

Risk factors in the agriculture sector

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Abstract: The agricultural sector is characterized by the fact that there is a high level of risk. It was always this case, but in the last years, there is a tendency of the increasing of the risk. The ability of early detection and effective management of the risks is an integral part of the strategic management of every agricultural organization. The paper presents the procedure and outcomes of the questionnaire survey aimed at the occurrence of the risk factors and approaches to the risk management in the enterprises of the primary agricultural production in Slovakia. The survey is focused on the individual character of the risk. The results of the survey point out the fact, that Slovakian farmers perceive the price risk, production or income risk as the most important risk factors, and the diversification as a most important strategy of the risk management. The most significant positive correlations were found between the land size and the perception of the price risk importance, between the number of years in office and the perception of the price risk importance. Concerning the production or income risk, the significant positive correlation was found in the legal form of business. As the most important, there was evaluated the risk perceived by the self-employed farmers.

Keywords: agriculture, agribusiness, risk, risk factors, risk management

Slovakia has the character of a countryside state. It is unique by that despite of the worldwide tendency, Slovak citizens are migrating from the cities to the countryside. It is the second most countryside state of the EU, with more than one half of the population living in the rural areas. Even higher is the share of the rural area of Slovakia. In the complex, as well as structured evaluation of the agricultural performance of the Slovak Republic within the EU, Slovakia belongs to the weakest countries. Our current agriculture is struggling to cope with the organizational and legal issues, it seeks to bring into operation the land market, to supply the internal market by the quality and affordable goods. Necessarily, it must increase the productivity, recover the production capacity of the land resources and constitute viable units. Those could compete with other entities, respectively, they could be an adequate partner in the EU in the framework of subsidies.

The farmers, in order to improve their position, must fight not only with the external factors of the environment, but also with many issues of the internal management of the enterprises. The overriding objective must become the orientation on the strategic management of the enterprises, while their effort is often focused on the survival because of the significant issues and the agrarian enterprises lack the coherent vision of the certainty of their future development. The part of the strategic management is also the risk management. The ability of an early detection and effective management of the risks is an integral part of the strategic management of every agricultural organization. Subjects, which are not aware of the scope and the strength of the impact of risk, and will not create the effective mechanism for its management, are endangering their existence. The effective risk management can be secured only in the case, when there is a clearly defined strategy of the

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business entity, including also the risk strategy; when there is a process of the risk management supported by the appropriate information system; when there is defined a responsibility for the risk management; and when there exists a functioning corporate culture able to adapt and take on new challenges of the risk management.

It is necessary to pay a special attention to the risk management in the agriculture because of many reasons. The agriculture is indisputably a specific area, where the production process is closely connected with the natural phenomena and it directly depends on the climatic conditions, which determine the risk level by different ways in the individual areas. Many types of risks influence the production, which can lead to the adverse effects and negative results of the agricultural production profitability. The risk in the agriculture is extremely high, because the farmers, with regard to the natural character of the activity, are facing the unpredictable effects during the whole year. On the one hand, the natural background is necessary for this kind of activities, on the other hand, some of the climatic factors, particularly drought, rain, storm, hailstorm, spring frost, floods, sunrise, and so on might have a negative effect on it. The plant production and animal production is exposed to these factors. Besides the biological nature of the production, another important factor is the liberalization of the world trade with the food products (the strengthening competitive pressure, the fall in prices, retail chains, and the strong volatility of the agricultural markets), but also the political decisions of the EU, which react on the actual worldwide situation.

The risk influencing agricultural activities is not only the problem of the farmers. This risk is a reference framework for the society as a whole, since the adverse attitude to the risk can lead to the ineffective allocation of the sources (Akcaoz and Ozkan 2005).

The paper presents the procedure and outcomes of the questionnaire survey aimed at the occurrence of the risk factors and approaches to the risk management in the enterprises of the primary agricultural production in Slovakia. This survey is focused on the individual character of the risk. Abroad, many studies were presented on the issue of the risk perception, identifying the risk factors and strategies in the agricultural business. Many of them are presented below. Nevertheless, in Slovakia, such studies are absent. This research gap we are trying to fill up through our contribution. It is a partial outcome of the project VEGA No. 1/0109/17 The innovative approaches to

management and their influence on the competitiveness and the successfulness of the companies within the conditions of the global economy.

