

PRODUCTION CAPACITY OF FISH PROCESSING IN LATVIA

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Abstract

The purpose of the research is to evaluate the technologies, available to the Latvia's sector of fish processing and their utilized capacity, as well as to identify the factors influencing production process, providing recommendations for development and improvement of further policy of the sector. The author evaluated availability and utilized capacity of production technologies in the Latvia's sector of fish processing, considering the analysis of financial indicators of the made investments, production capacity load and fish processing companies. In view of economic theory, the factors, influencing the production process of Latvia's sector of fish processing, were defined. As a result of analysis, the author established that the development of production of Latvia's fish processing sector is to a great extent influenced by the availability of human resources, raw materials and investments, as well as undertaking. For further development and policy planning of the sector it would be advisable to take into account these factors, influencing the production process of Latvia's sector of fish processing and their changes. The formed combinations of indicators may be used in scientific researches on establishment of production technologies availability and their utilized capacity, and identification of factors, influencing the production process; they may facilitate researches for its calculation and importance, as well as may assist the institutions involved in the fisheries' policy formation to work more successfully and improve the common policy in the field.

Key words: capacity utilization, Cohesion policy, fish processing sector, production process, technological equipment.

Introduction

The production process of Latvia's fish processing sector employs various production technologies: facilities (fish preliminary processing and freezing facilities, autoclaves, etc.) and their equipment, as well as various kinds of buildings (production workshops and auxiliary buildings, storage rooms, smokehouses, laboratories, etc.). Within last 10 years their purchase to a great extent has been facilitated by the investments in amount of EUR 96.63 million made in the framework of the EU finance instruments (especially by the Financial Instrument for Fisheries Guidance and European Fisheries Fund) (Central Statistical Bureau, 2014; Food and Veterinary Service, 2014; Ministry of Agriculture, 2014; Ministry of Finance, 2014; Rural Support Service, 2014; Latvian Investment Fund, 2014).

To work out further support activities for the development of Latvia's fish processing sector and fisheries policy planning, the production technologies available for the sector and their utilized capacity must be evaluated, as well as the factors, influencing the production process, need to be defined.

Research object was Latvia's fish processing sector.

Research subject was availability of production technologies and their utilized capacity, factors, influencing the production process.

Research aim - availability of production technologies and their utilized capacity, as well as factors, influencing the production process in Latvia's fish processing sector, must be evaluated, aimed at elaboration of support activities for further development of the sector.

Research tasks are as follow:

- 1) to define Latvia's fish processing companies, which are/are not the recipients of investments in the framework of the EU financial instruments in the planning periods of 2004-2006 and 2007-2013;
- 2) to evaluate the availability of production technologies and their utilized capacity in Latvia's fish processing sector;
- 3) to define the factors, influencing the production process in Latvia's fish processing sector;
- 4) to provide conclusions and suggestions for further development of Latvia's fish processing sector.

Research hypothesis: production technologies of Latvia's fish processing sector are not being utilized in their full capacity, thus not reaching the maximum production capacity due to several social and economic factors.

In the article the author reflects on the main results of the research, yet a more detailed analysis of which is provided in the research 'Availability of Production Technologies for Fisheries Development in Latvia' ('Ražošanas tehnoloģiju pieejamība zivsaimniecības nozares attīstībai Latvijā') funded by Ministry of Agriculture of the Republic of Latvia.

Materials and Methods

Carrying out the research the author used the descriptive, document and statistical (qualitative and quantitative) methods of analysis.

The author used data of Ministry of Agriculture, Food and Veterinary Service and Central Statistical Bureau of Latvia to define the participants of fish processing sector.

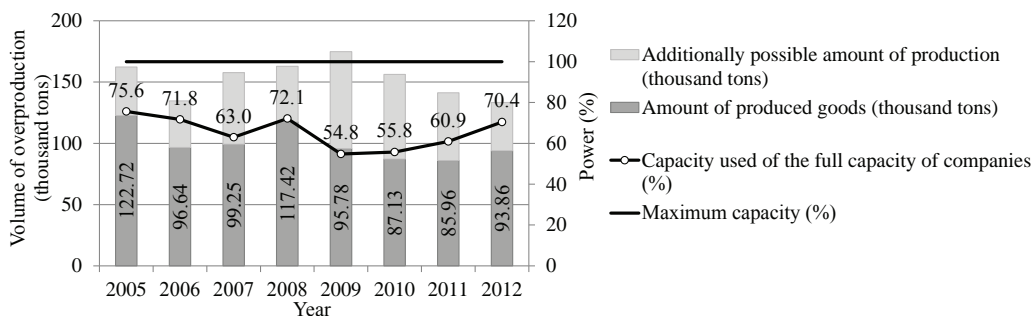


Figure 1. Production volumes and production capacity of fish processing sector in Latvia from 2005 – 2012, thousand tons, % (author’s calculations based on Central Statistical Bureau).

