

## **Agricultural Risk Management in the European Union and in the USA**

Székely, Csaba  
Pálinkás, Péter<sup>1</sup>

### **Abstract**

Risk management has become increasingly important in virtually all aspects of the economy, including agriculture. Every country that considers agriculture a strategically important economic sector strives for effective risk management in agriculture. In our study American and European Union farmers' risk management practices were, based on various surveys, compared. In terms of agricultural risk management, major differences between the USA and the EU were evident, and these derive from different farming cultures, differences in historical evolution, and economic philosophy. This study provides an overview regarding the important similarities and dissimilarities.

### **Key words**

agriculture, risk management, risk perception, EU, USA, surveys.

### **Introduction**

Although a universal definition of risk applicable to all disciplines is highly desirable, many research areas have a different understanding of the concept of risk. This difference stems from the fact that each discipline designs and applies a definition of risk that best fits its conceptual needs. Sometimes definitions overlap or are the same in different areas, but unfortunately this is not always the case.

Even in an restricted area like economics, there are many different approaches toward defining the concept of risk (Aven, 2003; Frame, 2003; Williams et al., 1995). To solidify our discussion of risk and risk management, precise definitions for these terms are required. In this paper risk will be defined as the potential deviation between the expected and the real outcomes resulting from an economic decision where, from a practical point of view, a negative outcome has greater importance, and constitutes the one actually considered by most decision makers. This definition relies heavily on the findings of Gallati (2003), Lugosi (1986), Chikán (1998), Baki et al. (2004) and Buzás et al. (2000). While risk may offer a positive outcome, crisis always refers to a situation with serious adverse consequences threatening the existence of economic entities (European Commission, 2005). In the worst case, the aftermath of risk and crisis is bankruptcy, meaning that the given economic entity (e.g. agricultural holding) is unable to continue its operations due to heavy losses or other negative events. According to our understanding, risk management is the range of strategies and instruments applied to avoid or minimize losses and to utilize opportunities. This approach relies heavily on works by Hardaker et al. (1997) and Moschini and Hennessy (2001).

Although risk can ultimately be measured through losses or gains in income, from a risk management point of view grouping risks offers an effective approach toward identifying similar risks and thus allows one to apply more targeted risk management tools and strategies. In terms of agriculture, the major risks are a business risk (including production, market, personal and institutional risk) and a financial risk (issues related to financing business operations). This categorization derives from works by Boehlje and Trede (1977), Fleisher (1990), USDA (1997), Burgaz (2000) and Hardaker et al. (1997).

<sup>1</sup> Vállalatgazdasági és Szervezési Intézet, Gazdaság- és Társadalomtudományi Kar, Szent István Egyetem, 2103 Gödöllő, Páter Károly u. 1.; szekely@gtk.gau.hu, palinkas.peter@gtk.szie.hu

The growing importance of risk factors affecting agricultural production is accentuated both directly and indirectly by local, regional, and global economic and natural phenomena which can be traced back to previous decades. Agricultural producers' conventional approach is to restrict their risk management strategies to offset and alleviate problems caused by climatic and natural phenomena. However, such a practice has become obsolete and nowadays keeping abreast of professional, market, and agricultural policy developments is increasingly indispensable for successful farming.

Moreover, it is vital to determine how farmers perceive the importance of risk factors surrounding their activities as this strongly influences their risk management strategies. In this regard professional organizations and policy makers' responsibility is easily discernible because they often play an important role in the orientation and education of farmers, thus allowing farmers to properly judge the importance of risk factors so they may work out adequate risk management strategies.

Moreover, one should not underestimate the relationship in the approach taken by farmers, professional organizations and governments. Government bodies should constantly monitor and survey agricultural producers' risk management strategies and recognize their own influence on market players' applied strategies. Recognizing the best practices carried out by agricultural producers' could, for example, prove important in shaping government policies and channeling them into support schemes could better contribute to successful risk management by all producers and prompt laggards to adopt efficient practices. On the other hand, via their professional associations, producers and other market players should provide feedback regarding government policies in order to provide a viable basis for further development of regulations. Of course, much depends on governments' and producers' desire for mutual cooperation. If both sides indicate a desire to work together, their efforts could prove most fruitful.

The European Union has long been aware of the importance of risk in agriculture and has investigated creating an EU level risk management system. The "Design and economic impact of risk management tools for European agriculture" research project conducted under the aegis of the Sixth Framework Programme fits that objective. An important part of the project has been surveying farmers' from various Member States perceptions regarding risk (crisis) and risk (crisis) management. The process as well as some results are outlined in this paper<sup>2</sup>.

To obtain a broader view of this topic regarding differences between countries, US farmers' risk perceptions and management practices were analyzed, thus allowing an international comparison. The United States has been chosen for this study because the US governmental sector, farmers and academia also consider agricultural risk management as highly important. Although the current version of this paper is limited by a lack of detailed information on the most recent US situation, published results of previous American surveys can serve as a basis for such cross-Atlantic comparison.

The current study should be considered a preliminary effort at comparing various agricultural risk issues in terms of the two agricultural super powers rather than an exhaustive analysis, which will be a subject of further studies and analyses.

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<sup>2</sup> This paper expresses only the findings and opinion of the authors and not the views of the European Union.

## Materials and methods

Following negotiations among project participants, five EU Member States were selected and agricultural producers were surveyed about their perceptions regarding the issues under investigation. Due to practical considerations and the need to include new EU Member States in the research, the following countries were selected: Germany, Hungary, Poland, Spain and the Netherlands. These countries were the most obvious choices as the partners participating in the project reside in these countries, facilitating the survey of agricultural producers' perceptions.

