Farmers land rationales in the context of urban sprawl: when decisions don't mean project. A method to understand farmer's strategies

Christine Léger, Françoise Alavoine-Mornas

Cemagref/IRSTEA, France

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Abstract:

Even if European and French policies aim at reducing agricultural land consumption for urban development, the equivalent of one French department area is built each seven years. The implementation of French land use planning policies is supposed to integrate the cooperation of agriculture professionals, as a governance form of public intervention. Considering this, we assume that there are some learning failures in the cultural integration between politics and agricultural sectors which may explain some misinterpretations of farming systems issues. In this paper, we expose a method to unravel farming systems dynamics in the context of urban sprawl, as understanding this means integrating on one hand the complexity of agricultural working systems, on the other hand the complexity of the different impacts of urban sprawl on these systems. With this aim in view, we present a new way to study farmers' strategies. Our approach is based on an analysis of farmers' decisions, coupled with their motivations. We identified five action levers and four distinct farmers' rationales with regard to land management decisions, and also their interdependencies. This method could also be used to study other types of farming systems' structural changes.

1. Urban sprawl and farmers land rationales: an analytical framework

Urban sprawl on farmland is one of the global challenges for agriculture nowadays, as it concerns food, amenities and environmental issues. Periurban farmland is expansively constructed every year. In France, 61 000 hectares were artificialized each year from 1992 to 2003. It increased to 86 000 ha between 2006 and 2009, which represent a loss of 73 750 ha of farmland (cultivated and permanent grass surfaces) each year (Agreste, 2010). More than just weighing consumed agricultural areas, this phenomenon is a structural change for agricultural periurban territories and farms immediate environment. Furthermore, urban sprawl induces an increase of land rent in the prospect of land transition towards building use. Consequently the functioning of land market mutates, and thus the renting, purchasing and selling owners strategies (Cavailhes and Wavresky, 2002). In general the access to producing land becomes too elusive for farmers. This sum of constraints hangs over the farming system management. We suppose that they also change the decisions a farmer takes for his farming system.

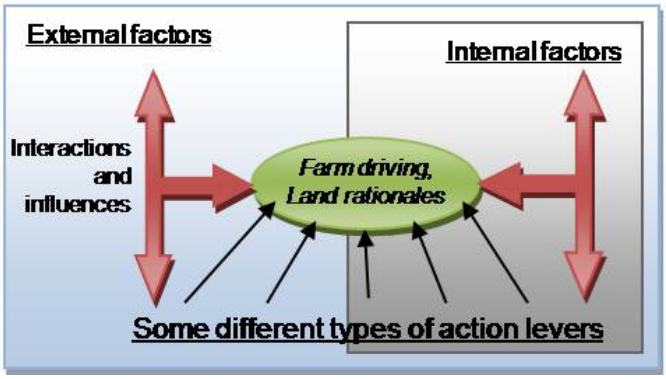
The literature about decision-making in farming system sets a comprehensive approach in the eighties with the simultaneous contribution of management science (works based on Cyert and March, 1963) and anthropology (Barlett, 1980). Renowned French authors have contributed to the formulation of a decision theory (Petit, 1981; Capillon and Manichon, 1988; Landais and al, 1988; Sébillotte and Soler, 1990; Brossier and al. 1991). Since then, most of researches are normative (Lemery, 2005, makes an exception, establishing a rationale comprehensive classification). According to Buchanan, (2010), it wills to "extract and combine theories, tools and

methods from several disciplines in order to present a holistic approach to measure resilience, often combined with the aim to provide a framework with which useful and sustainable development policies can be created and implemented". Researchers establish some decisional models in order to set decisional aid adapted to several mutations in the agricultural context (policies, water resources regulation, climate change), or to determine potential internal level indicators of each farm in terms notably of resilience, adaptability and flexibility coping with these phenomenon (Darnhofer et al., 2008). However, a recent literature of comprehensive researches on farmer's land rationales in periurban areas exists, notably in France in economics (Jouve and Napoleone, 2003), agronomy (Alavoine-Mornas and Giraud, 2004; Jarrige, 2004) and sociology (Vianey, 2005). But it implies that practices would depend on the farmer strategy and objectives, as exposed in the decision theory of eighties. Indeed, the analysis is based on an a posteriori realignment of land management strategy, adapted from the result observations of land practices: declining, increasing, or stagnation of the cultivated area. In sociology (Souchard, 2010) and geography (Vianey, 2005) studies are more comprehensive however it doesn't replace the analysis in the organization of farming system.

