

Seminar 3 – 14/12/2017: Resilience and risk

Summary

Starting in September 2017, INRA is organising a cycle of scientific seminars on the Common Agricultural Policy (CAP). This cycle – conducted as a scientific review – is part of a series of debates on the CAP from 2020 onwards; it has two main objectives, in line with two primary INRA missions: i) to identify top priorities in research, and ii) mobilise key expertise for the creation and implementation of public policy. Over the course of the 2017-18 school year, these seminars are reserved for INRA scientists and academic partners. The French agriculture minister will attend in order to present this effort in the context of planning for the next CAP. An assessment will be carried out after one year in order to examine how new partnerships can be developed with other public and private players and with civil society. Summaries and presentation material from the seminars are available to the public. This summary covers the third seminar, held on 14 December 2017. Summaries, naturally, are not exhaustive. They focus on the main points of the seminar.

The first two seminars focused on addressing environmental concerns in the CAP. The third seminar focused on another dimension: resilience and risk and the inclusion of these factors in the CAP. The morning session looked at resilience in farming systems. A first presentation by Nicolas Urruty examined the notions of stability, resilience, robustness and vulnerability. The three presentations which followed i) offered a framework in which to assess the vulnerability of farms to climate and economic change, as applied to dairy farmers in the process of converting to organic agriculture (Guillaume Martin), ii) looked at the technical, economic, structural and institutional pros and cons of diversifying crop systems; such diversification is generally seen as a key factor in increased resilience (Antoine Messean), and iii) explored the different adaptation abilities of farming systems to various time scales based on a summary of several studies carried out in INRA's Science for Action and Development (SAD) Division (Benoît Dedieu). The afternoon session looked at risks and at public/private mechanisms for managing risk, from a theoretical perspective (a review of economic literature by Alexandre Gohin) and an empirical one (a European-level review by Jean Cordier).

In his introduction, **Hervé Guyomard** recalled the increasing number of risks – economic, health-related, environmental – currently faced by European farmers, and the shortcomings of public and/or private risk management today. This, despite the inclusion in the CAP of an extensive range of risk management tools. **Emma Dousset and Karine Serrec**, who both work at the French agriculture ministry, underscored the importance of these tools at the European and/or national level, *but also the lack of a comprehensive and coherent strategy in this field*. In this context, the avenues explored



by the ministry can be divided into four recommendations. Firstly, a global risk management strategy must be defined which classifies risks according to their scope and establishes the corresponding responsibilities of the different stakeholders involved. Secondly and thirdly, consulting, training and communication opportunities should be reinforced, and preventative measures promoted. This third recommendation echoes the need to increase the resilience of farming systems. The fourth recommendation aims to ensure the coherent coordination of risk management measures. Such coordination is based on distinguishing risks according to their scope. In the case of private management of risks of limited scope, the ministry wishes to promote the building of precautionary savings by farmers, and approaches involving sectors and cooperatives. For farther-reaching risks, the ministry is focusing on risk pooling (via funds and insurance schemes); it views the pooling fund for health-related and environmental risks on one hand, and crop insurance on the other, as pertinent tools which, moving forward, should be further developed and made more effective. For market risks, the ministry is working on the income stabilisation tool, notably to examine its advantages and drawbacks (in terms of its ability to effectively stabilise income), and to establish the practicalities of its implementation (in particular the indexes that could be used to this end, in coordination with other tools).

The first discussions which immediately followed these introductory observations focused on three issues: i) knowledge of variations in farming incomes, especially compared with those observed in other economic sectors, ii) the effectiveness of significant subsidisation of insurance, even if there is consensus on this matter within the Conseil supérieur d'orientation et de coordination de l'économie agricole et alimentaire (CSO), France's governmental council on agriculture and food orientation and coordination, and iii) the scaling of measures to encourage precautionary savings.

Without looking, in detail, at definitions of stability, robustness, vulnerability and resilience and how these factors apply to agriculture; **Nicolas Urruty's** presentation highlighted the need, now more than ever, to better characterise the ability of farming systems to cope with and adapt to a more volatile, changing context. The different concepts analysed are complementary, and each one individually can be relevant depending on the perimeter analysed and the disruptions studied. In other terms, three questions should be asked: "of what", "to what" and "for what" (for example, what resilience/to what/for what reason). *Discussions with attendees identified two priorities: i) studying the capacities of the use chart of the different concepts suggested by N. Urruty to guide the choice of public policies which could increase stability, robustness and resilience, or reduce vulnerability, and ii) the issue of transition between concepts, on one hand, and of increasing levels of severity of disturbances on the other.*