The applied research methodology was a questionnaire survey. The questionnaire was translated into the 5 pertinent languages, and was thus designed to be completed in all of the selected countries. The authors of this study developed the questionnaire following a series of discussions amongst project participants, and attention was paid to the relevant literature (Malhotra, 1999; Lehtonen and Pahkinen, 2004; Chambers and Skinner, 2003; Agresti, 2002; EC – DG AGRI, 2001; EC, 2005; Hardaker, Huirne and Anderson, 1997; Anderson, Dillon and Hardaker, 1977; Williams, Smith and Young, 1995; Kapronczai et al., 2005). After six drafts and a pilot survey, the final version was drawn up, ensuring the document's viability in all the target countries. It was decided that 200 farmers/producers would complete the questionnaire in each of the selected countries. In the end, each country supplied at least 200 completed questionnaires, and in some cases even more (Hungary: 204; Poland: 206; the Netherlands: 236; Spain: 200; Germany: 201).

Following a sampling plan elaborated by the authors of this document and a detailed description for selecting the farmers, the respondents were chosen. Stratified sampling with proportional allocation was used as the sampling method for the questionnaire survey. Strata applied in the sampling plan for each country were economic size of the holdings and their type of agricultural activity; both category groups were based on European Commission FADN farm typology and the data source applied for the sampling was the 2003 Farm Structure Survey, which was available for all selected countries at the time of constructing the sampling plan. Preparing the sampling plan helped establish representative samples for all the five countries under investigation. (Lohr, 1999; ATTRA, 2005; EUROSTAT, 2003a, 2003b and 2005; KSH, 2004)

Selected project partners from each country included in the survey were responsible for carrying out the survey in their respective countries. In each country final versions of the questionnaire were translated by the local project partners. In Hungary and Poland the survey was arranged through the national FADN institutions, in Spain through a survey company specialized in agriculture, in the Netherlands through an agricultural insurance company, while in Germany through a network of professionals in contact with relevant farmers. After the completion of the questionnaires the results were recorded in a computer file that was prepared by the authors. After recording the data in the file, they were sent to the authors and the data have been processed using a statistical software package. The time necessary for completing the questionnaires varied from country to country, but the predefined number of completed questionnaires was received from all selected Member States.

This paper presents some of the findings of the data statistical analysis. Statistical analysis involved the exploration of overall difference among groups (primarily countries) followed by pairwise comparisons of groups to elucidate the differences in more detail, although the length of this paper does not allow us to show all the detailed results of the statistical analyses. In tables containing and comparing proportions of answers in countries, results are based on two-sided tests with significance level 0.05. For each significant pair, the key for the category with the smaller column proportion appears under the category with the larger column proportion. Tests are adjusted for all

pair-wise comparisons within a row of each innermost sub-table using the Bonferroni correction. A similar approach applies to the comparison of interval data where overall differences among groups were revealed by the Kruskal-Wallis test at a significance level of 0.05, followed by a series of post-hoc tests, using the Mann-Whitney test, exploring differences in pair-wise comparisons of groups (using Bonferroni correction). Tables representing these results express the differences so that the key for the category with the significantly smaller mean appears under the category with the larger column mean. Data labelled “Greater than” refer to these pair-wise comparisons in tables depicting interval data.

In Table 4 of this document the notation “Valid cases” refers to the number of respondents who completed the given multiple response question correctly while “n” in each column means the number of respondents within the valid cases who answered “yes” for the given option within the set of possible responses.

Information on the US agricultural risk management situation was adopted from diverse American publications focusing primarily on the most relevant and comprehensive research in the field, the annual Agricultural Resource Management Survey (ARMS) conducted by the United States Department of Agriculture (USDA). The ARMS covers several topics that were also dealt with in our EU 6<sup>th</sup> Framework Programme research project, so comparisons to a certain extent are possible. Although ARMS is done annually, those publications best suited for comparing the American and European situation were those that present relevant findings based on the 1996 ARMS survey. The difference in the time of the studies herein may call for caution but some aspects of the US situation covered here may not have changed so much during the past years that it would invalidate the comparisons presented here.

If US raw data were not available, detailed statistical analysis was not carried out, so the comparison of the US and European situations is based on already published American findings and the results of our own statistical analyses regarding European data.

It should be added that, from a methodological point of view, measuring risk is naturally not restricted to survey studies. The other major method of measuring risk is the statistical and economic analysis of data extracted from official statistical databases from professional organizations, government bodies, national and international statistical institutions which measure the factual situation and performance of economic sectors in one or more countries. Studies with different research methodologies are not mutually exclusive, and provide equally valuable input toward drawing conclusions.

## **Results**

### **Risk (crisis) perception and risk (crisis) experience**

Farming activity is influenced by a variety of factors prevalent in agriculture. Some factors may be either beneficial for farmers; for example, political measures may prove positive or detrimental. Farmers’ subjective judgments on these factors also determine the resources and effort devoted to offset risks. In our survey farmers were asked to subjectively rate some of these factors (Table 1). Factors could be rated from 1 (factor has no effect on farming) to 7 (factor has a major effect on farming).