The term *risk* has undergone a particular historical development. Firstly, it was characterized as a danger, respectively the exposure of the adverse events, later it was linked with the potential occurrence of the loss (Veber 2014). The current understanding of the risk, however, is not unified, and in the literature and mainly in praxis, there exist various concepts of this term. The basic concept for defining the phenomenon is, on the one hand, understanding the negative side of the risk, when we talk about the clear risk, and on the other hand, it is the broader understanding, which does not have only negative, but also a positive side in the form of the negative and positive variations from the expected or planned outcomes. Several authors accept the broader understanding of risk (Smejkal and Rais 2003; Váchal et al. 2013; Veber 2014).

The common features of all definitions are the following: the probability or possibility of loss, the variability of the potential outcomes or the uncertainty of the achievement, the deviation from the real and expected outcomes, the probability of any outcome different from the outcome expected, the situation, when the quantitative scope of a particular phenomenon is a subject of certain distribution of the probability, a negative deviation from the target, the jeopardy of the erroneous decision, the possibility of the loss or profit, an uncertainty linked to the development value assets, the median of the loss function.

Some authors stress the necessity of the differentiation between the risk and danger. The risk represents a quantified threat, since it is considering the probability of the occurrence of the given threat and the severity of its consequences in relation to the particular organization.

The risk in the agriculture is perceived in the literature in the same way in several dimensions. Firstly, as a business with a typical price and demand fluctuations (Uematsu and Mishra 2011; Sulewski and Kloczko-Gajewska 2014), emerging from the trade liberalization and the changes of the Common Agricultural Policy (Lien et al. 2003; Bureau et al. 2005; Flaten et al. 2005; Ahn et al. 2009; Park 2013; Lee and Lim 2015), but also another risks characteristic for this sector as the climate, weather, infections, which have the tendency to rise (Alcamo et al. 2007; Kundzewicz and Kozyra 2011; Olesen et al. 2011; Kemény et al. 2013; Legg and Blandford 2015; Kan et al. 2015; Prokopy et al. 2015).

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It is clear that the risk in agriculture has many causes as well as the solutions of its elimination. There are created, at the national level, the particular institutional frameworks, supported by the economic policy instruments, which help the farmers to address the risk, and there are created various offers of insurance and the tools of the price risk solutions. However, important are also the measures on the side of the management of the agricultural enterprises, in the framework of the risk management.

A wide range of authors deals not only with the conditions, which the farmers cannot influence (the political and infrastructure factors), but they deal also with those which they can handle by themselves through the methodics of the risk management. There are many studies, which point out the fact that the effective risk management depends on the behavioral factors, on the attitudes of the managers to the risks, thus on the inclination or aversion to the risk and also on its perception. Pennings and Leuthold (2000), Bard and Barry (2000), Borges and Machado (2012), Picazo-Tadeo and Wall (2010) point out that the right perception of the risk and the attitude to it are the necessary prerequisites of the effective risk strategy choice. The attitude and the perception of the risk depend on the manager and of course on the situation, in which the manager is and on the conditions, in which the manager acts.

Except the propensity to risk, there is analysed also the risk adverse. This issue is at present analysed in many foreign scientific studies (Dohmen et al. 2005; Fausti and Gillespie 2006; Damodaran 2009; Kouamé 2010; Cao et al. 2011; Uematsu and Mishra 2011). The results of those studies identify correlation relations of various variables and the risk adverse, but they agree, that it is about the subjective attitudes (measured mainly by the Likert scale), but the level assessment of the risk adverse can vary and it can be influenced by the scientists, and the ways of the review process. Polish authors have found out that a higher risk adverse creates a higher chance for the realization of the most considered strategies. The correlation between the risk adverse and the plans of the farmers, which concern the future strategy of the risk management, is very significant, while the factors of the increased level of the risk adverse are the debt ratios, losses from the past years, the financial independence, as well as the hierarchy of priorities. The risk attitudes were examined also in the extensive study on the sample of small Turkish farmers, where the author points out the fact, that

a better understanding of their risk preferences and the mutual link of the attitudes to the risk with variety of the agriculture is important for the decision making, the creation of the support strategies and for the development of the insurance tools for the mitigation of the negative consequences (Tshoni 2015). The result of the study was the conclusion that different types of the agricultural activities have different approaches to the risk.

