ECONOMIC ANALYSIS AND DEVELOPMENT PROSPECTS OF THE CROP FARMING SECTOR IN LATVIA

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Abstract. Agricultural companies are important for creating a stable agricultural industrial complex. Companies are dependent on grain purchase prices and dictate their rules; they should provide a production storage system to reduce these factors maximally. Businesses should also follow very conservative borrowing policies resulting in effective protection against a variety of external factors such as price changes, weather conditions, and national economic policy. The aim of the research is to perform an economic and financial analysis and to assess crop industries as well as to explore their development perspectives. It is possible to increase the area sown with grain in Latvia; mainly in less intensively exploited areas like Pieriga, Kurzeme, part of Vidzeme, and Latgale. Besides, there is a significant potential for increasing crop yields in Latvia compared with the other EU Member States. It is also necessary as far as possible to seek for lower costs to reach the highest possible outcome. The company major risk factors include adverse climatic conditions, unprotected domestic market, unpredictable current asset prices and price increase as well as grain purchase prices – a factor unknown at the time of sowing.
Key words: crop farming sector, financial analysis, grain, rapeseed.
JEL code: Q11, G3

Introduction

Agricultural industry is closely related with other industries, and it depends on prices of inputs needed for production: fertilisers, pesticides, fuel and machinery, and prices of services. It is also affected by the world demand for agricultural products; while supply, in its turn, to a great extent depends on the weather conditions in various regions of the world which unfortunately is a factor not to be influenced.

Agricultural enterprises have to produce their products under tough competition, and market studies are one of the most important procedures before making any financial or economic decision. The company managers have to possess reliable, sufficient, and timely information to reduce the company's risk. It is very dangerous for the company existence and further sustainable operation to rely, on market conditions, only on the intuition and previous experience of managers and specialists.

The **research aim** is to perform an economic and financial analysis and to assess crop industries as well as to explore their development perspectives.

Research tasks:

— to investigate and characterise the crop farming sector and the supply of crop farming products to the domestic market in Latvia;
— to identify development perspectives for the industries of grain and rapeseed.

The following research **methods** were employed in the present paper: the monographic method, the graphic method, calculation and constructive methods, the abstract and logical methods, statistical data analysis, analysis of causal relationships, and data generalisation.

Research results and discussion

1. Characteristics of the crop farming sector of Latvia and the supply of crop farming products to the domestic market

Unlike other industries of the national economy, crop farming has several peculiarities, thus, it is one of the most complicated industries of the national economy requiring extensive knowledge on the growth and development of plants, the specifics of any individual crop, plant nutrition, and the environment where the process of crop yield formation takes place, i.e. soil (Latvian Ministry of Agriculture, 2006).

As of 1 January 2011, the agricultural area was 2423231.1 ha or 37.6% of the total area of the country (State Land Service, 2012). In 2010, the Rural Support Service visually surveyed units of agricultural land and identified the agricultural area that was not maintained in good agricultural and environmental condition in Latvia. According to the survey the unfarmed area equalled to 368900 ha in 2010 or 16.0% of the total surveyed area in Latvia. There were surveyed 2352159 ha of agricultural land (Latvian Ministry of Agriculture, 2011).

Agricultural land occupies 77% of the territory of Zemgale region which is 26.1% of the agricultural area of Latvia. Soils in Bauska county are ones of the most fertile soils in Latvia; in some places, qualitative estimates of agricultural land exceed 60 points. Besides, the relief and climatic conditions are favourable for intensive use of agricultural land there (Bauskas novada dome, 2012). The Cabinet Regulations No. 977 "Regulations on Agricultural Territories of National Importance" of 1 January 2011 specify the agricultural territories of national importance and the terms of their exploitation. The agricultural territories of national importance are concentrated in Zemgale region, besides,