Table 1

**Rating sources of risk**  
(country averages; 1-3: No effect, 3-5: Moderate, 5-7: Large effect)

	<b>Hungary (A)</b> <i>Mean Greater than</i>	<b>Poland (B)</b> <i>Mean Greater than</i>	<b>Netherlands (C)</b> <i>Mean Greater than</i>	<b>Spain (D)</b> <i>Mean Greater than</i>	<b>Germany (E)</b> <i>Mean Greater than</i>	<b>Overall means</b>
Weather and natural disasters	6.24 CDE	6.41 CDE	5.06 -	5.74 CE	5.41 -	5.77
Animal disease and epidemic	4.91 -	5.19 -	5.98 AB	3.36 -	3.35 E	4.56
Price volatility	5.68 CE	5.55 -	5.24 -	5.48 -	5.35 -	5.46
Marketing difficulties	5.06 BDE	4.05 -	4.69 BE	4.39 E	3.95 -	4.43
Input market	3.98 BCE	2.21 -	3.27 B	3.75 B	3.47 B	3.34
Debt	2.63 -	3.42 A	4.52 ABDE	2.97 -	3.04 A	3.32
Political measures	4.15 B	3.31 -	4.89 ABD	4.07 B	5.23 ABD	4.33
Technological processes	4.22 B	3.64 -	4.31 BD	3.62 -	4.02 B	3.96

Source: Authors' own calculations

Overall averages show that weather and natural disasters are considered as the factors with the largest effect followed by price volatility. In the case of weather and natural disasters, countries fall into three identifiable groups, based on the statistically significant difference of the average rating for this factor. Polish and Hungarian farmers gave the highest ratings to this factor showing that weather and natural disasters have large effects on farming. The Spanish average rating is somewhat lower but still viewed as having a major effect. The third group consists of Germany and the Netherlands where, according to farmers, this factor's is also considered significant, but not to the same extent. Such differences are most probably explained by the different or similar climatic features in the various countries. Of the five countries, Germany and the Netherlands have the most balanced climate so there farmers are less concerned with unforeseen weather situations while in the other three countries such events are more common and make it very hard for farmers to be prepared. That is why farmers in these three countries attach higher importance to weather and natural disasters.

Regarding price volatility, farmers in all selected countries feel that it has a large impact but Hungarian farmers consider price volatility more significant than Dutch and German respondents.

Animal disease and epidemics (in livestock production) are considered as having a significant impact in Poland and the Netherlands, while the same holds true for political measures in Germany, and for marketing difficulties in Hungary.

Table 2 shows the distribution of answers regarding the question previously examined in Table 1. The results confirm some of the previous statements; for example, Hungarian, Polish and Spanish farmers worry most about weather and natural disasters due to their countries' highly

changeable weather conditions. Moreover, it is apparent that animal disease and epidemics concern Dutch farmers the most, corresponding to livestock production's importance in the Netherlands' agricultural profile.

Table 2

**Distribution of ratings of risk factors in case risk factors in each country**  
(% of respondents)

	<b>Effect on farming</b>	<b>Hungary</b>	<b>Poland</b>	<b>Netherlands</b>	<b>Spain</b>	<b>Germany</b>
Weather and natural disasters	No	3.0%	2.0%	17.3%	10.3%	8.0%
	Moderate	16.7%	11.7%	35.1%	20.1%	39.8%
	Large	80.4%	86.4%	47.6%	69.5%	52.3%
Animal disease and epidemic	No	21.3%	16.3%	4.0%	57.8%	52.1%
	Moderate	35.9%	32.0%	24.5%	12.1%	23.7%
	Large	42.7%	51.7%	71.5%	30.1%	24.3%
Price volatility	No	4.5%	7.3%	11.9%	10.8%	2.0%
	Moderate	36.2%	36.9%	39.4%	29.7%	54.5%
	Large	59.4%	55.8%	48.6%	59.4%	43.5%
Marketing difficulties	No	12.9%	34.1%	23.7%	31.0%	39.8%
	Moderate	41.6%	37.8%	38.7%	33.7%	42.3%
	Large	45.6%	28.2%	37.7%	35.4%	18.0%
Input market	No	26.8%	74.1%	57.1%	48.6%	52.9%
	Moderate	60.6%	23.1%	29.8%	19.0%	34.6%
	Large	12.7%	3.0%	13.2%	32.4%	12.7%
Debt	No	69.6%	42.4%	20.0%	63.7%	60.5%
	Moderate	16.2%	45.2%	45.2%	17.9%	26.5%
	Large	14.0%	12.2%	34.7%	18.4%	13.0%
Political measures	No	35.4%	50.1%	14.1%	41.6%	10.5%
	Moderate	42.0%	40.3%	45.5%	26.2%	43.8%
	Large	22.5%	9.7%	40.3%	32.3%	45.8%
Technological processes	No	23.2%	37.5%	25.2%	50.3%	29.9%
	Moderate	60.6%	46.0%	52.0%	22.4%	61.5%
	Large	16.2%	16.5%	22.8%	27.4%	8.6%

Source: Authors' own calculations

Several surveys were also conducted in the United States regarding farmers' perception for different risk factors in the last two decades. The major surveys' findings are well summarized by Harwood et al. (1999). These studies encompassed diverse geographical ranges and groups of farmers when investigating which factors farmers perceived the riskiest or the most significant in terms of affecting their farming activities.

The 1996 Agricultural Resource Management Survey (ARMS) asked farmers to what extent they were concerned about certain factors influencing their farming operations. Farmers had to rate different factors on a four point scale where the value 1 meant the farmer was “not concerned” regarding the given factor and value 4 expressed that the farmer was “very concerned” about the given factor. Table 3 depicts the results based on the answers of farmers expressing the aggregate opinion of all US farmers.