Norwegian authors (Flaten et al. 2005) have monitored the risk perception of the so-called organic and conventional farmers. The results are interesting and pointing out that the organic farmers are perceiving themselves as less risk-averse than their colleagues, the conventional farmers. Differences exist also in the significance assessment of the risk sources, when the conventional farmers perceived many risk sources as more important than the organic farmers. At the same time, they point out at the high level of the risk perception specific for the agriculture. A significant factor could be the high support of the payments and the high rate of the regulation. The relevant research was realized in Norway and Finland (Sonkkila 2002). The mutual relations of the risk preferences and the farm diversities were investigated by Harderker et al. (2004), Van Averbek and Mohamed (2006), Hindi (2009) and Tshoni (2015) and they stated that if the relation between these two concept exists, it should be transferred into the strategy and plan creation and also to the support policy.

Similar studies are rare in Slovakia, and despite the fact that the risk averse plays a significant role in the determination of the risk strategy, there is not paid an adequate attention to this area.

The risk identification and risk definition is the first and the most important phase of the risk management. The result is a list of risks, which could endanger the organization. The risk character is dependent on the business activity, while the single risks are differing not only by their character, but also by the probability of their occurrence and the degree of the severity of their consequences. There exist many studies dealing with the issues of risk sources in the agriculture, which deal with the risk according to the individual branches of the agricultural production, the size of subjects and many other variables (Gunduz and Esengun 2006; Aditto et al. 2012; Tumar et al. 2012; Agir et al. 2014).

The risk management is a complex process, which, beside the risk identification and risk definition and its analysis, includes also the evaluation and the

proposed measures. Here, there are important the risk strategies, whose course should be proactive (Catlett and Libbin 2007). There is assessed the acceptability of the risk and decided about the ways of its management. If the risk is unacceptable, there is used either the avoidance of the risk or there are applied various strategies leading to the reducing or mitigating of the risk.

In agriculture, there are discussions about various strategies of reducing the adverse results of the risks. Most often it is about the diversification, insurance, debt management, integration (Akcaoz and Ozkan 2005; Lagerkvist 2005; Sulewski and Kloczko-Gajewska 2014). The flexibility and caution, cost reduction, division of labour and guidance, membership in the corporate respectively farmers union, and prevention were also mentioned (Hayran and Gul 2015). Miller et al. (2004) divides the risk strategies into the financial, marketing and production ones. From the outcomes of the study, it results that many farmers do not have a sufficient knowledge and the positive tools of the measures for the risk reduction. Undervalued are particularly the strategies, which concern the cooperation, mainly in the small farmers segment, what probably results from the general unwillingness of cooperation among these farmers. The most popular tool, which should be a trend of the future, is insurance.

Diversification plays a significant role in the multifunctional understanding of the agriculture. Its support towards the non-agricultural activities, which is at the same time one of the goals of the EU Common Agricultural Policy, is focused at the keeping of farmers in rural areas. Schope (2011) considers the diversification as an essential feature of the agricultural structure change. According to him, it is economically meaningful to diversify when we want to settle the risk. Rowland (2009) points out that the diversification often offers a significant space for the improvement of the economic vitality of many agricultural enterprises, and at the same time, it decreases their dependence on subsidies, respectively subventions. Rowland also states that we can understand diversification as the business use of the agricultural resources on the non-agricultural purposes for the commercial profit. Diversification reduces, according to Špička (2006), the income risk, but it is more demanding for the initial capital and management capabilities. Regarding the long-term character of the production in agriculture, it is necessary to eliminate the income risks in the agro-sector by the balanced sales during the whole year.

MATERIALS AND METHODS

The aim of the paper is to present the results of the questionnaire survey focused on the risk factors occurrence and the approaches to the risk management in the agricultural primary production. The realization of the goal has required a survey in the investigated subjects, which took place by the questionnaires in 70 enterprises of various legal forms within the business in the agricultural sector. The selection of these enterprises was realized with the intention to homogenize the sample from the point of view of the production areas, which significantly affect the results of farming, so that we could assess, in the most reliable way, the level of the risk management in the investigated enterprises.

