

Public Risk Management Tools in Agriculture in European Union

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Abstract

This paper examines public risk management tools in the agricultural industry of the European Union, with emphasis on income stabilization mechanisms and responses to climate-induced extreme events. Agricultural risks are categorized into normal, marketable, and catastrophic, each requiring tailored strategies. While normal risks are typically managed at the farm level, marketable and catastrophic risks demand intervention through insurance, mutual funds, and public support. Central to the EU's Common Agricultural Policy (CAP), direct payments provide decoupled financial support to farmers, serving as a stabilizing tool against income volatility. Coupled payments target vulnerable sectors to improve competitiveness and sustainability. The analysis integrates policy documents, statistical data, and comparative evaluations to assess the allocation and effectiveness of CAP instruments and the EU Solidarity Fund (EUSF). The increasing frequency and intensity of extreme weather events necessitate stronger public interventions. The EUSF complements national responses by providing post-disaster financial aid to affected Member States. However, the overreliance on public funds may reduce incentives for private risk management strategies. The findings underline the need for balanced, adaptive risk governance in European agriculture, integrating public instruments with private initiatives to enhance resilience against growing climate challenges.

Keywords: Risk Management Tools, Direct Payments, Common Agricultural Policy, Extreme Events, Agriculture

Introduction

Agriculture is one of the most risk sectors of the economy. The sector is exposed in the same time to natural disasters, market, financial, institutional and human risks (Hardaker et al., 2015). The recent evolution of the climate change amplifies production risks. In the

same time globalization and liberalized markets increase farmers' exposure to price volatility. All these developments underscore the importance of agricultural risk management as a core element of both farm-level decision making and public policy.

The study is grounded in the concept of agricultural risk as a multidimensional construct, and adopts the framework of the European Union's Common Agricultural Policy (CAP), which distinguishes between ex-ante tools (insurance schemes, mutual funds, preventive investments) and ex-post tools (disaster relief funds, ad-hoc state aid) (European Commission, 2017). Within this framework, public risk management tools are understood as policy instruments designed to reduce farmers' vulnerability to adverse events by transferring, sharing, or mitigating risks at the systemic level (Meuwissen et al., 2018). The study situates public risk management tools not only as financial mechanisms but also as integral components of agricultural resilience strategies, supporting both short-term stability and long-term adaptation to climate change.

The agricultural sector's exposure to systemic shocks is not unique. COVID-19 economic impact disrupted labor availability and input markets across Europe. These experiences expanded the understanding of how external, unforeseen shocks can affect agricultural production and reinforced the need for effective public intervention. In parallel, climate change alters the risk landscape in a structural way, requiring risk management instruments not only to buffer shocks, but also to complement long-term adaptation strategies.

Within the CAP, public risk management instruments play a crucial role in stabilizing farm incomes and protecting farmers against market fluctuations and extreme natural events. Direct payments form the cornerstone of the policy. As decoupled transfers, they provide a safety net against market price fluctuations and ensure a stable income for farmers (Henke, 2018; Matthews, 2016). Studies confirm that direct payments contribute significantly to income stabilization (Severini & Tantari, 2015), although questions remain regarding their efficiency and equity, as larger farms often receive a disproportionate share (El Benni & Finger, 2013). Coupled direct payments, by contrast, target vulnerable sectors but risk distorting competition or encouraging environmentally unsustainable practices if poorly designed (Pe'er, 2017; Ciliberti, 2020; Erjavec & Lovec, 2017).

In addition to direct payments, Member States may provide ex-post state aid in the aftermath of natural disasters. Also it has to be consider that the EU Solidarity Fund offers financial assistance for major catastrophes. These instruments are very important in a context of increasing climate extremes. Separability of climate change they also face challenges, including limited budgets, bureaucratic delays, and uneven implementation across Member States (European Commission, 2018; European Court of Auditors, 2019; Boin, 2013; European Parliament, 2020).

All mentioned instruments illustrate both the achievements and shortcomings of the EU's approach to agricultural risk management. While existing tools have helped to stabilize farm incomes, EU must continuously adapt to the evolving challenges of climate change and global market volatility. This study analyzes the conceptual foundations, implementation, and

effectiveness of public risk management tools in EU agriculture, with a particular focus on their role in strengthening resilience and sustainability.