Table 3

**Rating sources of risk among American farmers**

	<b>Farms in the USA (mean scores*)</b>
Decrease in crop yields or livestock production	2.95
Uncertainty in commodity prices	2.91
Ability to adopt new technology	2.23
Lawsuits	2.26
Changes in consumer preference	2.47
Changes in government laws and regulations	3.02

\*1-Not concerned, 2-Slightly concerned, 3-Somewhat concerned, 4-Very concerned

Source: Perry, J. (ed.) (1997): Adaptive Management Decisions – Responding to the Risks of Farming. In Harwood et al. (1999): Managing Risk in Farming: Concepts, Research, and Analysis

When comparing European and US results, it is apparent that some factors were examined in both surveys. In the 1996 ARMS survey “changes in government laws and regulations” ranked as the major influential factor out of the six in question. According to American farmers, the second most important factor was the “decrease in crop yields or livestock production” and the third highest ranking option was “uncertainty regarding commodity prices”. In our European survey the highest ranking factor was “weather and natural disasters”, the second was “price volatility” and the third was “animal disease and epidemic” (in livestock production).

It is very difficult to compare the American and European results. Even when putting aside the time gap between the two surveys it remains that the rated factors were not the same and an exact match of the sets of questions could render different results. For example, “weather and natural disasters” was not included in the US set of options while it was found to be the most important factor according to European farmers.

On the other hand, it is still feasible to draw some comparisons. If we consider the European questionnaire’s “weather and natural disasters” and “animal disease and epidemic” as primary factors resulting in the American questionnaire’s “decrease in crop yields or livestock production,” then we can see that the decline in yields and production resulting from adverse weather and/or animal disease was the major risk in European agriculture while US farmers rated it second. In the USA and the EU uncertainty surrounding prices or in other words price volatility was ranked very high, just after drop in production showing that price or market risk is of great concern in both locations.

The most surprising finding is that the effect political measures have on farming, manifested by changes in laws and regulations, got the highest rating from US farmers while it was viewed as much less important relative to other factors in Europe. However, we can see that in both surveys farmers assigned more or less the same importance to this factor. In the USA farmers described themselves as being somewhat concerned about this issue while in Europe farmers evaluated it as

only having moderate effect on farming. From the relative ranking of factors in the two surveys, it can be concluded that American farmers considered changes in agricultural policies as more important than farmers in Europe.

During the 1990s, several other studies were carried out in the USA illustrating farmers' risk perception but mostly focusing on different regions and/or different farming activities. The summarizes these findings (Table 4).

Table 4

#### Studies on most important sources of risk according to questioned US farmers

Authors of study	Time of survey	First 3 highest ranking risk sources	Types of farms surveyed	Surveyed area
Patrick & Musser	1993	1. Injury, illness, or death of operator. 2. Crop price variability. 3. Crop yield variability and changes in environmental regulations.	Grain and livestock farms and ranches.	Corn Belt states
Blank, Carter & McDonald	1992-1993	1. Output price volatility. 2. Input costs. 3. n.a.	Diverse crop producing farms.	California
Jose & Valluru	Mid-1990s	1. Output price fluctuations. 2. Input price fluctuations. 3. Drought.	Crop producing farms.	Midwest and Great Plains

Source: Harwood et al. (1999): *Managing Risk in Farming: Concepts, Research, and Analysis*

From the above table it can be seen that in general terms output price volatility proved to be of great concern to US farmers as with European producers which was explained earlier.

#### Risk management strategies

Besides knowing farmers' subjective perceptions on the effect of given factors and experiences related to risk or even crisis, it is highly relevant to identify specific risk reduction methods applied by farmers. In Germany and Spain crop insurance is used by 60 to 70% of farmers, which is more than in the other countries. Livestock insurance is significantly higher in the old Member States (around 40%) than in the newer Member States. Marketing contracts are important in the new Member States and Germany. German farmers are more inclined toward off-farm investments (49.8%) and off-farm employment (36.8%) than those in the other countries. Property insurance is very important in Poland (67.5%), Germany (75.1%) and the Netherlands (66.8%). Avoiding debt (maintaining a conservative debt ratio) is equally important in all countries (around 40%) while holding financial reserves is quite important in Hungary (40.5%), Poland (51.5%) and Germany (61.2%) unlike in the Netherlands (22.6%) and Spain (22.5%). When one examines individual countries, the situation is as follows. For Hungarian and Polish farmers property insurance was the most common instrument (41.5% and 67.5%) followed by financial reserves (40.5% and 51.5%). In Holland avoiding debt is a popular tool (38.1%). In Spain crop insurance was the main risk management instrument (59.2%) but took second place in Germany (68.7%) preceded by property insurance. In Spain, at 36.6% each, livestock insurance and avoiding the use of credit held second place (Table 5).



Table 5

**Current use of risk management instruments**  
(Number and % of respondents using the instrument)

<b>Valid cases</b> HU – 195 PL – 206 NL – 226 SP – 191 GER – 201	<b>Hungary (A)</b>  <i>% of cases Greater than</i>	<b>Poland (B)</b>  <i>% of cases Greater than</i>	<b>Netherlands (C)</b>  <i>% of cases Greater than</i>	<b>Spain (D)</b>  <i>% of cases Greater than</i>	<b>Germany (E)</b>  <i>% of cases Greater than</i>	<b>Average percent of farmers using the given tool</b>
Crop insurance	21.5% -	14.1% -	30.5% B	59.2% ABC	68.7% ABC	38.8%
Livestock insurance	4.1% -	6.8% -	37.2% AB	36.6% AB	42.8% AB	25.5%
Diversification	23.1% C	33.5% CD	11.5% -	18.8% -	28.4% C	23.1%
Marketing contracts	38.5% CD	35.4% CD	18.6% -	12.6% -	49.3% BCD	30.9%
Production contracts	15.9% D	16.0% D	20.8% D	5.8% -	16.4% D	15.0%
Off-farm investment	4.1% -	1.9% -	6.2% -	5.8% -	49.8% ABCD	13.6%
Off-farm employment	19.0% D	20.4% D	17.7% D	4.7% -	36.8% ABCD	19.7%
Property insurance	41.5% -	67.5% AD	66.8% AD	29.8% -	75.1% AD	56.1%
Vertical integration	3.6% -	5.8% -	4.4% -	12.6% AC	7.0% -	33.4%
Avoiding credit	37.9% -	40.3% -	38.1% -	36.6% -	31.3% -	36.8%
Hedging	1.5% -	2.9% -	1.3% -	1.0% -	5.0% -	2.3%
Holding financial reserves	40.5% CD	51.5% CD	22.6% -	22.5% -	61.2% ACD	39.7%