Guillaume Martin examined the vulnerabilities of dairy farms in the process of converting to organic farming in a context of increasing conversions, sometimes launched hastily or by farmers with new profiles. Vulnerability, defined here as the ability to face the negative effects of environmental, economic and technical changes, was studied from two angles: a technical and economic angle based on surveys and statistical analysis, and a socio-technical angle aimed at identifying how a farmer perceives "his or her ability to adapt and overcome a vulnerable position". Technical and economic analysis is primarily based on statistical comparison in the framework of non-derived, reduced versions of a theoretical framework, vulnerability indicators and possible explanatory factors. Sociotechnical analysis of perceptions highlighted the fact that certain farmers could perceive that market-related risks were lower in organic farming; that they had greater latitude in which to manage risks on an organic farm, and that they felt more confident in organic farming to face these risks, also because they were supported by a community. In conclusion, G. Martin underscored the



key role of aid in an organic conversion, the utility of changing perceptions about organic farming within the farming world, of producing organic references and of developing networks for organic farmers (a process which is well under way). Discussion following the presentation focused on the scope of the analytical framework: not for it to be applied to other contexts, but to derive more general knowledge about barriers to correct and advantages to develop in order to facilitate the changes targeted in agriculture towards the optimum design of public policy and consulting activities. Discussions also addressed the inclusion of structural aspects and effects in this type of analysis, in order to differentiate between specific policies (e.g. which target organic farming) and more general, structural policies. On another level, a distinction should be made between structures and practices in order to improve public policies.

Crop and crop system diversification and diversity are often presented as a way to increase environmental performance and resilience. In this context, **Antoine Messean** began by presenting the main findings of a study, at the farm and sector level, *on the pros and cons of crop diversification*. The study used a 'lock-in' analytical framework which identified, at the agro-supply, farm, cooperative, industrial processing, distributor and consumer levels, the barriers and obstacles to diversification. Coherent action is needed on all these obstacles and, therefore, all links in a sector. *Public authorities have a role to play in encouraging the development of innovative niche markets* at every link (e.g. via varietal innovation in diversification crops) and, more generally, via multi-stakeholder partnerships aimed at developing diversification sectors and markets. *They also have a role to play in facilitating changes to the sociotechnical landscape so that the predominant sociotechnical scheme integrates diversification*: in this sense, the CAP addresses the utility of greening requirements for diversification, coupled aid and legumes, as well as measures aimed at reducing the use of pesticides (since diversification is one way to reduce their use). The EU-funded DiverIMPACTS 2017-2022 programme coordinated by A. Messean is a continuation of this study. The programme is divided into 6 "work packages": 1) the identification of the pros and cons of diversification in Europe, 2) the promotion and diversification of crops via several case studies in Europe as part of stakeholder-oriented research, 3) quantifications of the benefits of diversification on the basis of field experiments in different European contexts, 4) the assessment of crop diversification on economic, environmental and social aspects of sustainability, and at the farm, value chain and regional level, 5) the development of innovation and value chains in diversification, and 6) in a cross-cutting approach and based on previous work packages, the development of strategies, methods and tools to support crop diversification all along the value chain. It should be noted that the 25 case studies are conducted in varying soil and climate conditions in order to study dependence on local contexts. Also noteworthy: for work package 6, public policy recommendations will be drafted which aim to better define agro-environmental policies at the European, national and regional levels. *Discussions highlighted the need for data to better identify and quantify the factors driving specialisation / diversification and the utility of extending analysis to livestock farming, including in the framework of the above-mentioned European programme, by including the animal feed market, which can be an interesting outlet for diversification crops. The discussion also brought to light the utility of measuring the benefits of specialisation, particularly at the farm level, before calculating the cost for the farmer who does not specialise and before basing remedial public policies on such calculations. Cost in this case should be viewed in relation to the three dimensions of sustainability.*

The last speaker of the morning session, **Benoît Dedieu**, presented an analysis of the ability of livestock systems to adapt, based on a summary of research conducted at INRA's SAD Division. The presentation identified the different timescales of adaptation: short-term (adapting to contingencies



without changing a configuration), medium-term (changing configuration) and long-term (remaining sustainable in uncertainty), as well as the subjects studied – the livestock system and the livestock farm/family system. Different drivers of adaptation were presented (global changes, the family/farm dynamic, regional dynamics, and biology to the extent that it is a source of uncertainty, due to the random nature of reproduction and the complexity and variability in how ecosystems function, for example). Resisting contingencies requires flexibility, both external (insurance, networks) and internal (three categories exist: static flexibility via the existence of buffering abilities and leeway; reactive flexibility which is based on a system's regulating properties, and proactive flexibility based on adaptive management). Configuration change is a non-linear process, spread over several years, which is multi-form (i.e. not only technical) and caused by multiple factors. Long-term resistance in situations of uncertainty requires simultaneous action on five levels: i) the configuration of the family/farm system and its evolution over time, ii) technical system function, iii) finances, iv) the system's functional bases, such as soil fertility or the choice of appropriate breeds, and iv) support from networks. *The conclusion and discussions with the audience focused on findings regarding public policies. The general goal is clearly to have more environmentally-friendly livestock farming systems; however these are not necessarily (automatically) more resilient or better suited for contingencies (e.g. grazing systems which have to adapt to drought situations) in part because they have fewer fail-safe redundancies (fewer "belts and braces" situations). The use of public policy to encourage flexibility in production systems, and support for actual projects in a "crash test" approach, is legitimate.*

