was still insufficient. In recent years in Latvia, organic farms mainly worked on innovations contributing to technological and organisational solutions, and little focus was placed on product innovations, which indicates that financial support for the farms stimulated the production of safe food as such, yet the farms were not motivated to work on higher value-added products, which could be achieved through product innovations.