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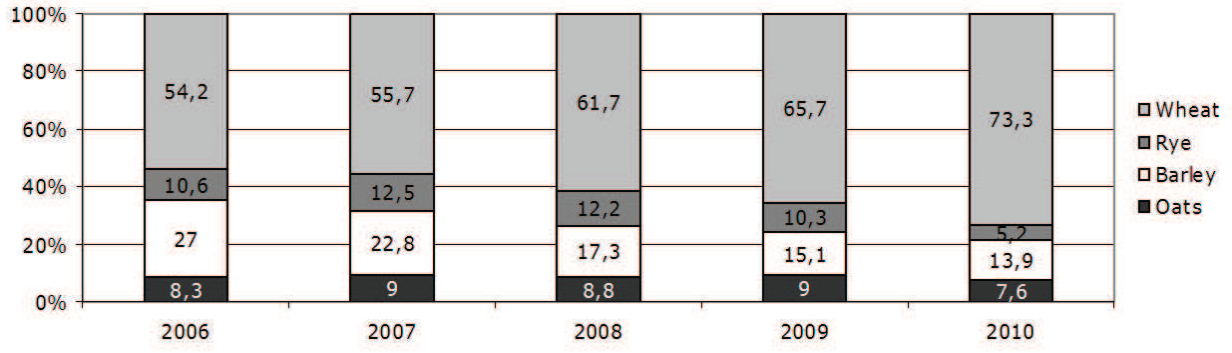
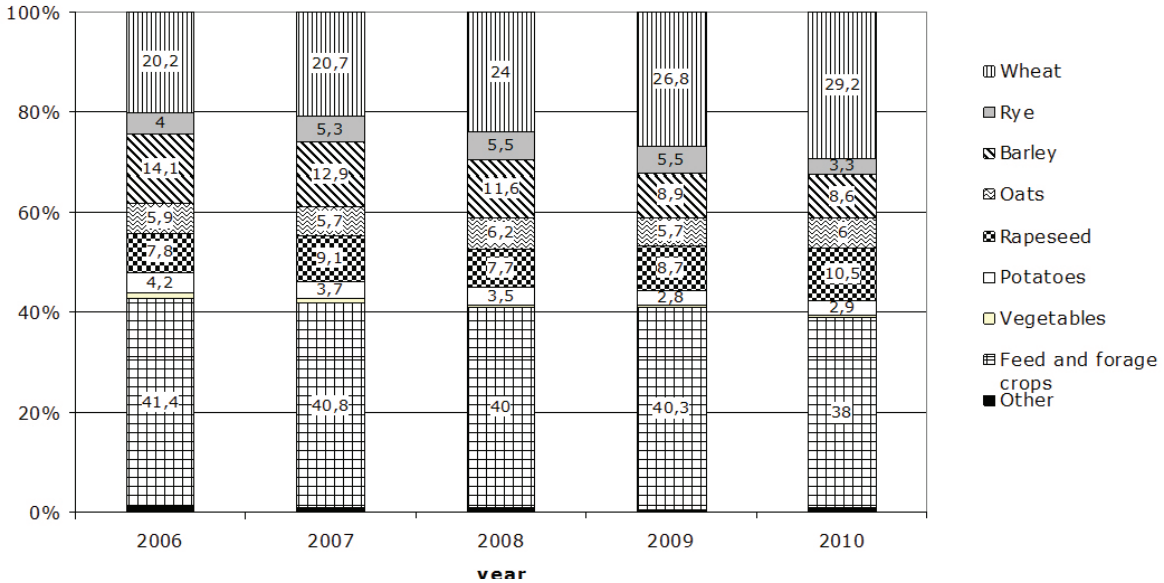