The selection of the region, which was the Nitra Region, was based on the fact that this region is considered as the agriculturally most developed and the most fertile one with the statistically largest representation of the agro-enterprises creating the largest number of job positions. We have addressed mostly the directors of the cooperative farms, respectively the members of the top management, and also the managers and owners of private enterprises or self-employed farmers, which expressed their attitude to the risk and risk strategies. The questionnaire was divided into two parts. The first part was identificational and it included the socio-economical data of the respondents. The second part was dealing with the risk as a part of the decision making processes of the agro-management.

The whole survey was run in two phases. In the first phase, we tried to gain, in the framework of the risk management issues, the information about the possible risk factors. The respondents were addressed by a short questionnaire with two open questions. Subsequently, we used the summarized results from the pilot survey in the second questionnaire, where the respondents expressed to what extent is the risk factor important in the relation with their business and the successful achievement of the results. It used the scale from 1 – not important at all, to 5 – totally important. The second part dealt with the investigation, how represented are the various types of the approaches to the risk management in the agriculture. Again, we used the scale from 1 – not important to 5 – very important, to find out whether the risk management through the given measures is systematic or random, respectively improvised.

In order to assess the questionnaire, were used statistical methods. For the analysis of the obtained

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data, there were used the descriptive statistics and the correlation analysis. In the first step, we have defined, by the descriptive statistics, the investigated package of the respondents from the socio-economic point of view and at the same time, we used the selected descriptive characteristics for the definition of the risk factors and risk strategies. Subsequently, we have calculated the correlation between the perception of the specified risk factors and the socio-economical characteristics. The statistical significance was investigated through the Pearson Correlation coefficients and the coefficient of the significance. Only those correlations were taken into account, where the Pearson Correlation achieved value was at least 0.3 and the significance coefficient was lower than 0.05.

RESULTS AND DISCUSSION

Socio-economical characteristics of the farmers

The stated characteristics of investigated farmers researched by the descriptive statistics are displayed in the Table 1. The investigated package is formed by 70 enterprises of the agricultural primary production, which are in business as the agricultural

cooperative farms (41.43%), business companies (25.71%), joint stock companies (4.29%) and self-employed farmers (28.57%). The average number of the employees in the investigated sample of enterprises is 90.2, while 57.14% of the businesses have the number of employees from 51 to 250. The rest is formed by the enterprises up to 10 employees (28.57%) and from 11 to 50 employees (14.29%). The addressed representatives of the enterprises are in the function for a different number of years, the most from 11 to 20 years. The average number of years in the top function, respectively in the position of the manager or owner, is 14.73 years. The education of these respondents is the university education in the two thirds of the sample. The rest – 35.71% is with the finished secondary education. From the point of view of the size of the cultivated agricultural land, there are in the sample the enterprises mostly with the area above 1000 hectares (62.86%). The economic results of the analysed agricultural enterprises are considerably various. The average profit is 23.02 EUR per hectare, however, the standard deviation is high (40.79), suggesting that there are in the sample the enterprises with a high profit and also with a loss. More effectively farming were the limited companies and self-employed farmers.

Table 1. Socio-economical characteristics of the investigated sample of respondents

Variable		Frequency	Percentage	Mean	Std. Dev.
Legal form	agricultural cooperative	29	41.43		
	business. companies	18	25.71		
	joint stock company	3	4.29		
	self-employed farmers	20	28.57		
Number of employees	up to 10	20	28.57	90.2	84.93
	11–50	10	14.29		
	51–250	40	57.14		
Years in position	up to 5	17	24.28	14.73	8.32
	6 to 10	3	4.29		
	11 to 20	35	50.00		
	more than 20	15	21.43		
Education	secondary	25	35.71		
	university	45	64.29		
Cultivated land (ha)	up to 5	4	5.71	1909.86	1556.84
	6–100	4	5.71		
	101–500	6	8.57		
	501–1000	16	22.86		
	above 1000	44	62.86		
Economic result (EUR/ha p.p.)				23.02	40.79

Source: own calculations

Risk factors

The risks in the primary agricultural production can be divided into two groups. The first group is formed by the risks, which result from the factors of the external environment, the second group is formed by the risks resulting from the internal management of the agro-enterprise. The factors of the internal environment have a significant effect on the agricultural sector with regard to the strong participation of the state in the regulation of the agro-food market and also with regard to the strong dependence of the agricultural production on the natural conditions and their unpredictability. Depending on these factors, we can include among the risks of the external environment: risks resulting from the exposure to the natural elements and the biological character of the production, risks resulting from the increasing and changing competitive environment, risks resulting from the unstable economic environment, risks resulting from the unstable legal, respectively legislative environment, risks resulting from the sub-contracting relations, information risks, risks resulting from the regulation of the agro-market, risks in the economic-financial areas.

