

Evolution of the Concept „Risk” in Agriculture. From Theory to the Implementation of Risk Management in Agricultural Businesses

Mirela-Georgiana Matei (Oprea)*, Elena-Roxana Şuhani (Toader)**,
Dorina Nicoleta Mocuţa***

ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received: January 09, 2026 Accepted: February 13, 2026 Published: March 15, 2026</p> <p><i>JEL Classification :</i> Q12, D81, Q14</p> <p><i>Keywords:</i> risk, risk management, agriculture, climate change, agricultural insurance, scientific management</p>	<p>Risk management is essential for ensuring the stability and sustainability of both agricultural enterprises and economic agents as a whole. The paper analyzes the evolution of the concept of risk in agriculture, highlighting the transition from a reactive to a proactive approach based on identification, assessment and control. The main risk management strategies are also presented, including the use of agricultural insurance instruments. The study is based on a review of the specialized literature and relevant research, emphasizing the importance of adopting effective practices to protect agricultural enterprises, but also for creating training programs for farmers so that they can move towards a digitalized agriculture that aims to ensure both socio-economic stability and the food needs of the global population.</p> <p>Journal of Agriculture and Rural Development Studies (JARDS) © 2025 is licensed under CC BY 4.0.</p>

1. Introduction

The agricultural sector is widely recognized as one of the sectors most exposed to risks globally, as it is influenced by external factors that frequently generate uncertainty in both economic and social systems. By external factors we refer to climate change, market fluctuations, technological developments and legislative regulations that have had and continue to have a significant importance on the activity of farmers and the agricultural supply chain. Thus, over time, risk management has become increasingly essential for this sector that faces continuous and increasingly greater risks and more difficult to control, especially in terms of maintaining the sustainability and profitability of agricultural businesses globally. The concept of risk has evolved over time, initially being approached from a legal perspective and later integrated into modern economic and managerial models. Today, risk management is no longer just a reaction to unwanted events, but a proactive process of identifying, evaluating and controlling risk factors.

The purpose of this article is to analyse the evolution of the concept of risk in agriculture, to identify the main risk management strategies used in this sector and to explore the types of insurance available to protect agricultural businesses. The paper is based on a review of the specialized literature and on relevant case studies that demonstrate the applicability of the theory in agricultural practice.

*, **, *** University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania. E-mail addresses: mirelaamatei@gmail.com (M. G. Matei), suhanielena@yahoo.com (E. R. Suhani), dorinamocuta@yahoo.com (Corresponding author - D. N. Mocuţa).

2. Literature review

From an etymological perspective, the concept of risk has multiple linguistic origins, reflecting its complex and contested nature. Previous studies indicate that the term derives from the Latin *ressecum*, referring to the act of cutting or exposing oneself to danger, as well as from the Romanian word *rixicare*, associated with argumentation and dispute (Liuzzo et al., 2014). From a legal standpoint, risk has been classified into different categories, including safe risk, acceptable risk, and uncertain risk, depending on the level of scientific validation and predictability associated with potential outcomes.

At the institutional level, one of the most widely used definitions of risk is provided within the European regulatory framework, which distinguishes between food-related risk and animal health risk. Food-related risk refers to the probability and severity of adverse health effects, while animal health risk emphasizes the likelihood and significance of potential consequences (Codex Alimentarius Commission [CAC], 2007; European Commission, 2002). This distinction highlights the multidimensional character of risk and its relevance across different policy and regulatory contexts.

Beyond legal and regulatory interpretations, risk has also been approached as a central analytical concept in social sciences. Boudia and Jas (2007) argue that risk has long served as a focal point for research in disciplines such as politics, sociology, and economics, emphasizing its role as a defining feature of contemporary societies. Their perspective underscores the importance of risk as both an analytical tool and a social construct.

In economic and business contexts, risk generally refers to an organization's exposure to factors that may affect its performance or threaten its continuity. Business risks are commonly associated with strategic decision-making, compliance requirements, operational processes, and reputational considerations. These risks are influenced by a wide range of factors, including market demand, cost structures, competitive dynamics, macroeconomic conditions, and regulatory environments. More broadly, risk is often linked to uncertainty regarding future outcomes, particularly in financial and investment management, where it is frequently expressed as variability around an expected value or as potential expected losses (Harrington & Niehaus, 2003).