To obtain the current information on utilized capacity of technological facilities, kinds of necessary investments and their availability, the author elaborated a questionnaire. The survey was conducted from May 12 to June 16, 2014. The target audience of the survey were 111 Latvia’s fish processing companies. 36% of the respondents completed the questionnaire.

In elaboration of conclusions and suggestions mostly the methods of analysis and synthesis were applied.

Results and Discussion

Availability and utilized capacity of production technologies

Analysing the data on the utilized capacity of technologies used in the production process of Latvia’s fish processing sector, it is evident that since 2005 the production capacity has been changeable and has not been fully used (Figure 1).

Capacity utilization in 2010 in the Latvia’s fish processing sector on average was 56%, whereas in Estonia, Russia, Lithuania and Poland - 61%; 75%; 80% and 80%, respectively (Latvijas Lauksaimniecības universitāte, 2013).

The data analysis shows that the volume of production in the Latvia’s fish processing sector from 2005 – 2012 decreased by 7%, thus not utilizing the

production technologies in full (average production capacity is 65.5%). If the demand for the ready production of fish processing companies was so big to utilize all production technologies, the maximum volume of produced goods in 2012 on average would be 133.37 thousand tons that would be by 30% more than it was actually produced (93.86 thousand tons).

The actual production capacity of Latvia’s fish processing companies in 2012 was on average 256.44 tons a day, not reaching the maximum production capacity – on average 392.41 tons a day (Figure 2).

To ensure the actual production capacity of 2012, on average 197.33 tons of raw materials a day were necessary. However, to reach the maximum production capacity on average 280.40 tons of raw materials a day would be necessary. Viewing the data analysis we can see that at the maximum production powers it would be possible to process all the raw materials available in Latvia: own produced (caught and grown) and imported fish, as well as imported fresh, refrigerated and frozen fish (on average 284.24 tons a day). The available amount of raw materials is not being fully used, as a result of non-stable and small production volumes and average purchase prices of separate fish kinds.

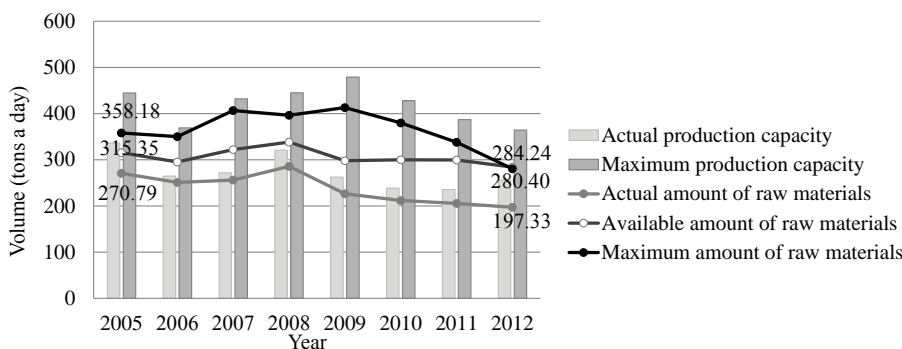


Figure 2. Production capacity of fish processing sector in Latvia from 2005 – 2012, tons a day (author’s calculations based on Central Statistical Bureau, 2014; Food Safety and Animal Health and Environment Scientific Institute ‘BIOR’, 2013; Ministry of Agriculture, 2014).

