

ASSESSMENT OF FINANCIAL DISTRESS IN AGRICULTURAL COOPERATIVES IN LATVIA APPLYING THE PREVENTION SYSTEM INDICATORS

*Gunita Mazure^{ORCID}, Inguna Leibus^{ORCID}, Rolands Feldmanis

Latvia University of Life Sciences and Technologies, Latvia

*Corresponding author's e-mail: Gunita.Mazure@lbtu.lv

Abstract

Cooperation and financial stability of agricultural companies, especially small and medium ones, is very significant for the development of agricultural sector. In Latvia, cooperatives represent different sizes and industries: dairy, grain, fruit and vegetable, forest, agricultural services and home production. The research aim is to assess financial distress in agricultural cooperatives in Latvia by applying the prevention system indicators. The evaluation of financial indicators is based on the methodology developed by Deutscher Raiffeisenverband e.V. (DRV) - the leading association of agricultural and food industry cooperatives and cooperative-oriented companies in Germany. This system prescribes reporting and monitoring requirements for cooperatives to perform the preventive case analysis to ensure a successful operation of a cooperative or to prevent financial problems, if any. Therefore, financial indicators of cooperatives in Latvia were analysed adapting the DRV analysis methodology to the situation of Latvia to identify cooperatives requiring support to ensure viability.

The evaluation of cooperatives by the number of employees, assets, sales and other financial indicators convincingly demonstrates that the largest and most financially strong cooperatives in Latvia operate in the grain sector, followed by the dairy sector. The assessment of financial distress reports that 10 out of 51 analysed cooperatives experience risk of operation. The most common threat to a cooperative in Latvia is related to its equity; however, it is recommended to evaluate this indicator in line with other indicators, for example, changes in equity in recent years and length of a cooperative's operation.

Key words: agricultural cooperatives, financial distress, prevention, performance indicators.

Introduction

Agricultural cooperatives as cooperative societies providing services to producers of agricultural products play a significant role for the development of small and medium sized companies, since they can obtain higher value added for their products and ease the access to markets as well as to reduce costs, especially, transportation. Already at the beginning of the 1980s, Turtiainen & Von Pischke (1982) indicated that the financing system of cooperatives, though, having some common features, differ from other companies or organisations. The most essential difference lies in the characteristic that cooperatives depend on their membership; hence, expansion of cooperatives may be limited and they may become financially vulnerable (Turtiainen & Von Pischke, 1982). The same opinion is strongly emphasised also by a group of researchers who have examined agricultural cooperatives, their operation and financial situation several decades later. These researchers conclude that the principles and values of agricultural cooperatives are determining factors for the different financial analysis (Marcis *et al.*, 2018; Pokharel, Archer, & Featherstone, 2020; Piccoli *et al.*, 2020; Silva, Bagio, & Santos, 2022). Hence, Pokharel *et al.* (2019) examined the financial performance of agricultural cooperatives in the USA and came to a conclusion that profitability ratios differ in financially stressed and non-stressed cooperatives. However, the entire analysis indicated that smaller cooperatives may suffer from bigger financial stress compared with larger ones (Pokharel *et al.*, 2019).

Slovak researchers Vavrek, Kravčáková Vozárová, & Kotulič (2021) consider that the financial analysis and diagnosis of critical situations of agricultural companies help highlight financial threats at an early stage of emergence. Similar arguments are expressed by

Lithuanian researchers who distinguish two groups of factors impacting the financial performance of agricultural companies, namely, economic and non-economic ones (Stulpinienė & Aleknevičienė, 2012). The economic factors include liquidity, profitability, operating efficiency and other factors. Stulpinienė (2012) emphasises that financial distress is basically related to a non-qualitative farm. Maintenance and improvement of profitability and liquidity ratios as critical issues for the cooperative performance are also reported by Barton *et al.* (2011). Already in 1996, researchers have indicated on profitability as one of financial stress factors in agricultural cooperatives (Moller, Featherstone, & David, 1996). In Latvia, cooperatives differ by their size, value of assets, liquidity and profitability ratios and other financial indicators; thus, it is essential to provide the assessment of financial distress in these agricultural cooperatives to conclude on their viability potential. The financial distress evaluation is possible through the application of various methods; yet, the present research focuses on the methodology developed by Deutscher Raiffeisenverband e.V. (DRV), which is the leading association of agricultural and food industry cooperatives and cooperative-oriented companies in Germany. **Hypothesis:** the operational risk assessment of agricultural cooperatives in Latvia is possible via the application of the DRV preventive case analysis system. The **research aim** is to assess financial distress in agricultural cooperatives in Latvia by applying the prevention system indicators. The following **tasks** help achieve the set aim: 1) to characterise agricultural cooperatives in Latvia; 2) to analyse financial indicators of agricultural cooperatives. The terms *cooperative* and *cooperative society* are interchangeable in the research paper. The legal form of all analysed agricultural undertakings is a cooperative society; though, a term

cooperative is used throughout the present research paper for the purpose of simplicity.