We believe that these methods omit the fact that farmers react in a periurban context to a series of heavy constraints, including access to land. That why the purposes are not always successful. Evaluating this strategy (taking in account how constraints influence the decisions), only on the base of the practices results (that is to say, the evolution of their land plot system) thus seems to be reconsidered. This article presents another method, applied in three French periurban areas in farmers' land rationales comprehensive analysis. The method is inspired by different works of the place of land in farm management (Bryant, 1976; Morardet, 1992; Gueringer, 2008, 2009). The procedure appears more realistic and effective to understand precisely the farmers' decision drivers, as they can't take decisions due to several constraints. Therefore we distinguish "is" and "could be" and focus our study on the second item, in order to translate accurately what urban sprawl perturbs in agricultural activities. Obviously this work requires an important qualitative research.

Land rationales are different forms taken by land farm management. It results from a complex combination between the decision drivers and the action levers panel the farmer has in hand. The decisions drivers' are internal factors – which are resulting from the characteristics of the farm and the farmer –, and external factors produced by the context. These three elements have many interactions (Figure n°1).

Figure n°1 : Land rationales taken function of factors and levers



This can be revealed by the farmer's discourse through an explanation of the past decisions during a given period. It requires asking him to give also for each decision, its justifications. Of course this way of information gathering could be criticized, because the farmer can give a kind of an *a posteriori* logic to his decision. Some first interviews permit to determine a frame of external factors, internal factors and action levers. In the case of our research, we distinguished four types of external factors, nine types of internal factors (Figure n°2), and five action levers. These last ones are *Agricultural practices*, *Management of land in producing perspectives*, *Property holdings management*, *Social relations*, and *Institutional or political positioning*.

2. Sample, interviews and analysis

We performed a detailed survey with farmers in urban and suburban areas of the Rhône-Alpes region in France, near Lyon, in the conurbations of Saint-Etienne, Vienne and Voiron (95 municipalities). A particular area was chosen in each city, depending on the diversity of agricultural production systems, urban sprawl and the part of artificial surfaces, including the presence of various development projects (business parks, highway…). Eight homogenous municipalities in terms of urban pressure and growth rate of urban space have been invested (Figure n°3). When the interviews were made, each of the three studied areas was subjected to important urban projects. In the observed municipalities in the conurbation of Saint-Etienne, a highway was scheduled for over twenty years. It didn't concern more than two or three farms, since a tunnel was planned. People were not convinced about the achievement of the project because of the – long – political debate and the needed public budget.

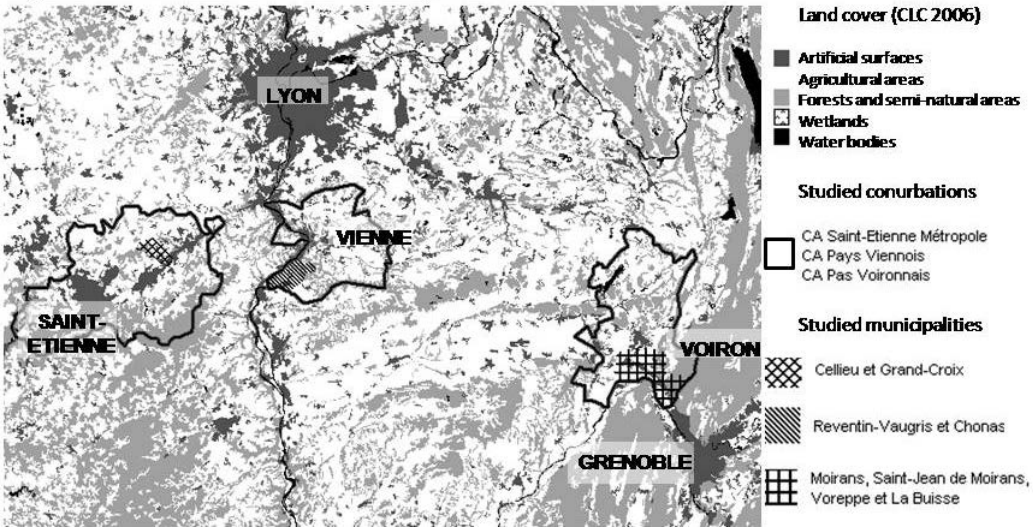
Figure n°2: Classification of external and internal factors in the farm, determining farmers' decisions