Table 1

Production capacity of fish processing companies in Latvia (according to the type of their specialization) in 2014, tons a day, % (author’s calculations based on Central Statistical Bureau, 2014; Latvian State Institute of Agrarian Economics, 2014; Food and Veterinary Service, 2014; Ministry of Agriculture, 2014)

Kind of specialization	Actual production capacity (tons a day)	Maximum production capacity (tons a day)	Used capacity (%)
Chilled and frozen fish	229.0	362.9	63.1
Smoked fish	37.7	46.5	81.1
Canned fish (sterilized and unsterilized) and culinary products	52.0	77.5	67.1
Various (mixed)	49.8	78.6	63.3

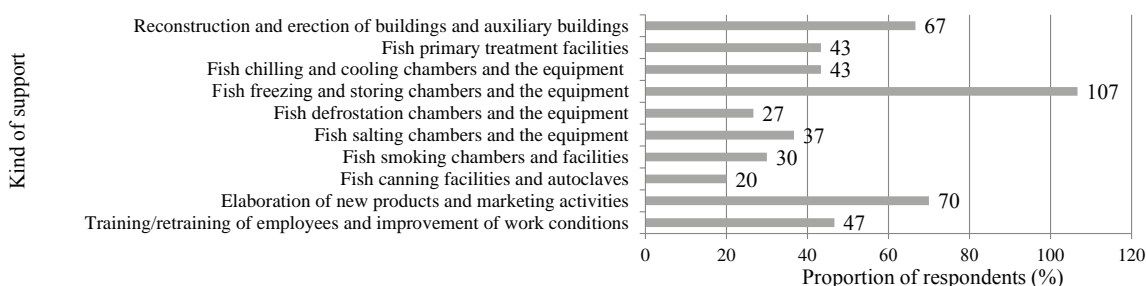


Figure 3. The kinds of support necessary for fish processing companies in Latvia, % (author’s calculations based on Central Statistical Bureau, 2014; Latvian State Institute of Agrarian Economics, 2014; Food and Veterinary Service, 2014; Ministry of Agriculture, 2014).

Also, from the results of surveys it is evident that maximum production capacity is not being used, where 36% of respondents noted this fact.

The obtained data show that all kinds of fish production companies do not use the maximum production capacity – both the fish processing companies specialized in the refrigerated and frozen fish production, and the ones that specialize in production of smoked fish, canned fish (non-sterilized and sterilized) and culinary products, as well as production of various (mixed) fish products (Table 1).

Although the maximum production capacity is not reached, 86% of the respondents have indicated a need in a various support for the development and modernization of companies; however, the rest 14% have indicated that their companies are well enough developed and currently no additional support is necessary.

Part of respondents (67%) have indicated that the development of their companies needs construction and reconstruction of buildings and auxiliary buildings, taking into account that the company wants to expand and involve additional human resources (Figure 3).

In addition, the respondents indicated the need in such production technologies as fish primary treatment, chilling and refrigerating, freezing and storing, defrostation, salting, smoking and canning chambers and facilities. 23% of the respondents

have indicated that they rent separate technological chambers, facilities and equipment from other companies and institutions, since their own purchased technologies are insufficient.

Furthermore, the respondents have replied that support is also necessary for the development of new products and implementation of marketing activities (70%), which would be very significant in future, considering the fact that in 2013 canned fish – sprat, sardines and sardinellas (the main raw material is sprat – a quota-dependent fish) – constituted 53% of the whole produced amount (Central Statistical Bureau, 2014) and export to Russia constituted 50% of the total prepared and canned fish export amount (Ministry of Agriculture, 2014). Taking into account that the whole production is mostly focused on canned sprat production and export to Russia, which is a great risk for fish processing sector, it is advisable to channel a further support to acquisition of new market and offer innovative products.

The greatest part (80%) of the respondents have mentioned that implementing corresponding support activities a company would increase the volume of present output; however, 60% of the respondents consider that volume of output for elaboration of new products would increase. Only 7% of respondents indicated that as a result of carried out measures, the amounts of the production would remain the same, proving that mostly the support is necessary to renew