Source: Authors' own calculations

For applied risk management strategies, among US farmers the majority of studies concentrate not on the overall composition of farmers' risk management portfolios but rather on the use of specified risk management instruments, and thus compiling a table similar to Table 4 was not possible for all US farmers. In our research two surveys were identified as comprehensive for a applied set of risk management tools regarding US agriculture. The first one, dating back to 1993 (Patrick and Musser, 1997), investigated the trend toward diverse agricultural risk management instruments among large-scale farmers operating in the Corn Belt states. Table 6 indicates the findings.

Table 6

**Risk management tools used by large scale Corn Belt farmers in the early 1990s**

<b>Risk management tool or strategy</b>	<b>% of respondents using the given strategy</b>
Options	37%
Hedging	60%
Minimum price contracts	21%
Forward contracting	73%
Multiple Peril Crop Insurance	35%
Back-up management/labor	43%
Enterprise diversification	46%
Geographic dispersion	43%
Government program participation	73%
Hail/fire insurance for crops	49%
Off-farm employment	17%
Off-farm investment	43%
Liability insurance	73%
Financial/credit reserves	59%
Debt/leverage management	56%

Source: Patrick, G. F. and Musser, W. N. (1997): Sources and Responses to Risk: Factor Analyses of Large-Scale US Corn-belt Farmers. In OECD (2000): Income risk management in agriculture.

Table 6 shows that the most widely used risk management tools or strategies by large-scale Corn Belt farmers were forward contracting, government program participation, and liability insurance, all three ranking first then came hedging and after financial/credit reserves. These results clearly differ from the ones observed in our European study primarily due to the contents of the sample and the questionnaire.

In 1997, Farm Futures magazine conducted a survey that examined a large range of risk management instruments among US farmers, but the sample was far from representative as respondents were mostly large-scale farmers, 75% of them from the Corn Belt states. Table 7 illustrates the use of risk management strategies or tools derived from this survey.

Table 7 shows that large-scale farmers mainly from the Corn Belt relied heavily on government farm programs, diversification both in products and in time, and on forward contracting. These instruments are also very important in the European Union where EU level and national subsidies are significant sources of income for farmers while diversification and forward contracting are also widely used strategies and tools.

Table 7

**Use of risk management instruments by respondents to Farm Futures magazine**

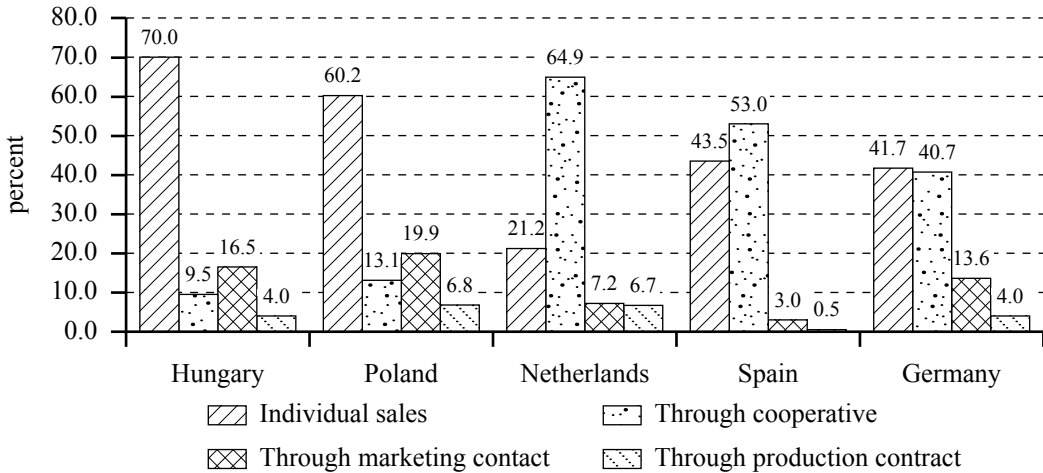
<b>Risk management tool or strategy</b>	<b>% of respondents using the given strategy</b>
Used government farm program	69%
Diversified operation by raising crops and livestock	39%
Planted seed varieties with different maturity dates	39%
Contracted inputs to lock in a good price	35%
Bought crop insurance	30%
Used crop-share land rents	25%
Kept a credit line open to take advantage of attractive input prices	20%
Used multiyear leases	16%
Irrigated	13%
Shared expenses with landlord	10%
Refinanced loans to take advantage of lower interest rates	8%
Hired custom operator to reduce machinery expenses	6%
Hired custom operator to improve timeliness of crop operations	6%
Diversified by growing crops not normally grown in the area	3%
Leased equipment rather than bought	3%
Rented equipment rather than bought	2%

Source: Farm Futures magazine survey (1997) In OECD (2000): Income risk management in agriculture.

