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Review of Agricultural, Food and Environmental Studies
https://doi.org/10.1007/s41130-023-00187-5

NEWS AND VIEWS

Risk management in the Common Agricultural Policy: the promises of data and finance in the face of increasing hazards

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Accepted: 16 January 2023

Keywords Common Agricultural Policy · Risk management · Environmental risks · Economic risks · Private insurance

The management of economic, environmental and sanitary hazards is a founding objective of agricultural policies. During the early decades of the Common Agricultural Policy (1960–1992), risk management was mainly approached through direct production subsidies and protective measures at the external frontiers of the European Community. In several respects, the 1990s represented a turning point since the agricultural sector both experienced increasing hazards affecting farm income and agricultural production, and benefited from the creation and institutionalisation of new private instruments for risk management.

Hazards intensified through two distinct but interrelated processes. First, European agricultural productions have been progressively integrated into international markets in the context of the Uruguay Round and the Marrakech Agreement (1994) that limits customs tariffs. Meanwhile, faced with overproduction crises and the rising costs of subsidies for society, the European Commission initiated the first steps to deregulate the previous community-level mutualised risk management system, starting in 1988 with the definition of production and subsidy thresholds. These initial measures were rapidly followed by the McSharry reform that reduced the role of direct payments, thus leading to a greater reliance on commodity markets. Since then, because agricultural productions are increasingly valorised on international markets and thereby subject to significant price fluctuations, farmers are more affected by income variations and less protected at the same time.

In Europe, price-related hazards represent the greatest threat for farming economies (European Commission, 2017), but environmental hazards lie not far behind, representing a second major threat. In 1990, the first IPCC report mentioned the potential impacts of climate change on agriculture. Since then, the frequency and

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Published online: 02 February 2023

intensity of environmental and sanitary hazards have been on the rise and the impacts of climate disruption have been increasingly acute over the past decades. These cause price volatility as they affect both quantities and qualities of commodities, and illustrate the greater economic and environmental threats within which European farms evolve. In short, European countries are experiencing more frequent and more significant agricultural income crises, while environmental and climatic hazards are becoming more frequent and more complicated to forecast.

The transformation of European farms' economic and environmental context goes hand in hand with a mutation of risk management at farm level as well as in the Common Agricultural Policy. For the past 25 years, while market interventions and subsidies have been gradually decoupled from production, new risk management tools have been designed and integrated in CAP regulations, such as farming income insurance, mutual funds and income stabilisation tools. Even though these measures remain marginal from a budgetary point of view, and unevenly developed (currently more adapted to field crops), I argue in this paper that they are indicative of a new rationality that runs through the recent CAP reforms in which farmers become risk managers, and financial markets play an increasing role as reinsurance systems. Environmental and climatic risk management entails a major shift in the way risks can be addressed, problematised and tackled, as the effects of climate disruption and environmental crisis are highly uncertain and difficult to predict. Despite such a troubled future, the CAP has gradually reduced direct intervention and given private insurance companies more responsibilities for risk management. This trend means that farmers bear greater responsibility for their choices and the related consequences, giving rise to the new risk of seeing winners and losers among farmers in the face of environmental hazards.

Diversity of risks and related management strategies

Risk management at farm, supply-chain and market levels

Agricultural risk management strategies can be observed at farm, supply-chain and market levels. First, at individual level, the technical, agronomic and economic orientations of farmers play a direct role in coping with the consequences of an economic shock or environmental event on the farm. Notably, economists highlight the extent to which diversified farms are less subject to significant farm income variations. The economic management of farms, including savings, credits and investments, as well as private storage and sale, is also a key dimension of what can be achieved by farmers at the scale of the farm (Mishra & El-Osta, 2002). More recently, specific legal set-ups for decoupling land, capital and labour are also on the rise as a means to handle economic risks.