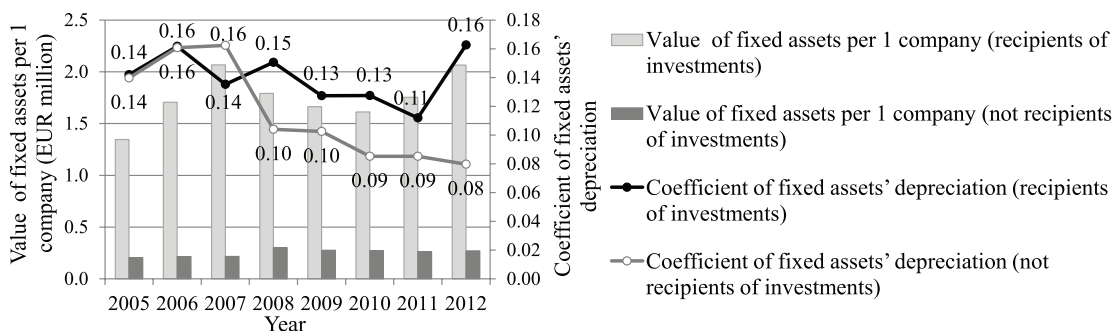


Figure 4. The value of fixed assets and the depreciation coefficient of fixed assets of fish processing companies in Latvia from 2005 – 2012, EUR million, coefficient (author’s calculations based on Central Statistical Bureau, 2014; Ministry of Finance, 2014; Rural Support Service, 2014; Latvian Environmental Investment Fund, 2014; Food and Veterinary Service, 2014; State Revenue Service, 2014; Ministry of Agriculture, 2014).

the value of fixed assets of the companies, but not to increase the competitiveness.

To find out, how intensively fish processing companies renew the value of their fixed assets, the author viewed the changes of fixed assets value.

Analysing the value of fish processing companies’ fixed assets from 2005 – 2013, we can see that in the value of fixed assets of the fish processing companies, which received investments, it increased by 53%, whereas of the fish processing companies, which did not receive investments, - by 33% (Figure 4).

The depreciation coefficient of fixed assets, characterising the level of technical provisioning in a company, shows that the coefficient of fish processing companies, which received investments, is higher than the one of fish processing companies, which did not receive investments.

The depreciation coefficient of fixed assets of fish processing companies, which received investments, is higher, since they use the technological facilities in the production process more intensively. In its turn, the depreciation coefficient of fixed assets of

fish processing companies, which did not receive investments, is lower, as a result of less intensive use of technological facilities.

The fish processing companies, which received investments, renewed the value of their fixed assets more intensively (except during the economic crisis), but slower than the companies, which did not receive investments (Figure 5).

It happened so because the means invested in renewal of the fixed assets of these companies were more voluminous and time consuming than for fish processing companies, which did not receive the investments.

To find out the financial benefit of fish processing companies, the efficiency of fixed assets is analysed (Table 2).

The calculations about the year 2012 show that for fish processing companies, which received investments, one unit of fixed assets’ value (EUR) reached the turnover in amount of EUR 3.81 (return of fixed assets) and profit EUR 15.44 (profitability of fixed assets), whereas for the fish processing

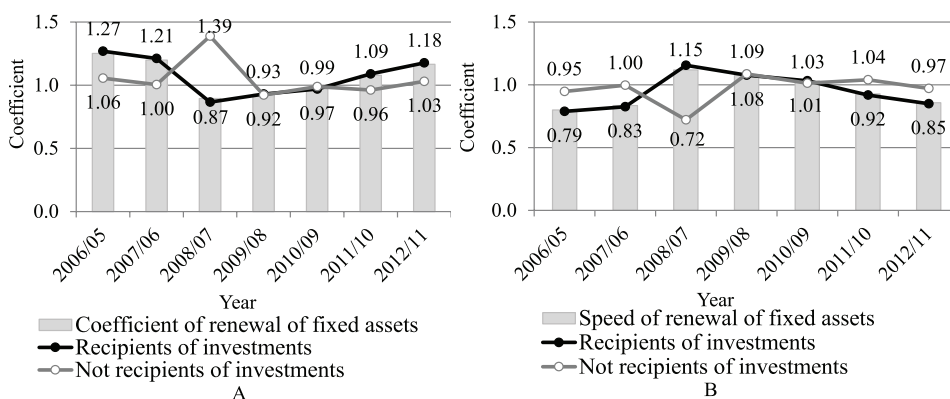


Figure 5. The coefficient of fixed assets’ renewal (A) and speed of fixed assets’ renewal (B) for fish processing companies in Latvia from 2005 – 2012, coefficient (author’s calculations based on Central Statistical Bureau, 2014; Ministry of Finance, 2014; Rural Support Service, 2014; Latvian Environmental Investment Fund, 2014; Food and Veterinary Service, 2014; State Revenue Service, 2014; Ministry of Agriculture, 2014).