Methodology

The methodology employed in the analysis of public risk management instruments, specifically direct payments and the EU Solidarity Fund, involves a comprehensive approach combining documentary analysis, quantitative evaluation, and comparative interpretation. The analysis is grounded in an examination of official documents issued by the European Commission and related public data sources. These documents include detailed reports on budget allocations, strategic plans for the Common Agricultural Policy (CAP), and statistical data platforms such as EM-DAT, which track extreme weather events.

In assessing the role of direct payments under the CAP, the study delves into the distribution of financial support allocated for the CAP from 2023 to 2027. It employs quantitative methods to analyze budget data, illustrated through various tables and figures that depict how funds are allocated among direct payments, sectoral support, and rural development. This quantitative analysis is complemented by a graphical examination of the frequency and impact of extreme events across Europe. This includes a detailed look at the correlation between farm incomes and direct payments over time, and the changing trends in extreme weather events.

The methodology also involves a comparative analysis of how different EU member states utilize direct payments and the EU Solidarity Fund. This comparison is based on an examination of the allocation and effectiveness of these financial tools in various countries, highlighting differences in national strategies and their impact on sectoral resilience. For instance, the text explores how some countries have opted for coupled direct payments to support specific sectors in difficulty and compares these approaches to others.

Further, the analysis of state aid policies examines both ad-hoc and institutionalized forms of compensation provided by governments in response to catastrophic events. This part of the methodology evaluates how these compensations are applied in different member states, providing specific examples to illustrate variations in response mechanisms.

Finally, the study reviews the historical and current budgets of the EU Solidarity Fund, analyzing trends in funding allocation and the patterns of financial support across different countries. It incorporates a review of the frequency of extreme events and their anticipated impact on future funding needs. This section aims to contextualize the role of the EU Solidarity Fund within the broader framework of risk management in agriculture.

Overall, the methodology integrates documentary evidence, quantitative data analysis, and comparative studies to provide a thorough understanding of how public risk management instruments function and their impact on agricultural stability and disaster response in Europe.

Public Risk Management Tools

The approach to addressing risk management tools in agriculture starts with understanding the types of risks involved. The response to these risks is largely determined by the combination of the frequency and impact of the risk event.

Normal risks are characterized by frequent occurrences but with minimal damage, manageable at the farm level. These might include minor changes in prices or yields due to weather events, such as a growing season with low precipitation leading to smaller harvests.

Marketable or insurable risks, which occur less frequently than normal risks, can lead to much larger losses when they do occur. These are more challenging for farmers to manage independently, necessitating the use of insurance market tools or risk sharing with other farmers. Such tools can be applied either before or after the risk event and are designed to prevent, mitigate, or manage the risk.

Catastrophic or systemic risks, while rare, cause significant damage across many farms. Due to the high costs associated with catastrophic risks, it is often too expensive for private companies to provide coverage for these losses. Consequently, public aid is given to cover agricultural producers' losses. Catastrophic risks include widespread droughts or floods affecting entire countries or regions, or the spread of contagious diseases. The correlation between agricultural risks and the existing risk management tools is summarized in Table 1.

Table. 1

Public Risk Management Tools

	Normal risks	Commercial risk	Catastrophic risk
At farm level	Financial management		
	Hygiene and quality standards		
	Diversification		
Tools		<i>Forward</i> contracts	
		Cooperatives	
		Non-subsidized insurance	
		Non-subsidized mutual funds	
Preventive policies		CAP - subsidized income support	
		CAP - subsidies for insurance and mutual funds for yield risks	
		CAP - agricultural market measures	
		CAP – Basic payment schemes	
Post risk policies			Immediate support in case of disasters

Source: EU Agricultural Markets Briefs, 2017, Risk management schemes in EU agriculture Dealing with risk and volatility

Table 1 categorizes risk management tools into three types: normal risks, marketable risks, and catastrophic risks. It is crucial to note that there are no clear-cut boundaries between these risk categories, nor is there a definitive answer as to whether the desired risk management tool should be public, private, or public-private. At the farm level, perceptions and attitudes toward risk vary; one farmer might view a marketable risk as significantly disruptive, while another might see it as normal.