Second, from a broader productive perspective, supply chains and professional organisations define a collective level of risk management (Zeuli, 1999). Farm diversification can notably be linked to or constrained by supply-chain organisation. In this regard, studies highlight how the historical specialisation of areas into production basins through specific processing infrastructure leads to lock-in effects and

currently limits the development of new cropping systems. This is the case for protein crops, praised for their climate mitigation potential (through carbon sequestration and nitrogen fixing), whose cultivation is limited by the fact that grain cooperatives are no longer equipped to process and store them (Magrini et al, 2016). From a financial perspective, supply-chain integration, achieved through specific contracts with cooperatives or industries, is another expression of the social organisation of risk management in relation to the fact that the deregulation of direct aids and price support has led to greater dependence on the market economy. The diversity of contract terms with regard to quantity, quality, price, input, etc. can be interpreted as a consequence of the current evolution of agricultural markets and policies, as cooperatives and supply chains are increasingly involved in the design and implementation of their own risk management tools. In a landscape of increasing market segmentation linked to traceability systems, contractualisation with specialised farms may appear more appealing for cooperatives. The debate about the relevance of this orientation of farm risk management is not new: critics have long questioned farmers' autonomy in this economic structure, and the globalisation of agricultural commodity markets may both increase cooperatives' dependence on the rules of a globalised economy and limit farmers' ability to make autonomous production choices (Billows, 2022).

In synergy, as direct interventions have been reduced, the marketing of agricultural goods has evolved and risk management is achieved through greater reliance on forward and futures markets (Domanski & Heath, 2007). These derivative markets underwent rapid growth and this has led to a change in financial strategies, as futures and derivatives are integrated in larger investment portfolios, with a direct impact on commodity price fluctuations. The 2007–2008 food crisis raised public awareness of the negative impacts of agricultural markets' financialisation, and this is now a major focus of academic attention (Headey & Shenggen, 2008).

These levels of agricultural risk management are interdependent (van Asseldonket al., 2013) hence worth addressing together in order to grasp the direction in which the CAP is heading. They have given rise to several risk management policies, broadly tackled as ex-ante and ex-post, whose enforcement can be complementary or somewhat incompatible.

Ex-post and ex-ante policy interventions

The core objectives of the CAP's recent reform (2023–2027) highlight the many dimensions of the economic regulation of agricultural production: sustaining farm income and resiliency; enhancing market orientation and increasing competitiveness; enhancing the farmer's position in value chains.[1] In relation to this, public support for agricultural risk management is manifold, encompassing farm, supply-chain and market levels and consisting of ex-post and ex-ante actions.

[1] https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/new-cap-2023-27/key-policy-objectives-new-cap_fr#documents

Member States and the European Union historically play a direct role in supporting the agricultural sector during major crises. This is tackled as 'ex-post' risk management and relates to specific policy instruments based on compensation for damages. They are mostly product-based interventions. A number of exceptional interventions and rescue plans are implemented as a last resort when specific sectors (e.g. livestock farming production in 2015 and 2016) are confronted with sanitary or economic disruptions, and include subsidies for the voluntary reduction of production or public takeover of loans reimbursement. To a lesser extent, these extraordinary measures also include direct interventions on commodity markets, such as public storage or support for private storage. The levels of intervention are lower than during the early days of the CAP, but they are usually carried out over a longer period (Détang-Dessendre & Guyomard, 2022).

In addition to the ex-post management of wide-range crises, public regulators are also involved in risk prevention at farm, supply-chain and market levels through dedicated regulations. The past three decades have seen major changes in the way risk management and support is addressed at the various levels of agricultural production and marketing.

In France, one of these changes was the creation of 'production organisations' in the dairy industry in 2011: after the phasing out of milk quotas, the French government drew up new regulations about value distribution among supply chains. Producers and processers are now obliged to formalise their contractual terms and producers are allowed to circumvent competition law and collectively negotiate prices and volumes through a production organisation. In this case, public intervention has been replaced by local and private regulation directly involving producers' responsibility.