Source: authors' construction based on the CSB data, 2012

Fig.1. **Percentage distribution of the grain output in Latvia in 2006-2010**



Source: authors' construction based on the CSB data, 2012

Fig.2. **Percentage distribution of the sown area in Latvia in 2006-2010**

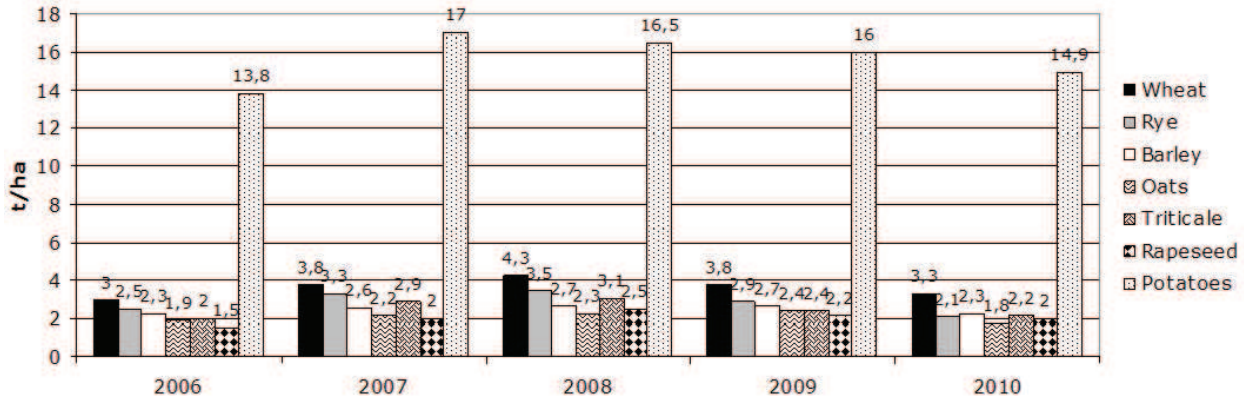
it is estimated that the agricultural territories of national importance located in Zemgale might account for 3% of the total agricultural area in Latvia (Bierande R., 2010).

In 2010, the most popular crop products were grain in Latvia, accounting for 33.3% followed by potatoes with 11.2%. However, in 2010, the largest increase in output was observed for rapeseed when it rose by 1.1 percentage points compared with 2008.

The proportion of wheat in the total output of grain has consistently increased, accounting for the largest share or 73.3% in the total quantity of grain produced; the proportion of wheat has risen by 19.1% over five years. The growth was due to an increase in the sown area, which, in its turn, was stimulated by the effect of prices, particularly wheat prices which were higher. The proportion of other grain decreased with the increase of wheat proportion in the total output of grain. In 2010, oats accounted for 7.6%, barley – 13.9%, and rye – only 5.2% of the total grain output. The increase in the production of wheat was also stimulated by a stable increase in the export of wheat.

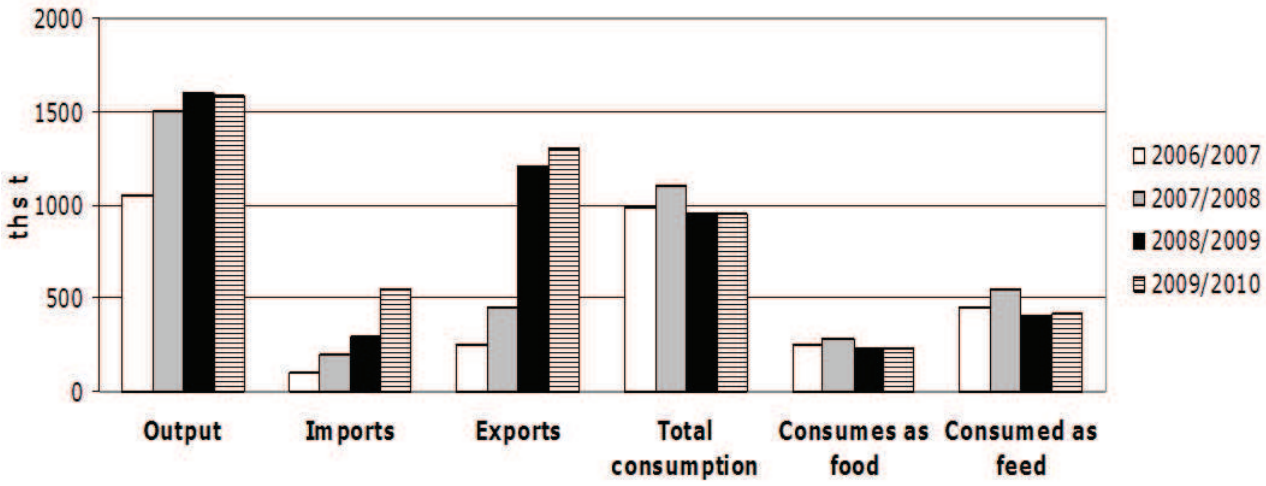
In 2010, feed and forage crops occupied the largest proportion or 38% of the total sown area; yet, it tended to decline. The area sown with wheat, on the contrary, has steadily increased since 2006. It has increased by 9 percentage points; whereas the area sown with barley has steadily declined – by 5.5 percentage points over five years. The area sown with potatoes has also decreased; whereas the rapeseed area has increased by 2.7 percentage points over five years, reaching a proportion of 10.5% of the total sown area in Latvia in 2010. It is important to analyse the average yield of crops to draw conclusions on the causes of and correlations in changes in the sown area and total output.