The concept of management, in turn, has evolved alongside economic and organizational development. Management is generally understood as a process through which resources and activities are planned, organized, and coordinated to achieve predefined objectives efficiently and effectively. Efficiency refers to achieving objectives with minimal resource consumption, while effectiveness concerns the extent to which desired outcomes are attained within a given timeframe.

The historical evolution of management thought has been extensively analysed in the literature. Okolie and Oyise (2021) highlight that, while certain managerial practices can be traced back to early civilizations, the Industrial Revolution marked a decisive turning point in the formal development of management as a distinct discipline. During the classical period, several foundational approaches emerged, including systematic management, the human relations approach, and bureaucratic management, each contributing to the structure of modern organizations.

Within this context, Frederick W. Taylor's principles of scientific management represent a seminal contribution to management theory. Taylor (1911) advocated for a systematic and scientific analysis of

work processes, replacing traditional rules of thumb with standardized methods based on observation and measurement. His approach emphasized the scientific selection and training of workers, close cooperation between management and employees, and a clear division of responsibilities between planning and execution. These principles laid the groundwork for efficiency-oriented management practices that continue to influence contemporary organizational models.

Building on these early contributions, administrative management shifted the analytical focus from individual tasks to the broader functions of management at the organizational level. Henri Fayol's work provided a comprehensive framework by identifying five core managerial functions—planning, organizing, commanding, coordinating, and controlling—along with a set of general principles intended to guide managerial practice (Fayol, 1916). This perspective reinforced the view of management as a profession that can be systematically taught and learned.

The emergence of risk management as a distinct field of study occurred in the period following World War II, with its modern origins commonly dated between 1955 and 1964 (Crockford, 1982; Williams & Heins, 1964). Early academic contributions focused primarily on pure risk and insurance-based approaches, with limited attention to corporate financial risk (Mehr & Hedges, 1963; Williams & Heins, 1964). In parallel, engineering disciplines developed models for managing technological risks, while operational and political risks gained increasing importance, particularly within regulated sectors such as banking and insurance.

Conceptual developments in risk management have also reflected broader changes in how uncertainty is understood and addressed. Bernstein (1996) emphasizes that the notion of risk management presupposes a belief in human agency and control over outcomes. Similarly, Kloman et al. (2011) point to the growing reliance on quantitative analysis and probabilistic reasoning as a defining feature of modern approaches to risk.

Contemporary definitions of risk management extend beyond loss prevention to encompass both threats and opportunities. Kumar (2018) defines risk management as a process that supports organizations in identifying, understanding, and managing risks and opportunities to reduce uncertainty and enhance the achievement of objectives. From this broader perspective, risk management involves maximizing areas of control while limiting exposure to uncontrollable uncertainties (Bernstein, 1996).

Earlier conceptualizations emphasized loss prevention as the core objective of risk management. Crockford (1982), drawing on McCahill's definition, described risk management primarily as a set of activities aimed at preventing accidental losses, while also noting that the traditional distinction between pure and speculative risk may have limited relevance in practice. A similar view is reflected in the definition proposed by Bannister and Bawcutt (1981) who conceptualize risk management as the identification, measurement, and economic control of risks that threaten an organization's assets and earnings.

The evolution of risk management theory reflects a gradual shift from a narrow focus on loss prevention and insurance toward a broader perspective that incorporates strategic, operational, and behavioural dimensions. Contemporary approaches recognize that risk management not only aims to mitigate negative outcomes, but also to enhance organizational resilience by improving the capacity to anticipate and respond to change. This perspective is particularly relevant in sectors characterized by high levels

of uncertainty, such as agriculture, where exposure to economic, institutional, and environmental risks is inherently elevated.

3. Materials and methods

To carry out this study, an observational research approach was adopted, based on the analysis of specialized literature and complemented by a comparative examination of risk management strategies applied in agriculture. The bibliographic sources include academic studies, official policy and regulatory documents issued by international institutions, as well as empirical research on agricultural insurance practices in various European countries. To identify the main categories of risk affecting the agricultural sector, the literature on risk classification was reviewed, with a focus on production risks, financial risks, market risks, and institutional risks. At the same time, the study examined the prevention measures and management tools used by farmers to reduce their exposure to these risks.

The research also provides a conceptual framework by separately clarifying the meanings of the terms “risk” and “management”, followed by an integrated analysis of the concept of “risk management”, as defined in the scientific literature. Emphasis is placed on the role of risk management in agriculture, highlighting the principles of scientific management, the emergence and development of risk management as a field, the strategies used to mitigate agricultural risks, and the types of insurance available in the agricultural sector.