External factors, influenced by the suburban character of territory	Tensions of land market, use and ownership	An opportunity of income for owner-farmers which widely overtakes farm incomes Rental agriculture tenure checked by the opportunity of income for owner Increasing price of full property General scarcity of agricultural land and tensions An important competition degree between farmers about the use of land Behavior of farmers slowing owners to rent (compensation)
	Periurban agriculture	Presence of a frame of farms Presence of a frame of farms of one same production system Economic weight of agriculture for the region (compared to other wealth)
	Spatial changes	Inadequate work organization for the neighborhood (some adaptations are possible) Inappropriate activity for the neighborhood (no adjustment possible) Regulatory limits due to the activity and presence of neighbors Engine movements inadequate to facilities
	Urban projects and planning policies	Uncertainty produced by the local town planning policies (PLU) Uncertainty generated by the large-scale projects of planning and infrastructures
Internal factors, influenced by the objectives of the farmer and by the intrinsic characteristics of the farm	State of mind and farm project	Preserve house and living environment Maintain a livelihood until retirement Perpetuate as a farm across time and generations
	Farm stage	Settlement Growth and development Stabilization and prosperity Transmission of farm and retirement
	Vision of way to develop	Rationalization Increase of production Diversification or specialization Choice of marketing strategy
	Degree of family devotion to the activity	Double activity of the farmer Full time and exterior job of spouse Couple or family work and potential resumption
	Farm and production system	Cereal farming Mixed and livestock farming Livestock farming Arboriculture, viticulture or truck farming
	Relation to land	“The purchase is necessary, any conditions” “The property is required, on a part of my parcel system” “The rent is satisfactory if it is guaranteed” “The rent is satisfactory”
	Land history of the farm	Resumption of a formed farm, with a base of land property Resumption of a formed farm with a base of rented land, and solidification Creation of the farm, by agglomerating of rented land
	Economic health of the farm	Good Average Poor
	Spatial dispersion of plots	Strong Average Low

In the surveyed municipalities in the conurbation of Vienne, a large business park is scheduled on the cereal plain in the planning document within ten years. From fifty to eighty hectares would be converted. Currently there are shared between the twenty cereal producers in the area. There is still a disagreement between the urban planning main document and the municipality, which has to translate its policy into its own planning document. And in the municipalities of Voiron, a part of the cereal and arboreal plain has been used in a large business park twenty years ago. The farmers still have to face the consequences of this construction concerning the spatial

organization and the lack of farmland. This urban operation should be extended to several tens hectares by the community of municipalities.

Figure n°3: location and land cover of studied areas



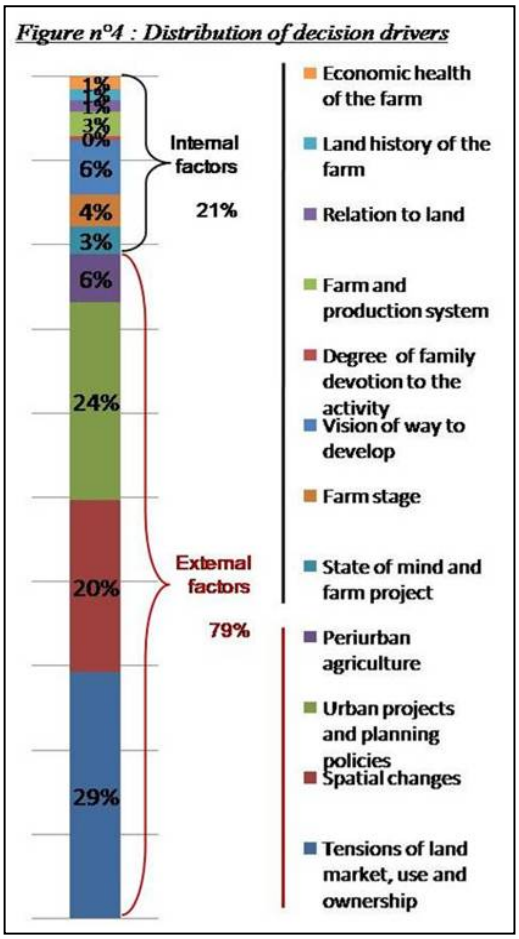
The interviewed farmers constitute a representative sample of the total farmers' population in these municipalities according to: the production system, its surface, its spatial dispersion and its distance to the nearest urban center. A minimum of 20% of farmers having more than 15% of their surface in the referred municipality territory were interviewed, which represents twenty-six farmers. In order to avoid any bias, the interview didn't focus on periurban effects; it aimed further to gather a large description of the farming system. More particularly, all decisions linked in one way or another with spatial dimension were collected. After a detailed description of the farm (inputs, economic functioning, outlooks), the interview covers a spatialization of all these elements. As a beginning, we asked the farmer to feature on a map, for each of its plots: the mode of tenure and the owner, its intended use in the planning document, the land and its use, all transportations linked with the activity, and the neighborhood configuration. Secondly, all changes made by the famer – and in memory – in the above areas were reviewed, and justified. The farmer was expected to describe his relationships with municipalities, communities or the agricultural profession (organization, communication), then with each of his owners. To conclude he was invited to detail and justify every choice of decisioning, positioning and behaving.