The presentation by **Alexandre Gohin** reviewed existing economic literature on the issue of risk in agriculture. The presentation focused on three subjects: i) the nature and importance of price contingencies in agriculture, ii) stakeholder behaviour in the event of contingencies, and iii) the effectiveness of different public risk management instruments. *The theoretical framework of the presented research is based on the public economy, which legitimates public intervention to correct market failures, for example in this case, the incompleteness of contingent risk management markets.* This incompleteness is linked to information-related issues: information is viewed as a public good, for which private players do not pay a price that enables information to be produced at the levels and degrees of accuracy required. The next question becomes: what should be done to correct this market failure? This issue is examined specifically in the third part of *A. Gohin's presentation, which first looked at the nature of contingencies in agriculture: quantity- and price-related contingencies; contingencies that co-occur and affect margins, revenues and sales for farmers. Several research issues arise: the evolution over time and space of quantity-related contingencies, particularly under the effect of climate change; the origin of price-related contingencies (and how these are linked to quantity-related contingencies, unexpected political decisions, forecasting errors on the part of stakeholders, financial arbitration, etc. and the combined roles of different potential factors).* The first part of the presentation also examined *price dynamics in agriculture*. In this framework, it should first be noted that recent research tends to show that competitive (i.e. private) storage would be effective and that agents would be rational insofar as shocks would be (essentially) external rather than internal (linked to stakeholder forecasting errors). However, such results are obtained using models based on several hypotheses which limit the scope (generality). Secondly, external market variations generated by a model with stakeholder forecasting errors – variations that can even be chaotic – would decrease with a general equilibrium modelling framework which incorporates economy-wide feedback effects, notably via production factor markets. This second research category also shows that competitive storage does not have a destabilising effect. Lastly, a third category of research studied "imported volatility" under the (possible) effects of financial



speculation, on one hand, and biofuel development on the other. The impact of financial speculation on agricultural price volatility is a very controversial topic, including on a scientific level. A. Gohin summarises the findings of research in public economics: speculation was observed to have a positive – but limited – effect on volatility, in particular where Exchange Trade Funds (ETFs) are concerned. *Concerning this second study, the first research requirement is to have access to all information, and the main priority is no doubt to analyse the robustness of the findings in relation to the hypotheses of the models.*

The second part of the presentation focused on analysis of stakeholder behaviour in the presence of contingencies. Micro-econometric studies show that farmers are risk averse. These studies are limited by faulty access to information – a shortcoming that precludes the proper inclusion of farmers' financial, contractual and technical strategies, their expectations (e.g. in terms of using information from futures markets), their level of wealth or the structure of their asset portfolios, etc. *As such, two areas of research are explored: experimental economics and the pairing of several databases of information on both farms and farming families.* Several studies aim to assess (quantify) the impact on production or revenue of different policies: specifically risk management policies (insurance, for example) or more general ones (direct aid, for example) in a context of contingencies. Other research specifically looked at a single instrument (such as the counter-cyclical aid launched in the U.S. with the 2002 Farm Bill; aid which would have a significantly positive effect on production volumes), or a parameter / sensitivity factor (such as a coupling effect, tied to wealth effects which cause so-called decoupled aid to have a positive effect on production volumes).

The third part of the presentation focused on analysis of the effectiveness of public policy instruments in response to contingencies: instruments to intervene on physical markets (price intervention with storage, border measures, supply control measures, measures aimed at modifying demand), direct funding (aid) instruments and risk management instruments (public intervention on insurance, mutual funds and financial markets). Two major findings, from several studies on the subject, are noteworthy: *Firstly, depending on the current theoretical state of the art, public action on risk management markets appears to be effective (more effective) than other intervention mechanisms in attempts to reduce contradictory impacts of price volatility on revenues. Secondly, and related to this, the limits of modelling frameworks which only imperfectly incorporate market failures and, specifically, information-related failures, despite these being the basis of what legitimises public intervention in the field of risk management.*

Proposals made by different stakeholders, including scientists, diverge significantly concerning which instruments should be used to deal with agricultural price volatility. Unfortunately, the impact of these proposals are not quantified often enough. In large part, this lack of quantification is linked to difficulties in accessing all the information needed to model information markets in a satisfactory manner. In an uncertain context, requiring significant investment in research, a distinction should be made between contingencies according to their degree of severity: low risks should initially be handled by the stakeholders themselves, and it is not possible to deal with catastrophic risks without strong measures on the part of public authorities. Risks “of the trade” are those for which analysis is needed to know how to combine public instruments and intervention in the most effective way possible; no doubt by giving priority to tools targeting risk management specifically (futures markets, insurance, mutual funds). Attention should also be paid to the extent to which public intervention – regardless of its purpose or nature – modifies the frontier between low, medium and catastrophic risk.