4. Results and discussions

In the context of the present analysis, risk is approached as a concept intrinsically linked to uncertainty regarding future outcomes. The literature distinguishes between two complementary interpretations of this uncertainty. In economic and financial contexts, risk is commonly associated with the variability of outcomes around an expected value, whereas in other contexts it is understood in terms of potential expected losses. These two meanings provide a useful analytical lens for structuring and interpreting different categories of business risk. The conceptual framework presented highlights how strategic, compliance, operational, and reputational risks can be understood through both perspectives, supporting a more comprehensive interpretation of risk exposure.

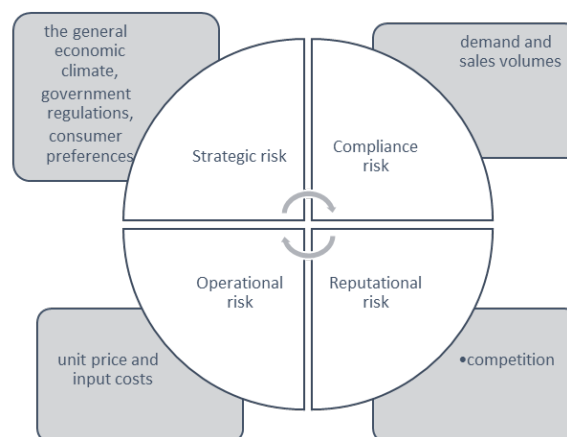


Figure 7. Sources of risk and influencing factors in the business sector

Source: author's own elaboration based on Harrington and Niehaus (2003)

Building on the previously discussed definitions and classifications of risk, as well as on existing syntheses in the literature, including the framework proposed by Komarek et al. (2020), the present study organizes the main sources of risk identified in agricultural research into a conceptual framework, illustrated in Figure 2. While Figure 1 provides a more detailed illustration of specific risk sources and influencing factors in the business sector, Figure 2 presents a higher-level conceptual classification of agricultural risk categories. This distinction allows for a clearer synthesis of the literature and supports the interpretation of risk exposure in agriculture at a more aggregated level.



Figure 8. Conceptual classification of agricultural risk categories based on the literature

Source: author's own elaboration based on the synthesis of existing studies, including the conceptual framework proposed by Komarek et al. (2020)

Within the agricultural sector, risk exposure can be structured into several interrelated categories, as reflected in the conceptual framework presented in Figure 2. Production risk arises primarily from variability in yields caused by weather conditions, climate change, pests and diseases, technological constraints, and resource management practices. Market and price risks are linked to fluctuations in output prices, input costs, and market integration, as well as to changing quality, safety, and product standards. Institutional and regulatory risks stem from changes in agricultural policies, subsidy schemes, food safety regulations, environmental requirements, and trade rules, which may have unexpected effects on farm income. Financial risk is associated with the methods used to finance agricultural activities, including access to credit, interest rate variability, and exchange rate fluctuations. In addition, personal risk relates to human factors such as the health, skills, decision-making capacity, and availability of farm managers and labour, which can significantly influence farm performance and continuity. Among these categories, production and market-related risks are consistently identified in the literature as the most significant challenges faced by farmers, reinforcing the need for structured management responses to uncertainty.

Agricultural production continues to depend on key factors such as land, labour, capital, and technology, with land remaining the most constrained and vulnerable resource due to increasing pressure from human activities and the gradual reduction of fertile areas. Despite technological progress, empirical evidence indicates that a significant number of farmers, particularly in Romania, face limitations related to insufficient technical knowledge, limited adoption of modern farm management tools, and the absence of coherent strategies aligned with market requirements (Horoiaş et al., 2022). These

constraints increase vulnerability to both market and institutional risks and underline the importance of targeted policy interventions.

Agricultural policies play an important role in mitigating the multiple risks faced by farmers by providing support mechanisms, regulatory frameworks, and stabilization instruments. At the same time, these policies may themselves constitute a source of risk, particularly in the form of institutional risk arising from changes in government priorities, agricultural policy measures, quality standards, contractual arrangements, and issues related to policy implementation and compliance. This dual role highlights the complex interaction between risk mitigation and risk generation within the policy environment.