**Marketing channels applied by farmers**

Selling agricultural products through contracts or cooperatives is less risky due to provisional factors and conditions. Selling the products individually is probably the most risky way of marketing the products, especially when there is increased competition and the farmer lacks bargaining power. The majority of Dutch (64.9%) and Spanish (53%) farmers stated they sell their products through cooperatives, although individual sales in Spain (43.5%) are also important, as is also the case in Germany where 41.7% of the respondents stated that their primary marketing channel is individual sales. On the other hand, 40.7% of German respondents sell the majority of their products through cooperatives (Figure 1). In Hungary and Poland, which are both new EU Member States, individual sales are still the most important marketing channel with 70% and 60% of respondents applying it respectively. In this regard, there was no statistically significant difference detected between Poland and Hungary. As for selling through cooperates, the same applies to the Netherlands, Spain and Germany group regarding, with the exception for the Netherlands/Germany comparison as in the Netherlands a significantly higher proportion of farmers sell their products through cooperatives than in Germany.

**How do farmers sell the majority of their products?**



**Figure 1: Marketing channels applied by farmers**

Source: Authors' own calculations

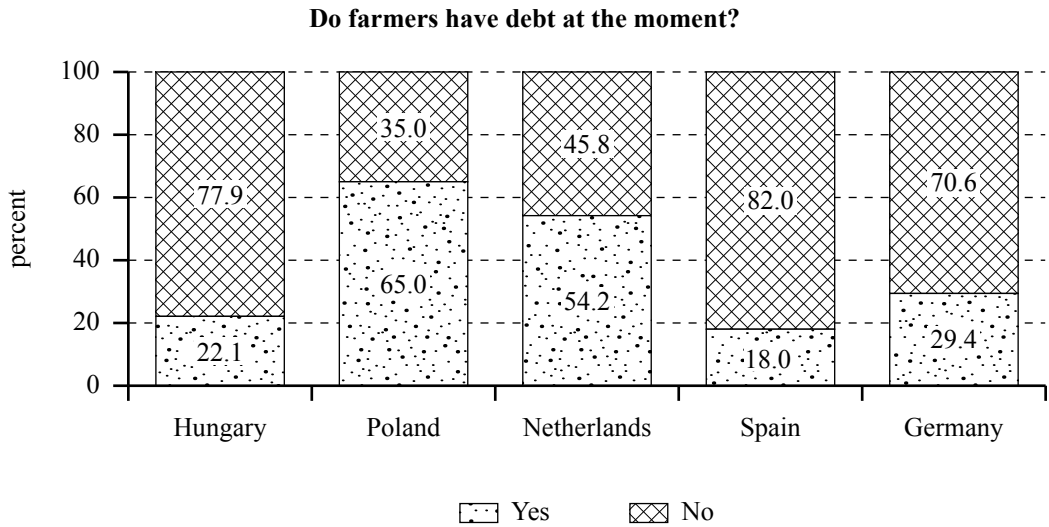
According to Key and MacDonald (2006) only around 10% of all US farms used contracts (production or marketing) in 2003 which is a trend that has not changed much since the early 1990s. They indicate that larger farms tend to use contracting while smaller farms still rely mainly on cash markets. They found that only 6% of small farms (sales under 250,000 USD) used contracting in 2003 to offset price risk while more than 60% of very large farms (at least 500,000 USD in sales) took advantage of this opportunity. In Europe, however, contracting tends to be more popular (marketing and production combined) with the exception of Spain where contracting has only a marginal role.

Key and MacDonald also describe the advantages of forward contracting which also ameliorates farm operations. They argue that by reducing price risks, production and marketing contracts enable farmers to obtain credit more easily and thus expand their farming operations. Banks also prefer contracting producers to independent ones even when producers are on the same footing financially. As a result, greater financial resources allow contracting producers to increase or expand production while independent producers have to meet their goals without this advantage. However, contracting impedes producers from reacting to sudden changes, both negative and positive, which affect farming.

**Financial aspects of farming**

Bank loans may greatly help farmers but may also burden them. Debt entails legal and financial obligations that curtail a farmer's power to make decisions and also entails additional risks because the debt has to be repaid within a certain period and thus diverts financial resources from farming activity. Using bank debt to finance operations is widespread in Poland and the Netherlands, where 54-65% of farmers have bank debt and there is no statistically significant difference between the two countries. However, the Dutch project partners felt that the Dutch data (54.2%) are not valid because in their view it is really around 90%. The reason for this discrepancy was not revealed in our study. Germany, Poland and Hungary represent one group of countries as there was no statistically

significant difference found between them. The share of farmers with bank debt in these countries is currently between 18% and 30% (Figure 2).