According to the data of selected farms, the average yield of wheat decreased in 2009 and 2010, yet, it was 3.3 t/ha in 2010 which was 0.6 t/ha more than the average yield in the country. The same situation was observed for other grain, except oats, the yield of which



Source: authors' construction based on the FADN data, 2012

Fig.3. **Average yields of crops on the FADN farms in 2006-2010, t/ha**



Source: authors' construction based on Latvian Agriculture, 2011

Fig.4. **Grain balance by season in Latvia in 2006-2010, thou. t**

slightly rose by 0.1 t/ha in 2009 compared with 2008. The yield of rapeseed decreased, and, according to the data of selected farms, it was 2 t/ha in 2010 which was 0.1 t/ha less than in the country on average. The yield of potatoes has decreased by 2.1 t/ha over three years and was 14.9 t/ha in 2010. Yet, it has to be noted that the average yields in the largest group of farms, according to the FADN classification, were higher for the majority of crops which may be explained by their ability to provide appropriate conditions for growing crops. One can conclude that the year 2010 was equally unfavourable for all crops which resulted in lower average yields in Latvia.

The grain balance shows that the output of grain totalled 1.663 mln t in Latvia in the season 2009/2010, of which 1.334 mln t were exported and 0.983 mln t were consumed domestically. The majority or 0.467 mln t of domestic grain consumption consisted of feed grain, and 0.276 mln t were consumed as food grain. Both the exports and imports of grain have significantly increased since the season 2008/2009; yet, the total grain consumption decreased after the season 2007/2008. Of the total grain quantity of 1.663 mln t produced in the season 2009/2010, 1.036 mln t were wheat which accounted for 62% of the total grain volume; 1.135 mln t of wheat were exported comprising 85% of the total grain exports. The majority of wheat was consumed as food, while the consumption of feed grain fluctuated which may be explained by the quality of grain in a season, i.e. if the quality of wheat is poor and it corresponds to the standard of feed, the price of grain is lower and more wheat is consumed as feed.

Food and agricultural produce were the second most important export industry in Latvia in 2010. The exports of these products accounted for 17.9% of the total value of exports in Latvia in 2010. The exports of wood and its products ranked first accounting for 19.3% of the total value of Latvia's exports. Yet, the imports of agricultural produce comprised 16.3% of the total value of Latvia's imports, and the imports of agricultural produce still exceed the exports of these goods. However, there was a positive trend, since the negative trade balance in agricultural goods fell to LVL 124.2 mln. It means that goods produced domestically were consumed more in Latvia

than it was done during the previous years. A foreign trade balance between exports and imports shows that Latvia is able to produce the necessary quantity of agricultural goods for its own consumption. In 2010, the most important food exports traditionally were non-alcoholic and alcoholic beverages, while grain ranked second with 17%, of which 30% was exported to Lithuania. The large proportion of export related to new Lithuanian companies that entered the Latvian market in 2010 and purchased grain at a higher price than local companies. The grain was exported to Lithuania, as the output of grain was lower there. A significant 18% increase in imports was observed for grain in 2010 compared with 2009. An analysis showed that both the exports and imports of grain increased. It may be explained by the fact that Latvian enterprises offered a lower sale price of grain in 2010, which boosted exports. Yet, understanding that no more grain could be purchased in Latvia, Latvia businessmen were forced to import grain, thus, artificially creating an increase in expenses.

2. Development possibilities for the industries of grain and rapeseed

It was concluded in a research on the development problems of agricultural production and business in Latvia that all the existing possibilities in the national economy had to be exploited to approach the average EU socio-economic level, and there were possibilities to expand economic activity in agriculture in Latvia, since a large area of agricultural land was not utilised and crop yields were also low (Zvirgzdina R., et al., 2009).