Materials and Methods

The evaluation of financial indicators and prediction of financial distress in agricultural cooperatives is based on the methodology developed by Deutscher Raiffeisenverband e.V. (DRV). Section 7 of the Guidelines of the Cooperative Assistance Fund of the DRV (Richtlinien des Genossenschaftlichen ..., 2021) prescribes reporting and monitoring requirements for cooperatives to perform the preventive case analysis to

ensure a successful operation of a cooperative or prevent financial problems, if any. The DRV Guidelines determine several indicators for the evaluation whether a cooperative classifies as a preventive case under the preventive case analysis system criteria (Table 1). The system distinguishes two types of warning signals: yellow and red. The yellow signal indicates on initial problems in the cooperative operation if the indicators achieve and fall below the set limits, while the red signal requires urgent preventive actions to avoid critical performance situation.

Table 1

The preventive case analysis system criteria and thresholds

Group of indicators	Indicators	Warning signals (thresholds)	
		yellow	red
Assets value	Days sales outstanding (DSO)	> 60 days	-
Financial situation	Equity ratio (ER)	< 20% or the main indicator (equity) has decreased by more than 40% compared with the previous year	< 10%
Liquidity	Quick liquidity (QL)	< 50%	-
Profit measures	Return on equity (ROE)	< -10% or the main indicator (equity) has decreased by more than 40% compared with the previous year	< -20%
	Personnel expense intensity (PEI)	> 70%	-
	Interest expense intensity (IEI)	> 70%	-
Qualitative factors	Management activities Accounting policy		

Source: Rahmenbedingungen für Sanierungen ..., 2018.

Theory on financial analysis enlists various methods and indicators applied to study the financial position of a company which differ consistent with the target and necessity for the assessment of financial situation. The DRV highlights five key groups and eight indicators; however, qualitative factors including management activities and accounting policy are beyond the present research. The accounting policy can be partially evaluated by the appendix added to the annual report; while, a survey of the cooperative management allows to evaluate the management performance.

The value of assets is the first indicator under the preventive case system analysis. The formula for calculation of **days sales outstanding (DSO)** is as follows (1):

$$DSO = \frac{\text{Average accounts receivable excluding prepaid expenses}}{\text{Net sales}} \times 365 \quad (1)$$

Days sales outstanding ratio shows the average number of days needed for a cooperative to collect payment after the sales have been made. The DSO ratio is considered to be optimal if it less than 60 days. The **equity ratio (ER)** or equity proportion of total assets (%) is the indicator showing the financial situation of a cooperative and it is calculated as follows (2):

$$ER = \frac{\text{Total equity}}{\text{Total assets}} \times 100 \quad (2)$$

The proportion of equity in total assets shall be above 20%. If the equity ratio falls under 20% or the value of

equity has decreased by more than 40% compared with the previous year it signals on problems in the financial situation of a cooperative. If the ratio is below 10%, the situation is especially critical.

Quick liquidity (QL) ratio measures the ability of a cooperative to cover current liabilities with its quick assets deducting prepaid expenses. The DRV methodology envisages the expression of quick liquidity in per cent and it is calculated as follows (3):

$$QL = \frac{\text{Current receivables} - \text{prepaid expenses} + \text{cash} + \text{current securities}}{\text{Current liabilities}} \times 100 \quad (3)$$

The ratio shall exceed 50%, i.e. a cooperative shall be able to cover its accounts receivable at least 0.5 times. Profit measures include three types of indicators: return on equity, personnel expense intensity and interest expense intensity.