Public support can significantly influence the development of private risk management tools. Increased public support for farmer income can transform marketable risks into normal risks, as farmers benefit from greater income protection and improved on-farm risk management. On the other hand, substantial public support for catastrophic risk management may increase farmers' reliance on public funding, diminishing their motivation to utilize private risk management strategies. This support could potentially hinder the growth of private risk management tools, as insured farmers often use fewer risk-mitigation measures and are less likely to adopt more resilient business practices..

Risk management starts at the farm level, where farmers implement various strategies to stabilize their income. They have numerous options to reduce risk exposure, such as diversifying production or income through different crops, livestock, or by developing non-agricultural sources like agro-tourism. However, diversification can incur costs, including lower income due to a loss of economies of scale. Off-farm employment also serves as a way to diversify household income, alongside saving, cutting private expenses, and making investments during difficult periods. In addition to these farm-level approaches, farmers can also utilize both private and public risk management tools.

The existence of other policy tools can impact the use of risk management instruments if policies are not carefully designed. For example, ex-post catastrophic risk payments from public institutions might reduce incentives for farmers to seek preventive private risk protection if they know their losses will be covered anyway. Thus, payments for catastrophic events should generally be offered only when private markets are unable to cover the catastrophic loss, and the use of government funds is justified to compensate farmers.

Direct payments serve as the primary instrument of the Common Agricultural Policy (CAP) for stabilizing agricultural income. European farmers receive these payments under stringent compliance regulations concerning human and animal health, plant health, and environmental standards. The level of support is not tied to production volume but aims to offer a safety net against market price volatility. These payments are allocated as basic support per hectare of land used.

Figure 1 shows the planned public expenditure distribution within the CAP for 2023-2027, including direct payments, sectoral support, and rural development



Figure 1: Distribution of planned public expenditure under the CAP 2023-2027
 Source: European Commission Agriculture and Rural Development, 2023, Approved 28 CAP Strategic Plans (2023-2027)

Direct payments are the most significant component of EU farmer support. Additionally, member states have the option to use a limited amount of direct payments for coupled support to enhance competitiveness, sustainability, and quality in struggling sectors. Member states can grant this support only under strictly defined conditions and limits to minimize potential market distortions. Twenty-six member states (excluding the Netherlands) have opted to use this support, with most allocating funds close to or at the maximum threshold, while five use it at significantly lower levels. Below is how this support is allocated for each country:

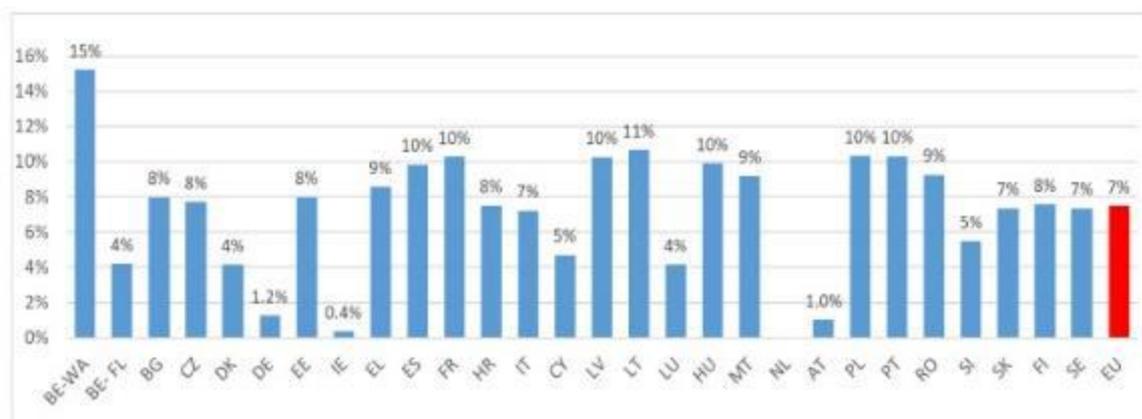


Figure 2: Country-level coupled direct payment support
 Source European Commission Agriculture and Rural Development, 2023, Approved 28 CAP Strategic Plans (2023-2027)

Direct payments primarily provide an income buffer, stabilizing and reducing income variability. Figure 3 illustrates the correlation between farm incomes and direct payments from 2005 to 2023.