Based on the data of Section 1, the authors conclude that crop farming produces the most significant crops as wheat and rapeseed. It is important to identify the prerequisites and possibilities for increasing their output in Latvia.

The area sown with wheat in the Northern Europe tends to increase and to decrease in the Southern Europe; yet, the average wheat yields rise in the entire Europe (Kobus V., 2010). The low yield and purchase price is also mentioned in various studies as one of the grain production problems in Latvia (Brakmanis A. et al., 2010).

According to the authors, one of the most essential problems in the industries of grain and rapeseed is the inability to predict the price. It has to be admitted that the situation in the world determines the demand for grain and rapeseed. As soon as the news on natural disasters in a region is received, the price goes up at a commodity exchange or vice verse – the price falls if there is a forecast on higher yields. The prices of grain and rapeseed, which slightly change depending on the terms of delivery and the region, published by the largest grain purchasers prove it.

"Various factors affect the prices of grain in the world, for instance, yield, inventory, sown area, grain consumption, price change in correlating goods, and other factors. The information on the weather conditions either favourable or unfavourable for growing/harvesting grain and forecasts issued by local statistical bureaus, ministries of agriculture, or grain agencies may also affect the prices of grain" (Graudu cenu..., s.y.).

The low prices for grain produced in Latvia in 2009/2010 insignificantly affected the sales of grain in other countries. According to the information provided by the European Commission, Latvia was the fifth largest grain exporter in the EU (in 2009). In the middle of January of 2010, a cargo with 28 500 tonnes of wheat was shipped to Indonesia for the first time by the cooperative of agricultural services "Latraps" and "Baltie Agro" Ltd. In the 2009 season, "Latraps" purchased more than 275000 tonnes of grain from farmers, of which 183000 tonnes were sold to other countries (Graudins U., 2010).

The forecasts of various institutions and departments on grain yields and reserves in the world mainly affected the prices of grain in 2011. In 2010, however, one of the most significant factors affecting the grain prices was Russia's grain export ban and a report on the world decrease in the yields and reserves of wheat, which started a price hike from 135 EUR/t in July reaching the highest level of 265 EUR/t in the beginning of 2012. It has to be noted that the latest news on lower yields for almost all crops is published every day. The information is publishing in relation with the weather conditions; hence, directly influencing the prices of grain.

The market of rapeseed differs from that of grain, as it has no strong association with price changes of other crops. The price of rapeseed started to increase already in November of 2009; though, it started to increase significantly only in June of 2010.

Another important factor, which affected the convergence of the Latvian market prices of grain and rapeseed with the prices on commodity exchanges, is the fact that many farmers concluded fixed price contracts in 2009 for the supply of grain in 2010. A penalty included in the contracts required a compulsory fulfilment of the contract terms, and these farmers were forced to sell their grain at significantly lower prices. Yet, it has to be noted that the quality of grain in 2010 was lower than expected, and, thus, farmers could not avoid paying penalties which considerably reduced their income gained from selling grain. Farmers continued concluding such contracts with purchasers of grain and rapeseed in 2011; however, many farmers did not conclude forward contracts anymore.

An overall estimate of the world wheat market indicates that the consumption of wheat exceeded the output of wheat in the seasons 2006/2007 and 2010/2011; the shortage was compensated by grain reserves from the previous years. According to a forecast, the total balance of grain will be positive.

Price hikes of other raw materials may be expected along with an increase in grain prices. Prices of spare parts and machinery have also increased. All these factors can significantly affect the cost of commodities produced in the coming year and simultaneously may leave a considerable impact on those farmers who prefer concluding fixed price contracts, as the real price might turn out to be higher.

"More and more speculators engage in grain markets through various exchanges and funds. The large fluctuations still depend on yields and climatic conditions in the main grain production regions; whereas, the small ones that push the overall price curve upwards just like in cardiograms, according to E. Ruza, are determined

by speculators. Grain contracts are traded instead of real grain. Grain producers in Latvia are influenced in a way that a price change of 30 LVL/t results in a daily loss of LVL 30 000 for a farmer who intentions to sell 1000 tonnes in the autumn and who has already concluded a forward contract" (Klavis A., 2010).