Table 2

The calculation of fixed assets' value of fish processing companies in Latvia from 2005 – 2012, EUR million, coefficient, % (author's calculations based on Central Statistical Bureau, 2014; Ministry of Finance, 2014; Rural Support Service, 2014; Latvian Environmental Investment Fund, 2014; Food and Veterinary Service of Latvia, 2014; State Revenue Service, 2014; Ministry of Agriculture, 2014)

Indicator	2005	2006	2012	Changes from 2005-2012 (%)
Value of fixed assets (EUR million)	65.65	82.16	99.70	52
Recipients of investments	60.55	76.78	92.94	53
Not recipients of investments	5.10	5.38	6.76	33
Net turnover (EUR million)	221.24	250.13	357.16	61
Recipients of investments	190.48	219.80	327.89	72
Not recipients of investments	30.76	30.33	29.27	-5
Profit (EUR million)	6.47	4.77	14.86	130
Recipients of investments	5.86	4.65	13.27	127
Not recipients of investments	0.61	0.12	1.58	159
Return of fixed assets	x	3.38	3.86	14
Recipients of investments	x	3.20	3.81	19
Not recipients of investments	x	5.79	4.40	-24
Profitability of fixed assets	x	6.45	16.04	149
Recipients of investments	x	6.77	15.44	128
Not recipients of investments	x	2.25	23.73	957

companies, which did not receive investments, one unit of fixed assets' value (EUR) reached the turnover in amount of EUR 4.40 and profit EUR 23.73.

Viewing the data analysis, it is evident that fish processing companies, which have received the investments, could not use the available fixed assets completely, unlike the fish processing companies, which have not received investments – with lower capacity of fixed assets they were able to ensure a bigger return of fixed assets.

Factors influencing the production process

In the theory of economics any production process comprises interaction of several production factors, namely: work, land, capital and undertaking (the founders of the theory are; Smith, 1776; Mill, 1776; Ricardo, 1817; Marx, 1967; Aswathy et al., 2013; Bakhrankova et al., 2015).

All the mentioned production factors influence the production development of Latvia's fish processing companies (including availability and utilized capacity of technological equipment). The factors are:

- availability of labour (especially at giving age) and ensuring a corresponding wage;
- the availability of raw materials (especially sprat) and average price of fish (especially aquaculture);
- the availability of investments for formation of a capital;
- undertaking.
- Also various external factors, such as demand, legislation, social, economic and political situation in the local and foreign markets, etc., influence the development of production process.

Analysing the factors influencing production process, we can see that employees of fish pro-cessing companies receive low gross wages in comparison with average gross wage in the fisheries sector, both in Latvia and the EU-27 (Figure 6).

The size of wages may be an impediment to the development of fish processing companies' production, since it is competitive neither in the local nor in foreign market. The production of fish processing companies is focused on the production of canned fish, where basically manual labour is used and employees do not need any special skills and knowledge. The involved labour may also choose work of equal conditions in some other sphere or abroad, earning much more competitive wage. In its turn, bringing the labour ready to work for low wage in from other countries may cause additional risk for the state.

Production capacity in fish processing companies is not fully utilized, which is determined not only by the technological process (maintenance works), but also availability of raw materials (seasonality) and the prices of their purchase.

The available amount of raw materials in the local market is not fully used – part of fish is also exported. Even if fish were not exported and would be processed, the production capacities of fish processing companies would not be completely utilized and the amount of produced goods would not increase significantly (Figure 7).

The investments in the amount of EUR 96.63 million received in the framework of the EU financial instruments from 2004 – 2006 and 2007 –