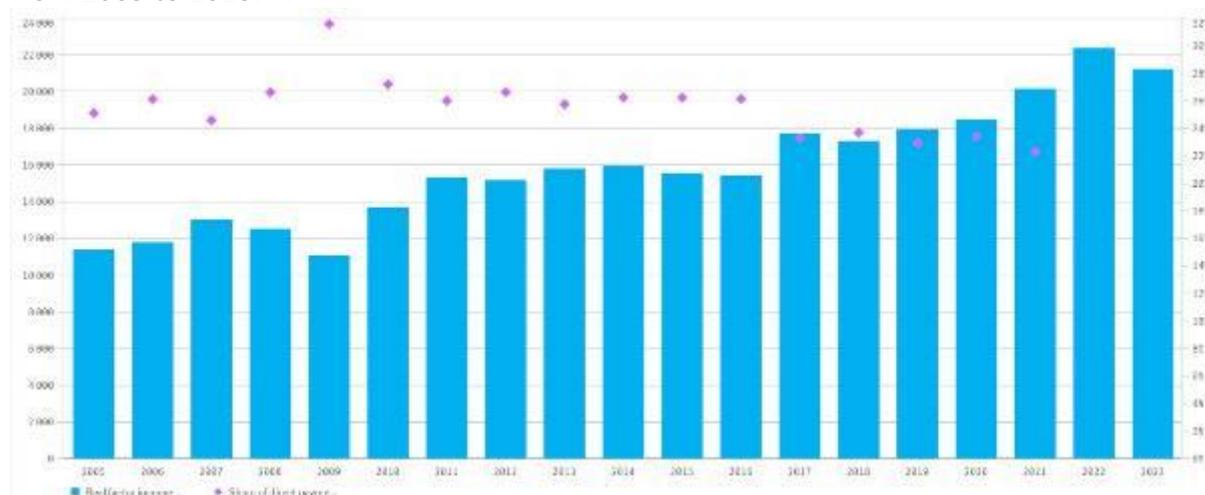


Figure 3: The evolution of incomes correlated with direct payments from 2005 to 2023
 Source: Farming Income Support (europa.eu)

In terms of national and central state aid policies, governments are allowed to provide ex-post state aid in response to catastrophic events. The European Commission permits member states to offer assistance for damages caused by natural disasters, extreme climatic events linked to such disasters, as well as animal diseases and plant pests. The level of government intervention differs among member states, with compensation being provided either on an ad-hoc basis or through institutionalized frameworks. Recent ad-hoc aid examples are seen in Germany, while the Netherlands uses an institutionalized model. Compensation availability varies across the EU; for instance, the UK does not offer government compensation, whereas the Netherlands has provided compensation for catastrophic losses since 1998 under the Calamity Compensation Act. In Sweden, there is no national catastrophe fund for flood-related losses, but financial assistance may be granted for major disasters on an ad-hoc basis (Van den Bergh and Faure 2006).

It is important to note that compensation for extreme events is not an adaptation measure in itself, as it does not prevent damages caused by climate change. It supplements insurance effects, which do not reduce losses but mitigate subsequent economic impacts, thereby stabilizing incomes and consumption for those affected and reducing vulnerability and impact.

The need for these funds arises from extreme events impacting economies globally. Figure 4 shows the number of extreme events in Europe over the past 20 years.