Return of equity (ROE) measures the profitability of a cooperative related to its equity (4).

$$ROE = \frac{\text{Retained earnings of the accounting period}}{\text{Equity}} \times 100 \quad (4)$$

The indicator shall exceed -10% or the value of equity should not decrease by more than 40% compared with the previous year value. The cooperative experiences serious profitability efficiency problems if the ROE is below -20%. In general literature, the ROE shall range between 15-20%, so the DRV methodology allows even a negative result. Intensity of expenses is valued through two indicators: personnel expense intensity and interest expense

intensity. These indicators allow to draw conclusions on the burden of personnel and interest costs and gross profit.

Personnel expense intensity (PEI) indicator shows the personnel costs in relation to the gross profit of a cooperative. Personnel expenses encompass all payments made to employees and workers, namely, salaries, wages, social insurance contributions, vacation payments, bonuses and any other payments related to personnel. These expenses is the only information in terms of money found about personnel in the financial statements of a cooperative. The personnel expenses intensity is calculated as follows (5):

$$PEI = \frac{\text{Personnel expenses}}{\text{Gross profit}} \times 100 \quad (5)$$

The DRV methodology sets the minimum limit for personnel expense intensity ratio of 70%. However, other sources acknowledge a lower minimum of 50% on average (REFA International ..., s.a.) distinguishing the ratio between production and service companies, i.e. 30% and 60%, respectively.

Interest expense intensity (IEI) indicator measures the costs of interest payment related to the gross profit. The indicator is calculated as follows (6):

$$IEI = \frac{\text{Interest expenses}}{\text{Gross profit}} \times 100 \quad (6)$$

Similar to the personnel expense intensity indicator also for the interest expense intensity indicator the DRV methodology sets the minimum limit of 70%.

The evaluation of all these indicators included in the prevention case analysis system help determine whether the existence of a cooperative is not endangered, financial problems are likely to occur or the system signals that a cooperative has fallen into the area of observation limits. The cooperative has reached a precaution threshold if it

produces a 'red signal' in one of the key indicator groups or at least one of the key indicators has a 'yellow signal' in three different groups.

Results and Discussion

Characteristics of agricultural cooperatives in Latvia

The Association of Agricultural Cooperatives of Latvia (LLKA) unites more than 50 cooperatives representing different sizes and industries: dairy, grain, fruit and vegetable, forest, agricultural services and home production. The LLKA is aimed to create a favourable environment for the development of agricultural cooperatives in Latvia, to help solve various problems of its members, to attract financing for the implementation of cooperatives' investment plans and needs in order to promote the growth, sustainability and financial stability of cooperatives.

The attraction of financial resources from commercial banks and other financial institutions or credit unions are often limited by the offered interest rates and guarantee requirements, especially for small and medium-sized cooperatives. In addition, the equity and other financial indicators of cooperatives are often not good enough to receive a loan. A positive aspect in the implementation of investment projects is the European Union financing available through the Rural Development Programme. However, it is available only to those cooperatives that are annually evaluated consistent with the Compliance Conditions of Cooperative Societies and have received a compliance status. Fifty agricultural cooperatives have received the compliance status in 2022 and 2023.

The following analysis was carried out for 51 agricultural cooperatives (Table 2), which have received the compliance status and/or are the members of LLKA, and were not liquidated on 31 December 2023.

Table 2

Characteristics of agricultural cooperatives in Latvia subjected to the financial analysis in 2022

Sector		Dairy	Grain	Fruit, vegetables	Meat	Other
Number of cooperatives		22	16	6	2	5
Number of employees	min	1	0	1	0	1
	max	92	219	11	1	4
	average	12	27	4	1	2
Assets, EUR	min	28 293	27 840	32 024	15 050	40 765
	max	4 608 624	126 349 464	1 918 851	67 680	498 330
	average	943 980	15 207 845	766 992	41 365	161 456
Sales, EUR	min	232 718	167 366	30 117	442 053	3729
	max	41 796 430	339 132 526	1 046 728	518 072	164 610
	average	5 917 676	39 509 067	1 200 974	480 063	85 154
Profit, EUR	min	-138 597	-3099	155	-15 509	-126 776
	max	291 654	4 762 256	156 107	5923	23 836
	average	59 533	573 778	46 638	-4798	-20 341
Equity, ER	min	22 790	12 582	12 817	-8697	1325
	max	2 539 232	29 894 190	6258 179	4165	489 090
	average	457 659	4 010 009	208 352	-2266	121 858

Source: authors' calculations based on Lursoft data.