Within this policy context, agricultural insurance represents one of the most widely used market-based instruments for risk management, operating through the payment of a premium by the farmer in exchange for compensation in the event of adverse events. The extent to which this instrument is adopted varies significantly across countries and is strongly influenced by national policy frameworks. Insurance coverage is particularly high in Spain and Germany, where approximately 60–70% of farmers use insurance mechanisms. In Spain, this high level of adoption is largely explained by substantial public subsidies that reduce the cost of insurance premiums, while in Germany it reflects a broader tendency among farmers to rely on insurance as a standard risk management practice. These examples illustrate how agricultural policies not only shape the availability of risk management instruments but also influence farmers' willingness and capacity to adopt them.

However, it is also important to consider the modern perspective according to which risk is associated with both threats and opportunities (Ion & Mocuța, 2020).

In addition to policy-based measures and insurance mechanisms, mutual (stabilization) funds represent a complementary risk management strategy that further supports the collective management of agricultural risks. These arrangements enable farmers to share risk by pooling financial resources and compensating losses in accordance with predefined rules. Typically established through private or semi-private initiatives, mutual funds are often organized at sectoral or regional level, reflecting the specific risk profiles of different agricultural activities. By combining elements of solidarity and risk-sharing, these instruments contribute to enhancing resilience, particularly in contexts where traditional insurance coverage is limited or costly (Schaffnit-Chatterjee, 2010).

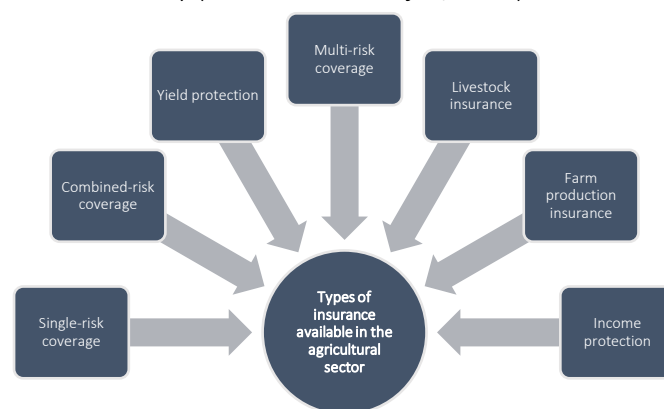


Figure 9. Types of insurance available in the agricultural sector

Source: author's own elaboration based on the synthesis of existing literature, including Schaffnit-Chatterjee (2010)

In contrast, within the EU insurance systems, the most advanced type is single-risk insurance, especially for hail. Each country develops an insurance system depending on factors such as:

- the level of risk and
- insurance system support policy.

Private companies generally only provide insurance for damage caused by hail and fire. Yield insurance covers all major weather-related risks but usually does not include plant diseases and pests. This type of insurance requires the cause of the loss to be established.

In Romania, managing risks associated with climate change remains a major challenge, particularly for resource-poor farmers. Based on the results of a survey conducted in 2022 on farmers' awareness of climate change and its impacts, it was found that, despite limited resources, some resource-poor farmers demonstrate adaptive capacities that enable them to cope with certain negative effects of climate change. At the same time, the study highlights widespread concerns regarding the impact of climate change on agricultural productivity and food security. Rather than advocating a return to input-intensive traditional farming models, which have negatively affected soil health and long-term sustainability, recent research increasingly emphasizes the need for sustainable and resilient agricultural practices that reduce dependency on chemical inputs while enhancing crop adaptability (Micu et al., 2022). Regarding climate change, research conducted over time has shown that significant climatic changes have occurred over the past 150 years, manifested primarily by an increase of approximately 0.8 °C in average global temperature, with increasingly pronounced effects on the agricultural sector (Iancu et al., 2022).

5. Conclusions

Considering the results of this research, we can say that risk management has been, is and will remain a field that requires continuous research to keep up with the increasing changes in the agricultural sector and the risks to which farmers are exposed. It therefore remains an essential component for maintaining the stability and sustainability of this sector. The study also highlighted the fact that risks in agriculture are varied and complex, and their management requires an integrated and multidimensional approach.

In the long term, increasing the level of education and training among farmers, together with the use of data and digital technologies, can significantly contribute to reducing vulnerabilities and increasing the capacity to adapt to emerging risks. Thus, the implementation of effective risk management becomes not only a necessity, but also an opportunity for the sustainable development of agriculture. At the same time, training programs for farmers are extremely important so that they can adapt to new types of agricultural strategies and encouraging young people to get involved in the agricultural sector.

Next, an important research topic for the agricultural sector in Romania would be the need for large-scale agricultural cooperatives so that small farmers can sell their own production in supermarkets and be an integrated part of Romania's socio-economic development.

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