According to E.Ruza, the key factors affecting the economic efficiency of rapeseed production are as follows: changes in oilseed rape productivity and productivity levels, regional aspect like growing conditions, size and specialisation of a company, and market prices. It has to be also noted that small and medium enterprises are not able to use technologies efficiently and professionally and they are not ready technologically to produce rapeseed professionally. At the same time, the higher is the yield on a farm, the more sensitive it is to meteorology (Ruza L., 2009).

Appropriate soil and weather conditions for growing winter rapeseed are specific to Latvia, especially its central part. The demand for rapeseed used for biofuel production increases. The rising rapeseed prices are one of the key prerequisites for an increase of the sown area in Latvia. Nevertheless, there is still a great possibility to increase the output of rapeseed (Balodis O., 2009).

Price stabilisation measures are topical due to the instability of the world grain prices.

"The only price stabilisation instrument in the EU is the intervention price which is set at 101.3 EUR/t. Price regulation is not allowed on the free market" (Latvian Ministry of Agriculture, 2008). "The European Commission has waived its initial requirement to introduce a tendering procedure for wheat (bread) interventions in downward bidding at the bid rate starting at 101.31 EUR/t, thus, allowing the Member States to purchase 3 mln tonnes of wheat according to the existing procedure. The tendering procedure is applied exceeding this quantity" (Latvian Ministry of Agriculture, s.y.).

Presently, the intervention price is lower than the market price which does not stimulate intervention purchases; though, on the contrary, this price serves as the lowest limit below which the grain price should not fall, of course, if no measures are undertaken to reduce the price through bidding.

The Ministry of Agriculture has elaborated a medium-term policy planning document "Rural Development National Strategy Plan of Latvia for 2007-2013" based on the "Community Strategic Guidelines for Rural Development 2007-2013". The purpose of the document was to promote balanced and sustainable national development and to increase the competitiveness of Latvia among other countries.

The Plan states that there are both strengths and weaknesses in the development of agriculture.

According to the authors, the Rural Development National Strategy Plan of Latvia for 2007-2013 is orientated towards the welfare of individuals in rural areas but it does not set a certain goal for developing agriculture. The Plan does not focus on agricultural production; it admits that agricultural output significantly contributes to the value added of the national economy. The Plan emphasises the role of education in agriculture, yet without mentioning certain measures for enhancing. It has to be noted that agricultural companies may not rely on financial support for agriculture and the contribution of education system to this industry, since the future is not presently clear. The agricultural companies, instead, have to analyse the changing situation on the world market themselves.

A. Veveris concludes in his research on the potential of grain production in Latvia and the economic prerequisites for achieving it that it is possible to increase the area sown with grain in Latvia; mainly in less intensively exploited areas like Pieriga, Kurzeme, part of Vidzeme, and Latgale. Besides, there is a significant potential for increasing crop yields in Latvia compared with the other EU Member States. Grain presently occupies 37% of the total UAA in Zemgale, of which 68% is wheat. The researcher points that grain is already presently grown in Zemgale as a monocrop, which, of course, may have a negative effect on the soil and increase the risk of spreading diseases (Veveris A., 2011). From this viewpoint, an increase in the area sown with rapeseed has positive aspects.

In general, one can conclude that a decrease in the demand for grain is expected neither in 2012 nor in the future; yet, the price change forecasts are different. It means that agricultural companies have to follow the market situation, make optimal business decisions, and draw a conservative financial policy, so that they are able to work efficiently and maintain the price as well as avoid the influence of weather conditions on their financial results.

Conclusions

1. Grain farming in Latvia, during its previous stages of development, was one of the leading and strategic agricultural industries, and it has a great possibility for development determined by appropriate natural conditions, traditions, and multifunctional use of grain products. Grain has become a significant export product in the country, accounting for 17% of the total exports in 2010 in the group of agricultural and food products.
2. Grain farming is the most important industry in the crop farming sector which is well-developed in Zemgale and is the key provider of food in Latvia.
3. Land is one of the main resources in Latvia. Zemgale is the country's granary, and 77% of the region's territory or 26.1% of the agricultural area of Latvia is the UAA there. The entire agricultural territories of national importance are concentrated in Zemgale region.
4. The area sown with rapeseed and the output of this crop tended to increase in Latvia; the area has increased by 27.4 thou. ha over the period of five years; although, the average yield has slightly decreased in 2010 equalling to 2.1 t/ha. The total output of grain tended to decrease at the same time. The year 2010 was unfavourable for all crops and the average yield decreased in Latvia.
5. According to the percentage distribution of the grain output, the share of wheat steadily increased, accounting for the largest part or 73.3% of the quantity of grain produced in 2010; it was due to an increase in the sown area, which, in its turn, was stimulated by the effect of prices.