According to the number of employees, assets, sales and other financial indicators, the largest and most financially strong cooperatives in Latvia represent the grain sector, followed by the dairy sector. In recent years, cooperation has also been developing well in the fruit and vegetable sector, while weaker results are reported by the cooperatives of meat and other sectors. However, the range of performance indicators and results of individual cooperatives is very large in all sectors (Table 2).

The dairy sector represents the largest number of cooperatives. In 2018, the first Level 2 cooperative was established in Latvia, namely, the *cooperative society of agricultural services* Baltu piens, which unites ten cooperatives of raw milk producers. The analysed 22 dairy cooperatives differ in the range of services they offer to their members as well as whether they are engaged only in the purchase and sale of products or they also provide processing of products. Therefore, cooperatives are very different in size and have financial results of a wide range. For example, a dairy cooperative Straupe has the largest number of employees and the largest equity, since its operating activities include also milk processing, cheese production and sales in 16 sales outlets. On the contrary, the majority of cooperatives deal mainly with the purchase and resale of milk to processing companies. Four dairy cooperatives ended the year 2022 with a loss; yet, a cooperative Nadziņi 1 experienced the worst situation (loss equalling to EUR 138.6 thou. in 2022 and EUR 67.5 thou. in 2021). Hence, the decrease of its equity is very sharp (by 86%).

Also, 16 grain cooperatives have very different size and financial indicators. The largest cooperatives are developing very rapidly by increasing the number of members, expanding the range of services, finding the best markets for the sale of products at the best prices (e.g., Latraps, VAKS, Durbes grauds). However, there are also small grain cooperatives that unite only a few farmers (Vandzenes agro and Akots). Both small cooperatives have closed the last two years with a loss; other financial indicators are deteriorating therein.

The six fruit and vegetable cooperatives have very different specialisations and scales. All these cooperatives have earned profit in 2022; hence, they were able to increase their equity. A cooperative Bio Berries Latvia, founded in 2019, has very good growth indicators. Both meat cooperatives are new (founded in 2021) and their operating results are different. Worse results are demonstrated by GreenBeef.lv, whose sales have increased 2.2 times in 2022 compared with 2021 but this increase coincides with the growth of loss. Therefore, the year 2022 was closed with a negative equity of EUR 2200.

The analysed cooperatives of other sectors unite beekeepers (2), providers of agricultural services (2) and home producers (1). A cooperative providing agricultural services Medotava, founded in 2017, which deals with the purchase and sale of honey, shows the best results and the fastest growth. While the

other honey cooperative Kurland Honey does not have such good results, as its sales decreased by 61.5% in 2022 compared with 2021 and the year was closed with a loss. Even worse results are reported by a cooperative providing agricultural services Bauņi, whose sales decreased by 93.5%, and the year was closed with a loss and a reduced equity.

Financial analysis of agricultural cooperatives based on the DRV methodology

The financial indicators of all LLKA members were analysed adapting the DRV analysis methodology to the situation of Latvia to identify cooperatives requiring support to ensure viability.

Days sales outstanding ratio. In 2022, dairy and meat cooperatives did not encounter problems with the recovery of receivables, which means that these cooperatives timely collected payment for the delivered products. In contrast, for seven cooperatives of other sectors, the threshold value of this indicator exceeded the critical 60-day limit (yellow signal). For some fruit and berry cooperatives, the settlement period exceeded even 200 days on average. However, according to the DRV methodology, this indicator alone does not pose a critical threat to the viability of the cooperative, since it shall be assessed in line with other indicators.

Equity ratio. Three dairy cooperatives, one grain and one vegetable cooperative have an equity ratio less than 20% (yellow signal), which is not assessed as a threat. Seven cooperatives of which two dairy cooperatives: Nadziņi 1 (3.6%) and Baltu Piens (9.4%), one grain cooperative Ošenieku grauds (8.1%), the two cattle cooperatives: Latvijas Liellops (6.2%) and GreenBeef.lv (-57.8%), one honey cooperative Kurland Honey (5.2%) and a cooperative Kuldīgas labumi (3.3%) have a ratio of less than 10% (red signal). In addition, the analysis determines also the evaluation of the **change in equity compared with the previous year (%) (Δ equity)**. The yellow threshold signalling that the indicator has decreased by more than 40% is reported by Nadziņi 1 (-86.0%); thus, indicating on a significant deterioration of the situation. The cooperative has operated with a loss for the previous two years. As a result, the cooperative's equity has decreased significantly. The size of equity has also critically decreased for cooperatives Piebalga (-43.4%) and Piena āre (-40.3%); however, the situation is not so dramatic, as these cooperatives ended at a loss only the year 2022. The equity of a cooperative Piebalga decreased just by 1.6% due to the loss (EUR 9.5 thou.), while the loss of the cooperative Piena āres (EUR 39.3 thou.) significantly reduced the equity - by 36.0% at the end of 2022 compared with the beginning of the year.