Within the first questionnaire, which represented the pilot research about the occurrence of the agricultural risks, were identified, according to the respondents, the following risks, which we have divided into six groups from A to F. A – price risks (risk of the decline in output prices, the increase in the prices of inputs), B – production or income risks (risks connected with the weather, with the animal diseases, with the variability of the output amount, risks connected with the crop diseases, risks connected with the mechanical errors), C – institutional risks (changes in the policy structure in the area of agriculture and in the other areas, the contracts and their violation), D – financial risks (the increase in the cost of the capital, the lack of

liquidity, the decline in the share prices, the exchange rate risks), E – human or personal risks (carelessness of the labour force, the life and personal crisis, a low proficiency of the management), F – property risks.

The significance of the single risk factors from the point of view of the respondents in the relation to their businesses and the successful achievement of the results is displayed in the Table 2. There was used the scale from 1 – not important at all, to 50 – totally important factor.

The respondents perceive as the highest risk factor, influencing their business, the price risks at the average level of the importance 4.67 with the standard deviation 0.47, indicating the motion perception of this risk between the level of 4 and 5. It is mainly about the risk of the declining of the prices of the outputs and increasing the prices of the inputs. Highly assessed were also the production or income risks, which are typical for the farmers, because it is about the risks connected with the weather, the risks connected with the with the animal diseases, with the variability of the outcome amount, the risks connected with the crop diseases, the risks connected with the mechanical errors in the supportive operations. The average evaluation of the importance is 4.29, again with the low standard deviation. Institutional risks represent the third group of the risks from the viewpoint of importance. The average value represents 3.83 with the deviation of 0.85. The selected minimum is 3 and maximum 5. A part of the sample perceives this risk as highly important (28.57%), the part of 45.71% at the level of importance 3. The group of the financial risks is perceived in the middle of the importance scale. The average value is 3.03, the standard deviation is 0.74. The respondents have chosen the importance of this risk factor between the values of 2 and 4. The group of the human or personal risks is assessed by the average perception of the importance of 2.01 with the deviation 0.77. It is interesting that these risks in the form of the risk of the disease, injury or death of the workers, their carelessness, a personal crisis or the management expertise are perceived at a lower level of importance. The property risks, connected with the robbery, fire or other loses or damages of the machines, houses and other elements of the property of the farmer used for the production are assessed by the average level of the importance of 2.36 with the standard deviation 1.16.

The individual groups of risks have their weights in time and space. Important is also when they are occurring. The managements of the enterprises often

Table 2. The importance of the risk factors in the enterprises of the primary agricultural production

Risk factors	Mean	Std. Dev.
A – price risks	4.67	0.47
B – production of income risks	4.29	0.46
C – institutional risks	3.83	0.85
D – financial risks	3.03	0.74
E – human or personal risks	2.01	0.77
F – property risks	2.36	1.16

Source: own calculations

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have to decide in the unstable conditions, what results mainly in the area of the minimum prices specification, which are set lately. The minimum granted prices should be set in the period of the formation of the production plans of the agricultural producers as they should condition their decisions by the selection of the production structures. Price risks are, therefore, perceived by the farmers as very important. By investigating the correlation between the socio-economical characteristics and the price risks, there has shown at the basis of the Pearson coefficient and the significance coefficient as important the positive correlation relation between the number of years in the position and the perception of the importance of the price risk (0.74). Many authors deal with the price risk management, offering a variety of tools, e.g. option strategies to risk management in order to point out the advantages and disadvantages of each hedging strategy (Rusnáková 2015).