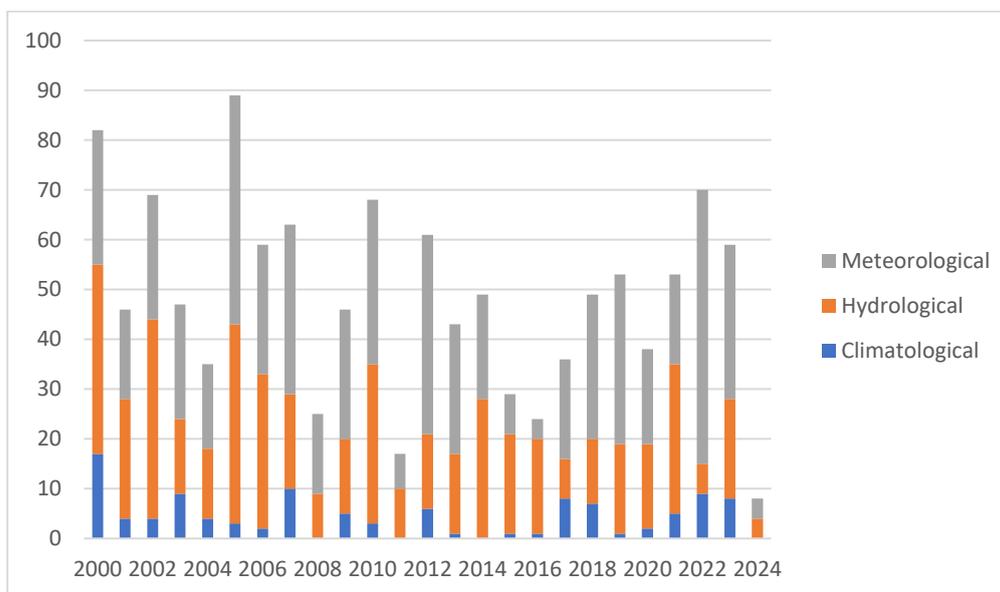


Figure 4: The evolution of extreme events in Europe from 2000 to January 2024

Source: made by author based on data from Public EM-DAT platform (emdat.be)

It can be seen that meteorological events are the most frequent, followed by hydrological and climatic events. Annually, over 40 extreme events occur in Europe, with 2011 recording the fewest at 17.

As a result of these extreme events, many risks reach central governments and can have significant financial and economic implications. As mentioned earlier, floods and other disasters can overwhelm national governments, potentially necessitating international assistance. The EU Solidarity Fund (EUSF) was created in response to the Central European floods of summer 2002 and became operational on November 15 of that year. Both member states and candidate countries can request aid for major natural or technological disasters. The fund provides financial assistance for emergency response when a natural disaster causes direct damages exceeding 3 billion euros (based on 2002 prices) or 0.6% of the national gross domestic product. Support from the fund can be mobilized even if these thresholds are not met, such as when neighboring countries are affected by the same disaster or during extraordinary regional disasters that severely impact the economy and living conditions for most of the population in a particular region.

Italy, Germany, and Croatia have received the highest levels of funding from the fund between 2002 and 2022. Looking forward, there is a trend of increasing frequency of extreme phenomena due to climate change. Literature discusses rising frequency, severity, and duration of events such as heatwaves, heavy precipitation in certain regions, droughts, floods,

and wildfires. Figure 13 illustrates the budget increase for the Solidarity Fund for the period 2024-2027. Since its inception, nearly all EU countries have requested support, with many receiving assistance. On certain occasions, such as after the large-scale floods in Central Europe in 2002 and 2003, the fund was nearly depleted by mid-year due to the high volume of claims.

Conclusion

Effective risk management in agriculture requires a comprehensive understanding of the types of risks involved and the appropriate tools to address them. Normal risks, which are frequent but cause minimal damage, can be managed at the farm level through financial management, adherence to hygiene and quality standards, and diversification strategies. Marketable or insurable risks, though less frequent, pose greater challenges and often necessitate the use of insurance and risk-sharing mechanisms. Catastrophic risks, despite their rarity, cause widespread damage and typically require substantial public aid, as private coverage is often insufficient.

Direct payments under the Common Agricultural Policy (CAP) are crucial for stabilizing agricultural income in Europe. These payments, which are not tied to production levels but are provided per hectare of utilized land, offer a safety net against market fluctuations. The planned CAP expenditure for 2023-2027 highlights that direct payments form the largest component of EU farmer support. Member states can also allocate a portion of these payments to coupled support for specific sectors, enhancing competitiveness and sustainability under defined conditions to minimize market distortions.

The increasing frequency of extreme weather events due to climate change underscores the need for robust risk management frameworks. The EU Solidarity Fund, established to provide financial assistance in the aftermath of major natural disasters, highlights the importance of collective action and international support in addressing large-scale agricultural risks. As climate change continues to amplify the frequency and severity of extreme events, the reliance on both national and international support mechanisms is likely to grow, necessitating adaptive and proactive risk management strategies.

In conclusion, the combination of direct payments, state aid policies, and the EUSF creates a comprehensive risk management framework for European agriculture, addressing both income stabilization and disaster response. However, with the growing intensity and frequency of extreme events, continuous adaptation and proactive measures are essential to enhance resilience in the agricultural sector.

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