Quick liquidity. According to the DRV methodology, none of the analysed dairy cooperatives has a critical quick liquidity ratio, as the total amount of current receivables and cash is not less than 50% of current payables. Three grain cooperatives and a cooperative

Kuldīgas labumi have the liquidity ratio below the set rate; however, this indicator alone does not pose a critical threat to the viability of the cooperative, as it shall be evaluated in line with other indicators.

Return on equity. Similar to the equity ratio, this indicator is also very critical for cooperatives: Nadziņi 1 (-608.1%) and Piena āres (-56.2%). Moreover, these cooperatives have reached the threshold of red warning signal, since the ratio is below -20%. In contrast, a cooperative Baltu piens, which had a critical equity ratio, has a positive and sufficient ROE (54.4%). In addition, the analysis of **the changes of profit of the accounting period (%) (ΔP)** demonstrates that a cooperative Nadziņi 1 has been experiencing a critical situation for the previous two years, as the loss has doubled (EUR 67 thou. in 2021 and EUR 139 thou. in 2022). A yellow ROE threshold was highlighted also for two grain cooperatives but, as mentioned before, this indicator alone does not pose a critical threat to the viability of the cooperative, since it shall be assessed in line with other indicators.

Personnel expense intensity. It is possible to calculate this indicator only for six cooperatives, as the other cooperatives do not enclose information on personnel expenses in their annual reports. The personnel expenses intensity ratio exceeds the limit set by the DRV methodology and corresponds to the yellow signal for four cooperatives. Again, this indicator alone does not pose a critical threat to the viability of the cooperative and it shall be evaluated in line with other indicators. The evaluation of this indicator for other cooperatives is possible only if cooperatives have identified data on personnel expenses. The majority of cooperatives (47 out of 51) classify expenses in the profit or loss statement according to the function of expenses, where personnel expenses

are not shown separately, as expenses are classified into production, sales and administration expenses. The application of the DRV methodology is possible only if a profit or loss statement is classified by the type of expenses or personnel expenses are decoded in the annex to the annual report of a cooperative.

Interest expense intensity. In 2022, less than half of cooperatives (23) disclosed interest payment expenses in their annual reports. In total, six grain cooperatives have significantly exceeded the limit value (70%) or reached the yellow signal. The indicator is negative for two cooperatives: Vandzenes agro (-137.1%) and Raibaļas (-922.6%). A cooperative Raibaļas is in a particularly critical situation, as the interest payments are relatively large (EUR 2.4 thou.) and the year was closed with a loss of EUR 261. It is positive that the interest payments and loss of this cooperative are decreasing compared with the previous year as well as the equity ratio is slightly increasing but it is still not sufficient (12.8%).

Results of the analysis demonstrate that the operation of 10 out of the 51 evaluated cooperatives were found to be endangered consistent with the financial results of 2022. Moreover, nine of them report at least one red signal (Table 3). The table also includes the company rating given in the Lursoft database. The rating is calculated by evaluating the main indicators characterising the financial activity of each company: solvency (weight in the rating 30%), profit before taxes (20%), liquidity (20%), increase of sales (10%), return on equity (10%) and liabilities (10%). The rating for the company is created both in the industry and among all companies registered in Latvia. Total rating is the average arithmetic index between the rating in the industry and the rating among all companies in the country. The rating ranges on a scale from 1 (poor) to 5 (good).

Table 3

Agricultural cooperatives of Latvia demonstrating endangered operational activity consistent with the DRV methodology by the financial results of 2022