The correlation 0.54 was found out between the size of land in hectares and the perception of the importance of the price risk. A similar higher correlation was found out also in the foreign study of Turkish farmers (Agir 2014). Other correlations were not important. The price risks were perceived as highly important also in many foreign researches. (Flaten et al. 2005; Akcaoz et al. 2009; Agir et al. 2014; Hayran and Gul 2015), while their conclusion is that the small enterprises are absolutely influenced by the price risk, because they are not able to gain the profit or the standards of the large enterprises. Small enterprises have higher unit costs of production than the large enterprises, they supply the market with a lower number of the goods, and they lack the opportunities for the processing and the power to finance the costs, they have a low or even negative negotiating power. It means that the small enterprises have a higher price risk (Agir et al. 2014).

The production or income risks are often connected with the weather, but also they include the risks like the diseases of the animals or crops. The income risk is measured by the variability of the incomes and it varies according to the single crops, depending on the climate, land and production method. In the case of the animal production, the income risk is lower for many producers, suggesting that the perception of this risk in the self-employed farmers, who are operating in the area of the crop production, is higher. Some researches confirm an even higher income risk in the smaller agricultural enterprises. A study realized on the farms in Germany confirmed

a higher risk compared to the Slovakian and Czech enterprises, what is explained by the fact that in Germany the average size of the enterprises is smaller and they are more diversified from the viewpoint of natural conditions regarding the size of Germany (Hambrusch and Tribl 2012). A positive correlation was found out also with the economic results, what is related with the above mentioned. Many foreign studies are dealing with this kind of risks, while their significance is perceived similarly high and it differs only slightly in dependence to the natural conditions (Hayran and Gul 2015).

Instability manifests itself also in the legal and legislative area by the often occurring changes of the laws, respectively directives, which influence the decision making of the management. The agro-managers have to solve the risks related with the increasingly changing competitive environment, with the unstable economic environment, the risks resulting from the sub-contracting relation and from the regulation of the agro-market. In agriculture, there are applied the minimum granted prices and also the contract prices at the basis of the agreement between the buyers and sellers, with the state as one of the partners. In this area, there are formed many risks, as the risk of the specification of the good prices, the risk of the extension of maturities, the risk of the reality of the contract relations with the processors. At this place, there are formed many issues, which deepen the difficult position of the farmers in the agro-food chain, while the contracts are mostly not performed unilaterally in the maturities. There are also situations, when the primary agricultural producer does not obtain the payment from the state. In the area of the institutionalized risks, there were demonstrated important positive correlations between them and the form of the business (0.93), economic results (0.86), and the years in the position (–0.86). From the viewpoint of the business forms, there were assessed these risk as highly important mostly by the self-employed farmers, and from the viewpoint of the number of years in the position, by the respondents with a lower level of seniority. We think that one of the reasons is the fact that regards a group with a smaller experience in this area. Institutional risks are in some foreign researches evaluated higher from the viewpoint of the perception of their importance (Sonkkila 2002; Flaten et al. 2005; Hayran and Gul 2015). It is especially the case in the countries of Northern Europe, which are significantly less exposed to the risk factors such as hail, stormy rain, droughts etc., which

are – in contrary – in the centre of attention in the countries of the Central Europe. Thus it is difficult to compare the approaches to risk management in different countries.

The financial risk is in the centre of attention in the sector of agriculture, mainly because the situation of financing the agricultural primary production is not improving. This area of risk includes above all the risk of unpaid supplies, the risk of unpaid state liabilities and the risk of the protracted debt collection. The risk of decisions on imposing sanctions, which lead to the risk of the cost increase, the risk of the unpaid wages of employees and the risk of decision making based on the shortage of financial resources can also be mentioned here. These may cause that the management of a company is eventually trapped in a “vicious circle”, when a significant number of top managers are forced to neglect their management activities and must manage not only the risk, but a pre-crisis or crisis situation of the company financing. The average value 3.03 of the assessment of the importance of this risk factor shows that not every company is in such a critical situation. Simultaneously, the correlations between the financial risk and the company form (0.62), as well as between the financial risk and the economic results of a company (0.66) are more significant than other correlations.

The human and personal risk factors are not assessed as very significant. The only interesting correlation was found between this type of the risk factors and the number of working years. The respondents with more years worked in the function view the human risk as more significant than the others. In this respect, many solutions are offered regarding the risk prevention in

agricultural enterprises in the management theory, for example the age management (Urbancová and Čermáková 2015), which has become very currently used in the view of the strengthening demographic trend of ageing of the population and which focuses on the management taking into account the age of the employees.