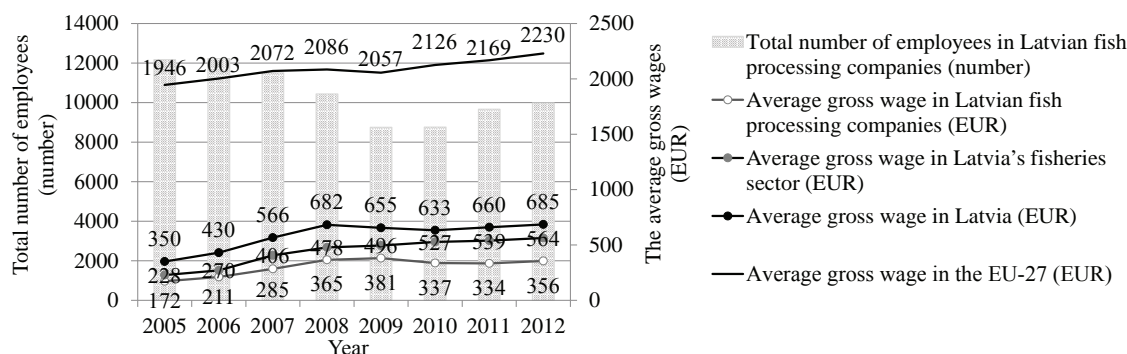


Figure 6. The number of employees and average gross wage in fish processing companies in comparison with the average gross wage in Latvia and the EU-27 from 2005 – 2012, volume, EUR (author's calculations based on Central Statistical Bureau 2014; Eurostat, 2014; State Revenue Service, 2014).

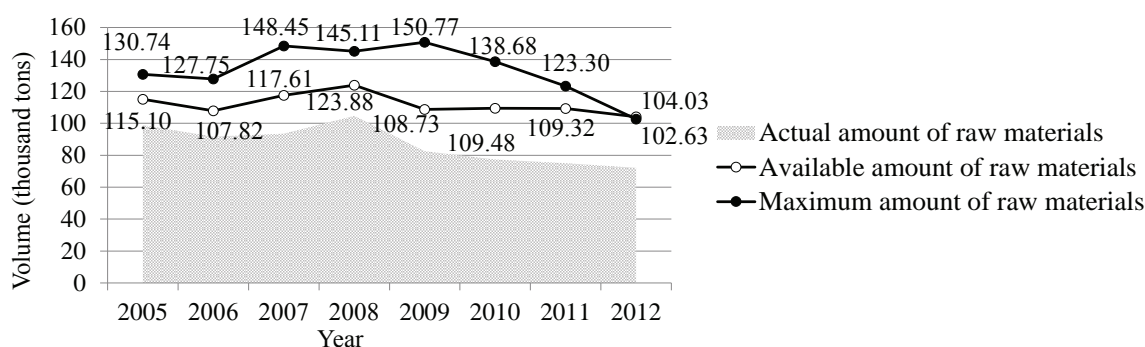


Figure 7. Actual, available and maximum amount of raw materials of fish processing companies in Latvia from 2005 – 2012, thousand tons (author's calculations based on Central Statistical Bureau, 2014; Food Safety and Animal Health and Environment Scientific Institute 'BIOR', 2013; Ministry of Agriculture, 2014).

2013 planning period were allocated to production technologies (buildings, equipment and facilities) and modernization. Despite the fact that 86% of respondents in their surveys replied that support is needed for purchase of these capital goods, the investments made up till now have been sufficient. The indicators of production capacity and efficiency of fixed assets' utilization prove that there was enough of investments.

Besides, undertaking is a significant factor influencing the production process; its rational and efficient application, combining the 3 above mentioned production factors, may considerably influence the development of the sector. Considering the decrease in the amount of catch not only in the Latvian territorial waters, but also all around the world, in future it is advisable to form a close cooperation with Latvian aquaculture companies, aimed at the development of the fish processing sector. A basis of cooperation requires some information to be clarified, such as kinds of fish preferable for processing, the amounts of the fish and their prices. In addition, entrepreneurs should find out if Latvian sector of aquaculture with the production technologies and knowledge it currently has, would be able to provide the local fish processing sector with necessary raw materials.

In this case, it would be advisable for promotion of undertaking to channel the support of the EU financial instruments to production of new, innovative products, where as raw materials the aquaculture fish are used, to implementation of marketing measures and acquisition of new markets.

Conclusions

Production technologies of Latvia's fish processing sector are not being utilized in their full capacity, thus not reaching the maximum production capacities. Several factors influence the capacity of technological facilities: demand, availability of raw materials and their prices, availability of human resources and their costs, as well as undertaking.

Despite the fact that in the framework of the EU financial instruments in 2004 – 2006 and 2007 – 2013 planning periods Latvian fish processing sector received investments in amount of EUR 96.63 million for purchasing production technologies and modernization, and the participants of the survey indicated a need in additional support for production development, the investments made up till now have been sufficient.

Taking into account the availability and utilized capacity of Latvia's fish processing sector, as well

as factors, influencing the production process, it is advisable to channel the support for the development of the sector to production of innovative goods, where the aquaculture fish are used as raw materials, to implementation of marketing measures and acquisition of new markets.