6. The grain market price is volatile, as it reacts on changes in total output, yields, sown area, quality, expectations, and the price of correlating goods in the world. It is difficult to predict the main factors affecting agriculture which hinder financial planning and the prediction of performance results.

Proposals

1. The Ministry of Agriculture, while elaborating consecutive planning documents for agriculture, has to envisage certain to be undertaken by the government institutions and businessmen in the fields of both private business and government administration, which would direct the development of the grain industry. Besides, it should clearly define the industries that have to be strategic in Latvia and envisage certain measures for their development.
2. Grain and rapeseed producers should have storage facilities for their products, thus, providing a possibility to choose the time and market price for sales of grain.
3. Any agricultural producer has to follow changes on the market to be able to choose the time for selling their products, produce their products at as low cost as possible. This may be achieved by following prices of commodities and forecasting increase and decrease in prices, thus, accumulating inventories or doing exactly the opposite – waiting until the price falls, following the financial indicators and observing caution as well as taking into consideration the fact that several financial indicators have to be higher than in the industry on average.
4. Grain processing companies have to be established and developed for the sustainability of grain industry. They could enhance supplying various final grain products to the world market and find possibilities for multifunctional use of grain products, thus, regaining the domestic market.
5. Businessmen have to invest in company establishment in the industries of grain and rapeseed, being aware of two major risks in the agricultural industry – weather conditions and price changes. When recruiting an employee, his/her qualification, knowledge, and accountability level have to be carefully evaluated, and the wage should be based on the quality of work performed. If financing deals of extreme and high risk, money reserves have to be accumulated for emergency situations due to unpredictability of risks caused by the nature.