Approaches to risk management

Agricultural managers must take these risk factors into consideration and attempt to eliminate them by taking different precautions. We have examined what kind of approaches to the risk management can be found among the agricultural companies studied and what means of the risk mitigation are the most commonly used. Again, a 1 to 5 scale was chosen (1 – not important, 5 – very important) for the respondents to express the importance of different strategies with regard to their impact on the economic performance of companies. The results are shown in Table 3.

The strategies of risk sharing, such as the vertical integration, the conclusion of production contracts and insurance, as well as the strategies within the company, such as the choice of products with a low level of risk or with a short production cycle and diversification, are equally represented. From the respondents point of view, the most important strategies of risk management include the diversification with an average score 3.83, the conclusion of production contracts with 3.71, the vertical integration with 3.56 (however, with a high standard deviation), the choice of products with a low level of risk with 3.10 and insurance with 3.01.

Other risk strategies are viewed by the respondents as less important. These include the choice of products with a short production cycle (2.87), the change in the structure and in the orientation to animal and crops production (2.84), gaining support from the processors (2.46) and the change of technology (2.13).

Diversification is a significant method of the business risk mitigation which consists of spreading the risk to the widest base possible. The most common type of diversification is extending the production program, the services offered by the company, processing products and their direct sale. No significant correlations were found despite our assumption of a certain connection to the company size or company form. According to the researches carried out abroad (Špička 2006; Tóthová and Fiřa 2014), small companies are the most prone to diversification, however,

Table 3. Importance of risk management strategies in the studied companies of agricultural primary production

Risk management strategies	Mean	Std. Dev.
Diversification	3.83	0.64
Conclusion of production contracts	3.71	0.46
Vertical integration	3.56	1.68
Choice of products with a low level of risk	3.10	1.35
Insurance	3.01	0.77
Choice of products with a short production cycle	2.87	1.25
Change in structure, in orientation to AP, CP	2.84	0.98
Gaining support from processors	2.46	0.50
Change of technology	2.13	0.83

Source: own calculations

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within the sample of our study, this was not proven. A significant positive correlation was found between the economic results and diversification, which can be explained by the fact that the diversification activities require sufficient financial resources and cannot be carried out without them. Apart from this, the companies are also hesitant when it comes to diversification because a dominant risk factor to them is the price fluctuation risk which generally has a more systematic character and is difficult to diversify.

Different types of integration can be found in agriculture. On the one hand, the farmers organize their own processing capacities, which are meant to ensure the sale of their production and to improve their liquidity. On the other hand, especially during the past few years, more complex forms of the vertical integration have been emerging. In these cases, however, some of the participating companies may lose their economic or sometimes even legal independence. For this reason, we explain the obtained results of examining the importance of this risk management strategy, which can be considered significant (with a mean value 3.56), but with a very high standard deviation, which means a high dispersion of the obtained values. The reason could also be the unwillingness of many farmers to enter cooperative associations due to a weak bargaining power with the customers which results in the pressure to lower the prices.

The vertical integration has some other risks as well, which must be taken into consideration by the producers in the primary sector. These include the dispersion of sources, a decreased flexibility, rigidity etc.

The choice of products with a low level of risk is a classical method of the risk mitigation with the mean value 3.10.

Insurance is one of the few possible financial methods of the risk management or mitigation in agriculture. The principle of insurance lays in the transfer of risk to the insurer for a premium. The mean value (3.01) and its higher variability (0.77) testify that in the past few years, the insurance in agriculture has more and more often been a subject to discussion. Some companies resist insurance which does not have any effectiveness for them. This is also proven by the correlation coefficient which has showed significant in the case of the company size and the company form. Smaller companies in general face a higher income variability risk which they try to manage by the means of insurance. The significance and efficiency of insurance is lower in the case of bigger companies, especially agricultural corporations and

limited liability companies. For these companies, the insurance is more of a cost than a benefit. Our results are identical to those of the Polish study which has found that the insurance is the most commonly implemented strategy in small farms, also that the least preferred are strategies which require the cooperation with other market participants (farmers, clients and suppliers). Cooperation means an additional risk for them, thus its low popularity (Sulewski and Kloczko-Gajewska 2014).