**Figure 2: Existence of debt towards bank(s) at the time of completing the questionnaire**

Source: Authors' own calculations

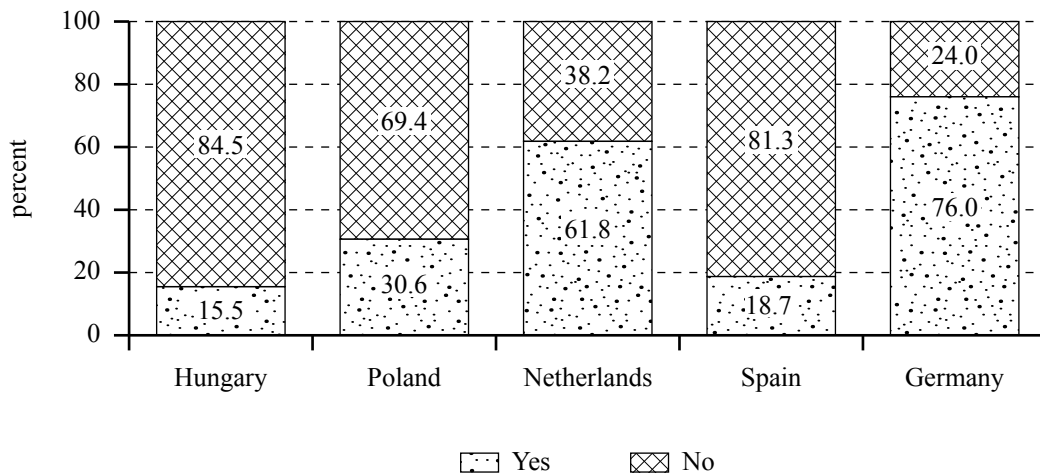
The US situation regarding the use of debt by farms was quite similar to the results shown in the above figure, and this especially held true for Germany, Hungary, and Spain as the majority (64.6%) of US farms did not have any debt in 2006 (Covey et al., 2008). The overall trend shows that the proportion of debt free US farms has risen from 57.4% in 2000 to 64.6% in 2006.

**Human resources risk**

Up-to-date knowledge is provided at professional educational courses and constitutes a viable method for obtaining valuable and directly applicable information. In Germany the vast majority – 76% of farmers – have recently attended such a course and it is 61.8% in the Netherlands. The situation is different in the other three EU countries where only less than 30% of farmers attend such courses with no statistically sound difference detected (Figure 3).

As for US farmers' participation in agriculture related educational programs, a survey was carried out in 1999 in Indiana, Mississippi, Nebraska and Texas with more than 1,800 crop farmers as respondents. The survey researched the participation of farmers in three different types of educational programs whose topics were as follows: using alternative pricing mechanisms (such as forward contracting, futures and options) to market agricultural commodities; use of alternative crop yield or revenue insurance programs; alternative aspects of agricultural and financial risk management. Table 8 shows the results of the survey in and rows represent the topics of the educational programs while columns show the US state to which the result corresponds.

**Do farmers participate in any professional educational program related to farming recently?**



**Figure 3: Recent participation in any farming related professional educational program**

Source: Authors' own calculations

Table 8 illustrates that the American farmers interviewed above all seek knowledge on alternative pricing mechanisms compared to other topics. The results also show that on average around 40% of both EU and American farmers attended such courses at the time the surveys were conducted. When compared to our European survey, one observes that the American situation does not match any of the EU countries surveyed. These differences may be due to a number of reasons; for example, the different geographical areas and composition of samples rather than only due to the time the survey was completed.

Table 8

**Percent of respondents participating in educational programs**

	Indiana	Mississippi	Nebraska	Texas	Average
Alternative pricing mechanisms	38.8%	37.4%	49.3%	46.0%	42.9%
Alternative crop yield or revenue insurance	28.3%	23.9%	37.6%	32.1%	30.5%
Agricultural and financial risk management	26.9%	23.0%	26.4%	34.3%	27.7%

Source: Coble et al. (1999): Crop Producer Risk Management Survey: A Preliminary Summary of Selected Data. Mississippi State University.

## **Conclusions**

In this paper we endeavoured to compare the US agricultural risk management profile and practices with the European Union, in the latter case using selected Member States.

Great differences between the USA and the EU were evident in terms of agricultural risk management. These differences derive from the different farming cultures, differences in historical evolution, and economic philosophy. Beside these differences it has to be clearly stated that the European Union cannot to be treated yet as a uniform economic formation due to the great differences in the new Member States' economic situation and farming culture. Moreover, the range of institutional instruments in risk management is greater in the USA than in the European Union as the USA has been designing and applying agricultural risk management policies for a much longer period than the EU.

One of the most important findings of this study is that American farmers considered changes in agricultural politics as being more important than their EU counterparts, although price variability is a major factor for both American and European farmers. Our study also revealed that hedging is far more popular among US farmers than with European ones. However, after viewing both the US and European situation we can conclude that participation in government programs and engaging in diversification are important risk management strategies both in the USA and in the EU. Finally, another significant finding is related to farmers' financial practices. Our study indicates that the majority of both US and European agricultural producers avoid using debt for financing their operations and try to use other solutions like having cash reserves to solve financial challenges.

As a final conclusion it can be stated that the European Union should form a agricultural risk management strategy with uniform guidelines which still take into consideration the individual characteristics and needs of Member States. To this end the US experience can only serve as comparative analysis because differences between the USA and the EU do not allow European decision makers to exactly apply US solutions in the EU.