Industry	Cooperatives with endangered operation	DSO	ER	EΔ	QL	ROE	PΔ	IEI	Lursoft rating
Dairy	Baltu piens*	15.8	9.4	121.4	125.0	54.4	142.2	0.0	2.9
	Nadziņi 1*	22.1	3.6	-85.9	77.9	-608.1	105.4	0.0	1.3
	Piena āres	17.2	19.0	-36.0	123.4	-56.2	-229.1	0.0	1.7
Grain	Ošenieku grauds	33.2	8.1	7.0	91.1	5.6	-15.3	650.2	2.2
	Vandzenes agro	106.7	14.9	-1.2	108.1	-1.1	56.0	-137.1	1.2
Meat	GreenBeef.lv	6.8	-57.8	-227.5	53.2	178.4	17.8	0	1.4
	Latvijas liellops	25.6	6.2	251.0	188.9	142.2	143.1	0.1	3.5
Fruit, vegetables	None of cooperatives has been identified as possible to encounter a threat to its operation or development								
Other	Kurland Honey	132.3	5.2	21.2	105.5	-45.1	-248.6	0	1.6
	Bauņi**	24 108.3	98.1	-20.7	2 548.8	-25.9	-268.6	0	2.5
	Kuldīgas labumi	6.5	3.3	364.9	7.9	77.3	-105.9	395.1	2.7

* not a member of LLKA, ** no compliance status. Source: authors' calculations based on Lursoft data.

It is very positive that none of the six fruit and vegetable cooperatives shows critical results after the financial results of 2022. Some yellow signals point to the fact that a cooperative Mūsmāju dārzeni should increase the equity ratio, a cooperative providing agricultural services Augļu nams should speed up the circulation of receivables, a cooperative providing agricultural services Baltijas ogu dārzi should reduce personnel expenses and promote the increase of profit, as its profit has decreased from EUR 24000 to EUR 2000 compared with 2021.

Out of the 16 analysed grain cooperatives, two were found to be at risk of operation. A cooperative providing agricultural services Ošenieku grauds is one of them, since its equity ratio is less than 10%; however, it has slightly increased (from 7.0% to 8.1%) compared with 2021. Only one grain cooperative - a cooperative providing agricultural services Vandzenes agro has received three yellow signals: DSO, ER and profit, as the last two years were closed with a loss.

In 2022, the worst results were observed for meat cooperatives and those representing other agricultural sectors. The two meat cooperatives received a red signal for the equity ratio - Latvijas liellops (6.2%) and GreenBeef.lv (-57.8%). A cooperative Latvijas liellops has improved its indicators compared with 2021. If the cooperative closed the year with a loss and had a negative equity in 2021, then it has earned a profit of EUR 5923 in 2022. In addition, the cooperative has increased its equity by EUR 1000 and reached a positive figure for the equity. In contrast, a cooperative providing agricultural services GreenBeef.lv closed the last two years with a loss and, hence, it has a negative equity of EUR 8697 at the end of 2022 as well as its liabilities exceed its assets by 57.8%.

In the group of other cooperatives, three out of five cooperatives show a significant decrease in revenues. A beekeeping cooperative Kurland Honey closed the year 2022 with a loss, which resulted in a negative return on equity (-45.1%) and a critically reduced equity (by 5.2%). Positively that the cooperative has increased its share capital and reserve compared with the previous year. The ROE of an agricultural services cooperative Bauņi also corresponds to the red signal; however, the large ER (98.1%) significantly improves the situation. The DSO is critical, since the amount of

receivables significantly exceeds the sales. Moreover, the annual report does not provide sufficient information for the evaluation of financial data. The ER (3.3%) is critical for a home manufacturer cooperative Kuldīgas labumi; nevertheless, it has increased the ER compared with the previous year, as the year 2022 was closed with a profit. Only two cooperatives of this group do not report problems with the development or a threat to their operation: a cooperative providing agricultural services Jeru mašīnu rings and a beekeeping cooperative Medotava, which have shown relatively good results.

The comparison of Lursoft rating and the evaluation results obtained by the research authors show that some cooperatives have received a good evaluation in the Lursoft rating, for example, cooperatives Latvijas liellops (3.5) and Baltu piens (2.9). Although, both cooperatives have received a red signal for their equity ratio according to the DRV methodology. Sufficiently good other financial indicators explain this situation, so it can be concluded that the fact that the equity ratio is less than 10% does not always pose a threat to the future operation of a cooperative. Calculations made consistent with the DRV methodology show that exactly the equity ratio poses the greatest threat to cooperatives in Latvia; though, it is recommended not to evaluate this ratio alone but in line with other indicators, such as the structure of equity and changes in equity in recent years as well as the length of a cooperative's operation. Several of cooperatives listed in Table 3 are new.