Tax measures are another important change: they are a type of state-intervention lever to address farm-based risk management. These are designed to promote precautionary savings, such as the 'dotation pour aléa' (hazard provisioning) in France, an individual risk management tool that aims to spread farm income more evenly over time through tax incentives on savings. However, implementing this tool has proved complex and it has been underused. Moreover, critics have highlighted that this measure is better adapted to regulating the income of large farms whose economic operation is based on a high labour productivity and proves less efficient for small farms.

Lastly, the 2006–2008 food crisis led to renewed attention on derivative markets from regulators in Europe and the USA (Clapp & Helleiner, 2012). The European Commission has stated the need to strengthen their regulations so as to sustain less volatile price setting, and has launched initiatives aiming to increase transparency and the centralisation of market clearances, the overall objective being to limit disproportionate price movements or the concentration of speculative positions (European Commission, 2009). Meanwhile, since 2008, the Common Agricultural Policy has also addressed risk management at farm level through support for developing a private insurance industry. This highlights the entrance of new players in the field of agricultural risk management—notably insurance companies, reinsurance companies, banks and financial investors—and calls into question the transformations of farm economy regulation that this entails.

Towards an expanded role of private players?

The 2008 CAP reform established a major innovation as it now includes a risk management toolbox in its second pillar, based on the support of private insurance mechanisms. Through insurance contracts, these formalise the partial or total transfer of a risk, and allow for compensation of the insured person (the farmer, in this case) in the event of damage, up to the level of the related economic loss. These individual mechanisms are also supplemented by the creation of mutualisation funds to compensate production loss from environmental and sanitary hazards: these allow for the pooling of risk management—as agricultural organisations are key stakeholders in the governance of such tools—and for the incentivising of private investments and risk securitisation through public participation in the fund. In this case, state action aims to initiate private investments: public money can be capitalised in these mutual funds in proportion to farmers' annual contributions to enhance private participation on the premise that the tool's consolidation will lead to farmers' increased involvement, higher profitability expectations for private insurers and better protection against risks. This seed money is considered essential for the development of a private insurance industry, as climate and sanitary risks have specific characteristics: they do not randomly affect farms according to distributed patterns; quite the reverse, when occurring, they concern all farms in a specific area, potentially jeopardising the economic models of insurance companies unless some reinsurance provision is considered, mutualising agricultural risks with risks from other economic activities. For this reason, a certain scale of action and degree of participation is needed to ensure their involvement (Meuwissen et al., 2018).

The 2008 reform proposed three types of support for farmers: subsidies for mutualisation funds for production risks and insurance premiums (for contracts including 30% of production loss and above, with the possibility to repurchase deductibles), support for catastrophe prevention investments and support for catastrophe adaptation investments. Specific attention is paid to farm income, with the creation of Income Stabilisation Tools (ISTs) that allow for the compensation of significant losses (30% minimum of margins on production costs) and that can be supported by European and national public funds (65% of economic loss, including 75% European and 25% national support) (Cordier, 2017). At first, the launch of the toolbox was only timidly endowed, as between 2008 and 2013 it represented less than 0.2% of the second pillar, and less than 0.4% of the total CAP budget (Bardaji & Garrido, 2016).

During its early years, the toolbox was rarely used in Member States' provisional budgets, and there was little effective tool implementation. Several Member States did not even make use of any of these tools. What was mostly used were subsidies to insurance premiums, especially in Italy (59% of total European budget allocated to the toolbox) and France (22%) (Cordier & Gohin, 2020). One explanation is that major crises are still handled by ad hoc public interventions, thus limiting the incentive for farmers to take out such insurance contracts. Another element may be the recent nature of the insurance industry and its low

level of consolidation. In any case, in reaction to this underuse, the activation conditions of the toolbox have been eased and implementation rules have been simplified by the Omnibus regulation of 2017. These now notably include lower regulatory thresholds for the activation of allowances, as thresholds have been cut to 20% of income losses, estimated at sectoral level. The IST have been completed by similar sectorial tools, activated after 20% sectorial income loss and subsidised up to 70% by public funds.