## References

1. **Agresti, A.** (2002): *Categorical Data Analysis*. USA: John Wiley & Sons. 734 p.
2. **Anderson, J. R.; Dillon, J. L. and Hardaker, J. B.** (1977): *Agricultural Decision Analysis*. USA: Iowa State University Press. 344 p.
3. **ATTRA / National Sustainable Agriculture Information Service** (2005): *Risk Management Survey*. USA: USDA. 9 p.  
Accessible at: [http://www.attra.org/risk\\_management/Survey/rmsurveyeng.doc](http://www.attra.org/risk_management/Survey/rmsurveyeng.doc)
4. **Aven, T.** (2003): *Foundations of risk analysis – A knowledge and decision-oriented perspective*. UK: Wiley. 190 p.
5. **Baki, L.; Rajczy, P. and Temesvári, M.** (2004): *A működési kockázatok mérése és kezelése a Magyar Nemzeti Bankban. MNB műhelytanulmányok 32*. Hungary: Magyar Nemzeti Bank. 32 p.  
Accessible at: <http://www.mnb.hu/Resource.aspx?ResourceID=mnbfile&resourcename=mt32>
6. **Boehlje, M. D. and Trede, L. D.** (1977): *Risk management in agriculture*. *Journal of the American Society of Farm Managers and Rural Appraisers*, 41.1. pp. 20-29.
7. **Burgaz, F.** (2000): *Insurance systems and risk management in Spain*. p. In: OECD (2000): *Income risk management in agriculture*. France: OECD, pp. 107-113.
8. **Buzás, Gy.; Nemssályi, Zs. and Székely, Cs.** (ed.) (2000): *Mezőgazdasági üzemtan I: A mezőgazdasági vállalatok gazdaságtana és irányítása*. Hungary: Mezőgazdasági Szaktudás Kiadó. 462 p.
9. **Chambers, R. L. and Skinner, C. J.** (ed.) (2003): *Analysis of Survey Data*. UK: John Wiley & Sons. 398 p.
10. **Chikán A.** (1998): *Vállalatgazdaságtan*. Hungary: Aula Kiadó. 453 p.
11. **Coble, K.H.; Patrick, G. F.; Knight, T. O. and Baquet, A. E.** (1999): *Crop Producer Risk Management Survey: A Preliminary Summary of Selected Data*. USA: Mississippi State University. 24 p.
12. **Covey, T.; Ahearn, M.; Johnson, J.; Morehart, M.; Strickland, R.; Vogel, S.; Traub, L.; Brown, D.; McGath, C.; Williams, B.; Stenberg, P.; Green, R.; Erickson, K. and Harris, M.** (2008): *Agricultural Income and Finance Outlook*. USA: USDA. 74 p.
13. **European Commission – DG AGRI** (2001): *Risk management tools for EU agriculture with a special focus on insurance*. (Working Document) Belgium: European Commission. 84 p.
14. **European Commission** (2005): *Communication from the Commission to the Council on risk and crisis management in agriculture*. COM (2005) 74. Belgium: European Commission. 8 p.
15. **EUROSTAT** (2003a): *Structure and Typology of Agricultural Holdings*. Working document. Luxembourg: EUROSTAT.
16. **EUROSTAT** (2003b): *Farm Structure Survey 2003*. <http://epp.eurostat.ec.europa.eu>
17. **EUROSTAT** (2005): *F.A.D.N.* [http://ec.europa.eu/agriculture/rica/index\\_en.cfm](http://ec.europa.eu/agriculture/rica/index_en.cfm)
18. **Fleisher, B.** (1990): *Agricultural risk management*. USA: Lynne Rienner Publishers. 149 p.



19. **Frame, J. D.** (2003): *Managing risk in organizations – A guide for managers*. USA: Jossey Bass. 287 p.
20. **Gallati, R.** (2003): *Risk management and capital adequacy*. USA: McGraw-Hill. 577 p.
21. **Hardaker, J. B.; Huirne, R. B. M. and Anderson, J. R.** (1997): *Coping with Risk in Agriculture*. UK: CAB International. 274 p.
22. **Harwood, J.; Heifner, R.; Coble, K.; Perry, J. and Somwaru, A.** (1999): *Managing Risk in Farming: Concepts, Research, and Analysis*. USA: USDA. 125 p.
23. **Kapronczai, I.** (ed.) (2005): *A mezőgazdasági termelők alkalmazkodóképességének jellemzői*. Hungary: Agricultural Economics Research Institute. 207 p.
24. **Key, N. and MacDonald, J.** (2006): *Agricultural Contracting – Trading Autonomy for Risk Reduction*. Amber Waves. 4.1. pp. 26-31.
25. **KSH /Hungarian Central Statistical Office/** (2004): *Agriculture in Hungary – Farm Typology, 2000, 2003*. Hungary: KSH. 51 p.
26. **Lehtonen, R. and Pahkinen, E.** (2004): *Practical Methods for Design and Analysis of Complex Surveys*. UK: John Wiley & Sons. 360 p.
27. **Lohr, S. A.** (1999): *Sampling: Design and Analysis*. USA: Duxbury Press. 450 p.
28. **Lugosi, E.** (1986): *Fejlesztési tevékenységek kockázatszámítása*. Doktori disszertáció. Hungary: Budapesti Közgazdaságtudományi Egyetem. 106 p.
29. **Malhotra, N. K.** (1999): *Marketing Research: An Applied Orientation*. USA: Thomson Brooks/Cole. 857 p.
30. **Moschini, G. and Hennessy, D.A.** (2001): *Uncertainty, risk aversion, and risk management for agricultural producers*. In Gardner, B.L. – Rausser, G.C. (ed.): *Handbook of Agricultural Economics*. Volume 1A: *Agricultural Production*. Handbooks in Economics 18. The Netherlands: Elsevier Science, pp. 87-144.
31. **Patrick, G. F. and Musser, W. N.** (1997): *Sources and Responses to Risk: Factor Analyses of Large-Scale US Cornbelt Farmers*. In OECD (2000): *Income risk management in agriculture*. France: OECD, p. 51.
32. **Perry, J.** (editor) (1997): *Adaptive Management Decisions – Responding to the Risks of Farming*. In Harwood et al. (1999): *Managing Risk in Farming: Concepts, Research, and Analysis*. USA: USDA, p. 5.
33. **USDA – US Department of Agriculture** (1997): *Introduction to risk management – Understanding agricultural risks: production, marketing, financial, legal and human resources*. USA: USDA. 19 p. Accessible at: <http://www.rma.usda.gov/pubs/1997/riskmgmt.pdf>
34. **Williams, C. A.; Smith, M. L. and Young, P. C.** (1995): *Risk Management and Insurance*. USA: McGraw-Hill. 680 p.