References

1. Aswathy N., Narayanakumar R., Salim S.S., et al. (2013) Total factor productivity growth in marine fisheries of Kerala. Available at: http://apps.webofknowledge.com/full_record.do?product=UA&search_mode=GeneralSearch&qid=41&SID=V1685VR4V6qQ71U9HXq&page=1&doc=1, 27 July 2015.
2. Bakhrankova K., Midthun T.K., Uggen T.K. (2014) Stochastic optimization of operational production planning for fisheries. Available at: http://ac.els-cdn.com/S0165783614001118/1-s2.0-S0165783614001118-main.pdf?_tid=39a5b6fe-3a31-11e5-b298-00000aacb35d&acdnat=1438642060_ca8c5101ab8662ed400d30d992d2debd, 27 July, 2015.
3. Central Statistical Bureau (2014) *Fish production and canned fish according to NACE 2.rev. code 10.20. from 2004 – 2013* (restricted access data).
4. Central Statistical Bureau (2014) *Latvian fish and fish products import and export from 2005 – 2013* (restricted access data).
5. Central Statistical Bureau (2014) *Latvian fish processing companies by NACE 2.rev. code 10.20.* (restricted access data).
6. Central Statistical Bureau (2014) *Production capacity of fish processing in Latvia from 2005 – 2013* (restricted access data).
7. Central Statistical Bureau (2014) *The average gross wage in Latvia and EU-27 from 2005 – 2013* (restricted access data).
8. Eurostat (2014) The average gross wage in the EU-27 from 2005 – 2013. Available at: <http://ec.europa.eu/eurostat/data/database>, 1 January 2015.
9. Food and Veterinary Service (2014) *Registered fishery product processing companies in Latvian*. Available at: <http://www.pvd.gov.lv/lat/uznemumi/>, 16 April 2014.
10. Food Safety, Animal Health and Scientific Institute of Environment BIOR (2013) *Latvian Fisheries integrated control and information system "LICIS": Latvian catch from 2005 – 2012* (restricted access data).
11. Latvian Environmental Investment Fund (2014) *The projects supported by the CCFI in the fish processing companies in Latvia by 01.04.2014.* (restricted access data).
12. Latvian State Institute of Agrarian Economics (2014) *Latvian fish processing sector participant survey results* (restricted access data).
13. Latvijas Lauksaimniecības universitāte (2013) Latvijas zivju pārstrādes nozares konkurētspējas rādītāju salīdzinošā analīze (A comparative analysis of competitiveness indicators of Latvia's fish processing branch). Available at: https://www.zm.gov.lv/public/ck/files/ZM/TP%20petijumi/Pet_ZIVIS_partikas_konkuretsp_2013_8_6.pdf, 3 January 2015. (in Latvian).
14. Marx K. (1867) *Capital: A Critique of Political Economy*. Available at: <https://www.marxists.org/archive/marx/works/1867-c1/index.htm>, 4 January 2015.
15. Mill J.S. (1848) *Principles of Political Economy*. Available at: <http://www.efm.bris.ac.uk/het/mill/book1/index.htm>, 4 January 2015.
16. Ministry of Agriculture (2014) *Registered fishery product processing companies in Latvian on 01.08.2013.* (restricted access data).
17. Ministry of Agriculture (Zemkopības ministrija) (2014) *Latvijas zivsaimniecības gadagrāmata 2014* (Latvian Fisheries Yearbook 2014th). Latvijas Lauku konsultāciju un izglītības centrs, Rīga, Latvija, 191 lpp. (in Latvian).
18. Ministry of Finance (2014) *The projects supported by ERDF, ESF, EAGGF, FIFG and LGA in the fish processing companies in Latvia by 22.05.2014.* (restricted access data).
19. Ricardo D. (1817) *On the Principles of Political Economy and Taxation*. Available at: <http://www.econlib.org/library/Ricardo/ricPCover.html>, 4 January 2015.
20. Rural Support Service (2014) *The projects supported by EAFRD and EFF in the fish processing companies in Latvia by 02.06.2014.* (restricted access data).
21. Smith A. (1776) *The Wealth of Nations*. Available at: <http://www.bartleby.com/10/106.html>, 4 January 2015.
22. State Revenue Service (2014) *Financial figures from 2005 – 2013* (restricted access data).