While risk management tools still represent only a minor share of the CAP's total budget, they are the topic of a number of important debates regarding the role of public entities in agricultural risk management, the related rise of private and especially financial stakeholders in the regulation of agricultural economies, the overall reliance on big data and forecasts to address these changing risk management approaches and the overall incentivisation of farmers to act as risk managers and entrepreneurs.

The promises of big data and financial markets

The transformation of risk management's rationality in the CAP goes hand in hand with a mutation of the way hazards are problematised, converted into risks, integrated into economic tools, managed by insurance and reinsurance companies, and linked to financial markets at a last resort. The founding principle of the insurance industry, i.e. the conversion of uncertain hazards into computable risks, has historically been carried out by constructing probabilistic occurrence models based on statistics and the analysis of historical data. This mainstream approach to risk management has been challenged since the 1990s as climate disruption and widespread environmental degradation have led to intensified crises and vulnerabilities. The case of 'catastrophe bonds' is particularly meaningful in this regard as it reveals how the probabilistic modelling of historical data has now been complemented by computer simulations that aim to predict potential future events in substantial numbers, leading to a new conceptualisation of risks. The shift to this forecasting approach relies on the integration of other scientific disciplines such as meteorology, climatology and geoscience, and it is mostly developed in large private insurance companies (Aguiton, 2018).

More generally, indemnity insurance schemes that use physical damage observation at farm level are criticised for the high transaction costs and delayed compensation they can entail. In relation to this, new types of insurance schemes for environmental hazards have sparked economists' and policy makers' interest: index insurance schemes based on an independent index (such as a rainfall level) correlated with losses, and area-yield insurance schemes based on deviations from regional yield statistics, are advanced as new possibilities to manage risks collectively at regional scale, thus limiting control costs at farm level (Vroege and Finger, 2020). The move from a case-by-case calculation of losses to a standardised and collective framework that addresses the links between an event and its consequences on production involves a growing reliance on big datasets and remote sensing (e.g. satellite imagery).

With the development of these big data-based insurance mechanisms, risk management is increasingly delegated to private actors. Through this shift, the role of public regulators is twofold. On the one hand, it is reduced to the incentivisation of private protection by producing a safe investment environment. This entails sustaining insurance firms through subsidisation or stake held, as well as subsidising farmers' participation so as to ensure the attractiveness of private tools. States also play a key role as re-insurers. Together with financial investors, they take positions in reinsurance funds (characterised by high fees because risks are difficult to assess and ensure) in order to act as a safety net for private companies in charge of direct farm risk insurance (Keucheyan, 2018).

On the other hand, States are also involved in data production to reinforce risk assessment and valorisation. As large-scale market-based instruments, insurance mechanisms are based on the premise that the accurate modelling of hazard impacts and economic conjunctures allows for an optimal implementation of risk coverage. Yet, high transactions costs due to lack of information are regularly highlighted as a cause of inefficiency. Advocates of agricultural risk management through insurance schemes insist on the need to exhaustively grasp natural processes and agricultural production through big data and satellite imagery. The promises of big data are therefore used for private risk management on the insurance market, in which States and public regulations play a facilitating role and endorse transaction costs.

From farmers to risk managers

The rise of agricultural insurance schemes involves developing a complex public/private institutional apparatus in which one may wonder how farms and farmers are taken into account and perceived. Complementarily, the role given to collective action is also a key question in this regard since insurance mechanisms are designed according to on-farm and risk-pooling possibilities.