The breakdown of agricultural cooperatives by regions (Table 4) demonstrates that the largest number of cooperatives, furthermore these are cooperatives representing various sectors, operate in Vidzeme (18). The most of cooperatives facing operational threats (4 out of 12) operate in Kurzeme. Dairy (6) and grain (5) cooperatives mainly operate in Zemgale. There are significantly fewer cooperatives in Latgale (5). In addition, two of them can be identified as operationally endangered according to the financial analysis. There are also fewer cooperatives in Pierīga, which can be explained by a smaller share of the agricultural sector in the region. Operational threats have not been detected in any of cooperatives in Pierīga; the situation is relatively better also in Vidzeme and Zemgale.

Table 4

Breakdown of agricultural cooperatives by regions and operational threat in Latvia according to the financial results of 2022

Region	Dairy		Grain		Vegetables		Meat		Other		Totally	
	total	probl.	total	probl.	total	probl.	total	probl.	total	probl.	total	probl.
Vidzeme	7	no	6	no	2	no	1	1	2	1	18	2
Zemgale	6	1	5	no	1	no	no	no	1	1	13	2
Kurzeme	6	1	4	2	1	no	no	no	1	1	12	4
Latgale	3	1	1	no	no	no	1	1	no	no	5	2
Pierīga	no	no	no	no	2	no	no	no	1	no	3	no
Total	22	3	16	2	6	no	2	2	5	3	51	10

Source: authors' calculations based on Lursoft data.

The evaluation of the results by the size of cooperative allows to conclude that micro (5) and small (5) cooperatives have worse results, while medium and large ones have better results (Table 5).

Table 5

Breakdown of agricultural cooperatives by sector, size and operational threat in Latvia according to the financial results of 2022

Size	Dairy		Grain		Vegetables		Meat		Other		Totally	
	total	probl.	total	probl.	total	probl.	total	probl.	total	probl.	total	probl.
micro	7	no	4	no	4	no	2	2	5	3	22	5
small	13	3	7	2	2	no	no	no	no	no	22	5
medium	2	no	3	no	no	no	no	no	no	no	5	no
large	no	no	2	no	no	no	no	no	no	no	2	no

Source: authors' calculations based on Lursoft data.

There are only two grain cooperatives in the group of large cooperatives: Latraps in Zemgale and VAKS in Vidzeme. Medium cooperatives are represented by five cooperatives and none of them has endangered operation. The size of a cooperative (company) is determined under the criteria prescribed by the Law on Annual Financial Statements and Consolidated Financial Statements, when evaluating the value of assets, sales and the average number of employees in the cooperative.

Conclusions

1. The evaluation of cooperatives by the number of employees, assets, sales and other financial indicators convincingly demonstrates that the largest and most financially strong cooperatives in Latvia operate in the grain sector, followed by the dairy sector. In recent years, the cooperation is also developing well in the fruit and vegetable sector, while weaker results are reported in the meat cooperatives and cooperatives representing other agricultural sectors. Yet, the range of performance indicators and results of individual cooperatives is very large in all sectors.
2. A complete application of the DRV methodology for the evaluation of the performance indicators of cooperatives requires the data on personnel expenses included in the profit or loss statement, which is classified by types of expenses. Another option is the identification of personnel expenses in the annex to the annual report of a cooperative.
3. The DRV methodology envisages also the evaluation of two qualitative indicators: cooperative management activity and accounting

policy. The accounting policy can be partly assessed using the appendix added to the annual report; but small cooperatives do not have to prepare it, so the accounting policy may not be assessed by the annual report. The management performance may be assessed by conducting a survey of the cooperative management.

4. Calculations made consistent with the DRV methodology show that 10 out of 51 analysed cooperatives experience risk of operation. The most common threat to cooperatives in Latvia is the equity ratio (9 cooperatives); however, it is recommended to evaluate this indicator in line with other indicators, for example, changes in equity in recent years and the length of a cooperative's operation.
5. In Latvia, the largest number of cooperatives of various industries operate in Vidzeme (18), while mainly milk (6) and grain (5) cooperatives operate in Zemgale. In Kurzeme, relatively more cooperatives face operational threats (4 out of 12). There are significantly fewer cooperatives in Latgale (5), and two of them were found to be operationally threatened. There are also fewer cooperatives in Pieriga (3), none of them has been found to be in danger of operation, the situation is relatively better in Vidzeme (operationally endangered are 2 out of 18) and Zemgale (respectively 2 out of 13).
6. The evaluation of the results by the size of cooperative allows to conclude that micro (5) and small (5) cooperatives have worse results, while medium and large ones have better results.

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