As explained by **Jean Cordier** in the last presentation of the day, it is this risk structure, based on scope, which underpins the current instrument scheme of the CAP where risk management is concerned. In addition to Pillar I direct aid, which, all things being equal, stabilises agricultural revenues (even if the aid has no effect on variations of individual income) the risk management tool kit includes, in Pillar I, a crisis pool instrument, and in Pillar II, public insurance aid (Article 37 of Measure 17 of Regulation No. 1305/2013), public mutual fund aid for climate-related, health and environmental production risks (Article 38), and public aid for the creation of income stabilisation tools (ISTs), or public mutual fund aid for agricultural income risks (Article 39). Analysis of the 2014-2020 Rural Development Programmes show that Pillar II *risk management tools are only rarely used in practice*. This finding is confirmed by an assessment of even more modest outcomes conducted in late 2017. Furthermore, mobilisation rates for instruments vary widely from one Member State to another. *Several things explain this weak mobilisation: technical problems surrounding implementation, which make it nearly impossible to establish an IST (none have been so far); unattractive conditions for farmers; gaps between perceived and objective risk, as well as a foreclosure effect linked to the near certainty that public authorities will intervene “in any case”.* The Omnibus regulation, which came into force in early 2018, is aimed at making the measures more interesting and attractive. Evidently it is too early to measure the extent to which these modifications will lead to increased use of the risk management tool box, and ultimately, better respond to income volatility. *Multiple things are needed to advance research; simulation, to analyse the effects of changing measurement parameters on their subscription rate, on the public cost of these changes, on the choice of indexes on which to base instruments and the consequences of these choices, etc.*

Insight from/for the French Ministry of Agriculture: K. Serrec from the agriculture ministry addressed several subjects requiring further exploration in a research context:

- Coordination between the different (risk management) tools and their objectives, in terms of i) triggering points for their use and ii) tool design according to the risk in question;
- Expansion of the current economic risk management tool box to make it more coherent and complete. More specifically, further exploration is needed of public intervention methods which would promote the development of futures markets; of assessments of CMO measures, and of IST: Advantages? In what conditions? Pertinent indicators which accurately reflect the diversity of income situations and upon which the tool can be based?
- Resilience, beyond the farm level alone, by incorporating the whole value chain.

General conclusions: *Under the influence of several factors, Community agriculture operates today in an even more uncertain context. Though unlikely, it is possible that contingencies will continue to increase. In light of this, European farmers – those who for a long time were protected by direct producer pricing support policies and border measures – must learn to better respond to these contingencies by mobilising the greater resilience of farming and food systems (ex-ante management) on one hand, and on the other, risk management tools (ex-post management). System multi-performance must imperatively be designed to include the ability to handle contingencies, notably because more environmentally stable systems are not necessarily/ systematically more resilient, more robust, or better suited to handle shocks and adapt to them. Ex-ante measures include technical prevention instruments such as hail nets or anti-frost technology. Ex-post risk management measures should (better) distinguish: i) rare, unpredictable and widespread risks which require Community-level intervention; ii) more common, more predictable and less widespread risk farmers may face via private risk markets which could benefit from public support; and lastly iii) frequent but limited risks which do not require public support. The current CAP risk management tool box adheres to this structure. As it stands, it is under-used and there is a need to better understand why. Beyond*



professional, political and principle-oriented declarations, there is a need to i) objectively and scientifically analyse the behaviour of farmers in dealing with risks, and ii) measure the extent to which the CAP overall – and more specifically the fact that public authorities will always intervene at the last resort if stakeholders apply sufficient pressure – are significant barriers for the development of public and private ex-post risk management tools. It would be beneficial to study positive and negative outcomes in non-European countries such as the United States, which have opted to explicitly target income stability. The CAP must also promote vertical solidarities at the sector level and horizontal ones at the region level, for example the supplementation of mutual funds by stakeholders in these sectors and regions. Generally speaking, there is a need to view risk management in a holistic manner by looking at all measures, public and private: those specifically dedicated to risk management and those with indirect effects on them, particularly to avoid foreclosure effects (limited appeal of an instrument just because another exists) and redundancies between public and private instruments. In this perspective, the use of modelling and simulation is indispensable. To this end, concerted efforts must target access to any information needed to develop relevant modelling frameworks which are precise and detailed enough to include all the mechanisms at play.

Written by: Hervé Guyomard, 2 February 2018 (revised 2 May 2018)