At farm level, the subscription of insurance contracts is still timid. It mainly targets grain farms for which tools are easier to calibrate. However, this highlights a tendency for individualised modes of economic risk management together with other practices such as private storage and direct interventions on stock exchange and future markets. In this trend, the deregulation of the Common Agricultural Policy not only entails an externalisation of policy costs through the privatisation of insurance mechanisms but also imposes new self-constraining administrative and management burdens on farmers' shoulders. These farmers may need to add yet another string to their bow and take on the role of risk managers. This is all the more crucial with some academics underlining the fact that, because risks are becoming more frequent and more diversified, insurance tools need to be combined specifically on a case-by-case basis to address and cope with each farm's situation (Vroege and Finger, 2020).

This would, at least, be coherent with how farmers are considered in academic literature on agricultural risk management. Research on this is currently dominated by public economics, and seeks to address issues of the utility, efficiency and optimisation of insurance mechanisms through their microeconomic

modelling. Academics insist on the need to address risks in a systemic way because distinct but simultaneous public and private interventions may have opposing or complementary impacts. Accordingly, farmers are conceptualised as rational actors who act individually, weighing up options and making efficient decisions, a condition for the conception and deployment of insurance tools that allow for the best cost/benefit ratio (see Boysen et al, 2021 for an example). In this kind of modelling, asymmetric information may lead to market failures. What is at stake here is the level of accessible information required to limit transaction costs. Based on this conceptualisation, studies highlight two potential drawbacks of indemnity insurance (based on physical damage observation) stemming from farmers' activities. First, only farmers with higher risks may be willing to take out insurance contracts (what economists call 'adverse selection'); and second, the subscription of an insurance contract may incentivise farmers to take more risks (the so-called moral hazard). However, academics also stress the virtuous effects of optimal risk management on farming systems because the annual revenue-levelling they aim for is acknowledged for the robustness it offers farms, in addition to greater adaptability and transformability (Meuwissen et al, 2019).

This calls for two comments. First, the creation of mutual funds based on the pooling of risks and the enhancement of index insurance and area-yield insurance are propositions supposedly designed to deal with adverse selection and moral hazard. However, they also pave the way for the development of risk securitisation on financial markets. Ultimately, the reliance on financial investors to protect farmers may open the door to a selection of easier-to-ensure risks and farms, and unequal access to protection potentially embodied in premium and allowance policies adapted to farm and regional characteristics. This drift has been identified in France and tackled by accrediting insurance companies allowed to sell insurance contracts. The latter are also required to publicise the type of indicators they use.

Consequently, the second comment involves the complementary research questions that social sciences could address with regard to agricultural risk management mechanisms. I foresee two research fronts. First, until now, studies have explored farm-level risk management based on typified farming systems (small/large farms, specialised/diversified systems), setting aside a number of factors that also currently cover farms. Notably, the decoupling of production means (the decoupling of land and labour, and of capital and labour) or increased integration into supply chains may change the game for risk management, and this calls for further investigation to figure out how these renewed social structures of agricultural systems are supported by specific economic and risk-management rationalities. A second point that remains beyond the scope of current literature revolves around collective action and the coordination of actors in the course of insurance implementation. Whether this relates to on-farm contracts or to pooling mechanisms, academics need to focus their attention on the role of prescribers, the power relations at stake, the significance of the growing reliance on financial markets, and more generally on the potential unintended consequences of private insurance mechanisms on agriculture's evolution. Since the rise of private insurance tools may seem to compensate for the progressive reduction of direct payments, more research is needed to examine their implementation and the consequences on farms and supply chains.

Conclusion

Risk management is a key dimension of agricultural production and policies, yet for the time being, little attention has been paid to this in social sciences. In this paper, my intention was to provide a glimpse of the CAP's major transformations over the past decades so as to highlight how risk management has shifted from structural public intervention to a more segmented, localised, individualised and financialised approach to risk management at the same time as environmental risks are on the rise and economic risks are a thorny issue. Even if private insurance contracts are still a minor coping mechanism at the time of writing, it is necessary to scrutinise their implementation and study to what extent these new instruments may pave the way to unequal access to protection for farmers.

Data Availability This paper is a position paper. The data used in this paper is based on literature review.

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