Bibliography

1. Balodis, O., Gaile, Z. (2009). Influence of Agroecological Factors on Winter Oilseed Rape (Brassica Napus L.) Autumn Growth. *Research for Rural Development 2009*. Jelgava: Latvia University of Agriculture, pp. 36-43.
2. Bauskas novada dome. (2012). Bauskas novada teritorijas planojums 2012.- 2023. gadam *(Bauska County Territorial Planning for 2012-2023)*. 1.sejums. Bauska. 187 lpp.
3. Bierande, R. (2010). Augstvertiga zeme - nacionalas nozimes vertiba *(Valuable Land – a Value of National Significance)*. Latvijas Vestnesis. Retrieved: http://www.lvportals.lv/?menu=doc&id=220218. Access: 13 January 2012.
4. Brakmanis, A., Bugina, V. (2010). Graudu razosanas ekonomika Latvija *(The Economy of Grain Production in Latvia). Economic Science for Rural Development*, No. 21. Jelgava: Latvia University of Agriculture, pp.100-108.
5. Graudins, U. (2010). Graudu cenas samazinas *(Grain Prices Fall)*. *Latvijas Avize*, Nr. 19, 11. lpp.
6. Graudu cenu ietekmejosie pamatfaktori *(Basic Factors Affecting the Prices of Grain).* (s.y.). Retrieved: http://www.graudi.lv/graudi/factors. Access: 20 February 2012.
7. Klavis, A. (2010). Graudi - pasaules ekonomikas tresais valis *(Grain – the Third Whale of the World Economy)*. *Kapitals*, Nr. 151, 43.-46. lpp.
8. Kobus, P. (2010). Changes of Level and Variability of Wheat Production in the EU Member States for the Period of 1961-2008*. Economic Science for Rural Development*, No. 21. Jelgava: Latvia University of Agriculture, pp. 90-99.
9. Latvian Cabinet of Ministers. (2010). Regulations on Agricultural Territories of National Significance. Regulation No. 977 of 12 October 2010. Retrieved: http://www.likumi.lv/doc.php?id=220150&from=off. Access: 13 January 2012.
10. Latvian Ministry of Agriculture. (2006a). Labas higienas prakses vadliniju izstrade graudaugu, ellas augu un paksaugu primara razosana *(Elaboration of Guidelines for Best Hygiene Practice for the Primary Production of Grain, Oil Crops and Pulses). Annex to Agreement No. 050706/S354 of 5 July 2006 on Receiving Subsidies*, p. 13. Retrieved: http://www.zm.gov.lv/doc_upl/Labas_higienas_prakses_vadliniju_izstrade_graudaugu,_ellas_augu_un_paksaugu_primara_razosana.pdf. Access: 3 December 2011.
11. Latvian Ministry of Agriculture. (2006b). Latvijas lauku attistibas valsts strategijas plans (*Rural Development National Strategy Plan of Latvia for 2007-2013*) Retrieved: http://209.85.135.132/search?q=cache:bIYEONhpAkYJ:polsis.mk.gov.lv/LoadAtt/file23872.doc+aktualiz%C4%93tais+Latvijas+lauku+att%C4%ABst%C4%ABbas+valsts+strat%C4%93%C4%A3ijas+pl%C4%81ns+2007.-2013.m&cd=2&hl=lv&ct=clnk&gl=lv&client=firefox-a. Access: 1 February 2012.
12. Latvian Ministry of Agriculture. (2011). Lauksaimniecibas gada zinojums 2011 *(Annual Agricultural Report 2011).* p. 148. Retrieved: http://www.zm.gov.lv/doc_upl/LS_gada_zinojums_2011.pdf. Access: 22 December 2011.
13. Latvian Ministry of Agriculture. (2008). Informativais zinojums „Par situaciju graudkopibas nozare" (*Informative Report on the Situation in Grain Industry*). Retrieved: http://www.zm.gov.lv/doc_upl/ZMZino_040808_Final.pdf. Access: 22 December 2011.
14. Latvian Ministry of Agriculture. (n.d.) Rezultati un ieguvumi Latvijai par panakto kompromisu Kopejas lauksaimniecibas politikas „Veselibas parbaude" s.g. 19.-20.novembra Lauksaimniecibas ministru padome

(Results and Gains for Latvia from the Compromise Achieved on the Common Agricultural Policy "Health Check" at the Council of Agricultural Ministers on 19-20 November of this Year). Retrieved: http://www.zm.gov.lv/index.php?sadala=1603&id=7713. Access: 22 December 2011.

15. Latvian State Institute of Agrarian Economics. (2011). Lauku saimniecības. Darba ekonomiskās analīzes rezultāti 2010 *(Agricultural Holdings. Results of Economic Analysis 2010).* Riga: LSIAE, p. 67. Retrieved: https://sudat.lvaei.lv/pub/teksts_2010.pdf. Access: 3 December 2011.
16. Ruza, L. (2009). Assessment of Rapeseed Production in Regions of Latvia and Farms of Different Size. *Economic Science for Rural Development*, No. 20. Jelgava: Latvia University of Agriculture, pp. 167-173.
17. State Land Service. (2012). Latvijas Republikas administrativo teritoriju un teritorialo vienibu zemes parskats uz 2011. gada 1. Janvari *(Report on the Land of Administrative Territories and Territorial Units of the Republic of Latvia on 1 January 2012)*. Retrieved: http://www.vzd.gov.lv/sakums/publikacijas-un-statistika/parskats/?id=807. Access: 13 January 2012.
18. Veveris, A. (2011). Graudu razosanas potenciala novertejums Latvija un ta sasniegsanas ekonomiskie nosacijumi *(Assessment of the Grain Production Potential in Latvia and the Economic Prerequisites to Achieve It). Scientific Papers of the University of Latvia*, Volume 771. Riga: LU, pp. 318-329.
19. Zvirgzdina, R., et al. (2009). Lauksaimnieciskas razosanas un uznemejdarbibas attistibas problemas Latvija *(Problems of Agricultural Production and Business Development in Latvia). Economic Science for Rural Development,* No. 20. Jelgava: Latvia University of Agriculture, pp. 160-166.