CONCLUSION

The sector of agriculture can be characterized as being exposed to a high level of risk. It has always been this way, however, in the past several years, this risk has had a tendency to increase. The price risk grows mainly due to the liberalization of trade with agricultural commodities, the production risk due to the stricter rules of the use of inputs and medication for animals, as well as to the transfer of illnesses through the state borders. The level of production risk is also affected by climatic conditions. One of the current trends in agriculture is the growth of specialization which leads to the increase of both the production and price risk.

Risk management is in many agricultural companies seen as the problem of insurance and the state support grants, whether by the refunds of a part of the insurance premium or a part of damages of the catastrophic scale. Company managers see its solution in the reduction of the insurance premiums or the increase of the support grants. In order to eliminate risk factors uncontrollable by the farmers, the implementation of some systematic measures is essential in this field. These measures are, however, object to much discussion. The basic pillar of such a system will remain the insurance of agricultural activities along with the possible modifications of the extent of support of the insurance premiums in dependence to the budgetary framework. Along with the support of the insurance premiums, there will be of importance the direct ad hoc state supports of risk management in agriculture (the measures approved by the European Commission) and the indirect supports in the form of reliefs.

The management of the controllable risk factors requires a gradual improvement of the preventive components and the focus on the efficient risk management built on the analysis and assessment of risk.

In this study, we have presented the results of the research focusing on the identification of the most important sources of risk in the companies of agricultural production in Slovakia, as well as the most significant strategies of the risk management with regard to the perception of these variables by the managers of companies. Simultaneously, we have analysed the correlations between the listed variables and the socio-economic characteristics of the studied sample. The results of the research showed that farmers regard the price risk as the most significant risk factor and the diversification as the most important risk management strategy. The most significant positive correlations were found between the size of land in hectares and the assessment of the importance of the price risk which is also confirmed by numerous foreign researches, according to which the small companies are absolutely more affected by the price risk, not being able to reach the profit nor the standards of big companies. In the study, we have also found a positive correlation between the number of years spent in function and the assessment of the importance of price risk. When it comes to the production and yield risk, a significant positive correlation was found with the company form. This type of risk was assessed as the most important by the farmers doing business individually. A positive correlation was found with the company's economic results as well. In the field of the institutional risk, which has gained the third place in the terms of importance, significant positive correlations were found with the company form and economic results and a negative correlation with the number of years spent in function – presumably due to a lower experience in this field and a higher uncertainty in doing business. The human and personal risk was not viewed as very significant. The respondents with a higher number of years worked in the function assess the human risk as more significant than those who have a higher propensity to risk and who do not consider the human risk as very significant.

Among risk management strategies, the diversification was deemed the most important. In general, it may be stated that the diversification is suitable above all for the small family-owned farms, where there are multiple possibilities of diversification in the agro-tourism, a direct sale of own products and different additional activities. In our studied sample, this was not proven. A more suitable strategy for big agricultural companies is the specialization of the product portfolio to one or a few products.

Specialization may lead to the increased quality, the reduction of costs and eventually to the overall stabilization of the company. A significant positive correlation was found between economic results and the diversification, which can be explained by the fact that diversification activities require sufficient financial resources and they cannot be carried out without them. Apart from this, the companies are also hesitant when it comes to the diversification because a dominant risk factor to them is the price fluctuation risk which generally has a more systematic character and is difficult to diversify. Although the vertical integration has gained a higher mean value of importance, it has had a higher variability within the sample. The reluctance to this means of the risk management can be explained by the risk of losing the economic and partially even the legal independence of the company, the lowered bargaining power with customers, the dispersity of resources and the decreased flexibility. Insurance, as the often discussed means of the risk management and mitigation in agriculture, is widely implemented in smaller companies. For other companies, it is more of an inadequate cost than a benefit. The current insurance systems cover only a small part of the real risk factors in the sector and the entrepreneurs cannot see any significant effects of the coverage of the major risk factors. It is obvious that, similarly to other countries, the majority of insurance costs should be a part of a unified policy of supports. The entire field of the insurance of farming is an especially important segment of the company stabilization and will certainly grow in importance.

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