Each decision with its one – or several – justification(s) was extracted from in extensor interview transcription. We noticed that a same decision could be made for several types of reasons. We matched so many "decision/justification couples" that we found possibilities. Then, each couple was classed among one of the five identified action levers; and each justification was bridged with one or several decision drivers (external and internal factors). Thus actions were analyzed with a permanent link to objectives. The pairs which could not be classified as effectively induced by specific periurban context were set aside. Indeed their "normal" character would have interfered with the qualitative analysis of the periurban context effect on farmers' rationales. After this extraction we obtained no more a 26 farmers sample, but a sample of 682"decision/reason couples".

3. Decision drivers, action levers and four land rationales

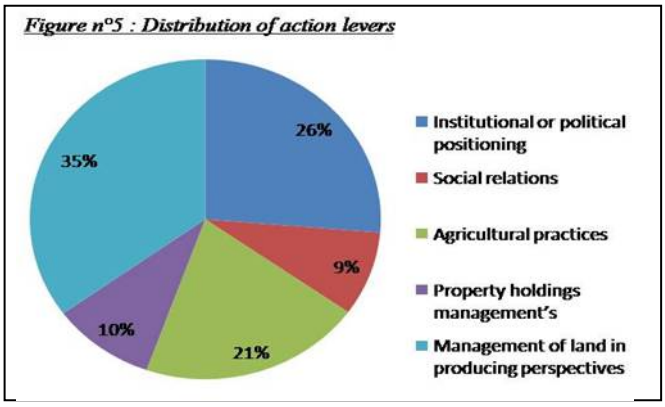
We noticed that decisions were taken more or less proactively. Hence we distinguished couples that revealed farmer's reactivity, from the ones that revealed rather passivity. The Reactive decisions were taken roughly pragmatically or with defensiveness. And the Passive decisions were sometimes voluntary. Thus we determined four types of land rationales.

- The *Adaptive reactivity*: the farmer is typically in a farming system logic that faces the changing context in adapting itself to new constraints. This requires certain degree of information about upcoming changes, the networks, media, planning documents or political gatherings.
- The *Combative reactivity* behavior is quite assertive, often collectively - in the action or wider in the way of thinking - where decisions generate opposition or conflict with other actors. The emotional state that leads to these decisions is quite fatalistic and cynical.
- The *Suffered passivity* is the feeling embodied by decisions and justified by the complete lack of margin in the farmer's decision. According to him undergoing the situation strains him to make unwilling decisions. In his mind, complaining to authorities is worthless. These decisions are made with fatalism, or submission.
- The *Passive strategy* is quite similar to the definition of "strategic inaction" in Sociology of Law (Sayn, 2007). The farmer abstains himself from deciding in response to short-term thinking because this behavior would be detrimental in the long term, with three types of stakeholders: landowners who are potential renters, neighbors who refer to his own profession representation, and elected officials who hold power in urban planning.

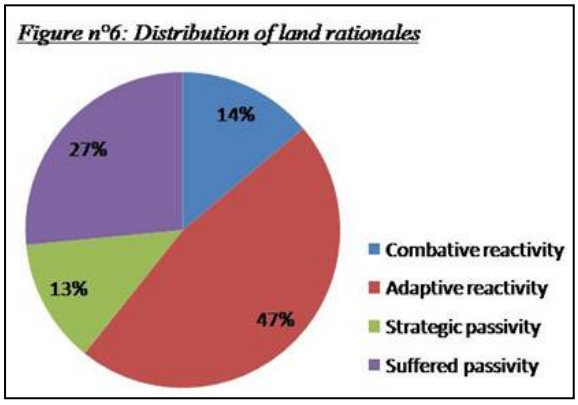


A basic description of decision drivers, action levers and rationales is enlightening. In the three territories studied, internal factors appear as less important as we thought (see Figure n°4). They represent only one fifth of the context elements considered by the farmer to make his decision. In particular, the *Vision of way to develop* – because of the willingness to enlarge farmland – stands ahead the *Farm stage*. Surprisingly the *Farm and production system* is not so determining, whereas the *Land management in producing perspectives* seems to be very different from one to another. External factors are almost equally distributed between *Tensions of land market*, *Urban projects and planning policies*, and *Spatial changes*. Only the importance of *Periurban agriculture* is as negligible as internal factors. We could say that they are like background "noises" in the decision world of the "Periurban farmer". But comparing this result with the rate of internal factors in "normal" decisions (discarded above) is enlightening too. In "normal" decisions, internal factors represent no

less than sixty percent of decision making drivers. It means that the farm system management in an effective periurban context constrains farmers to consider his proper characteristics twice lesser than in the case of a "normal" context.



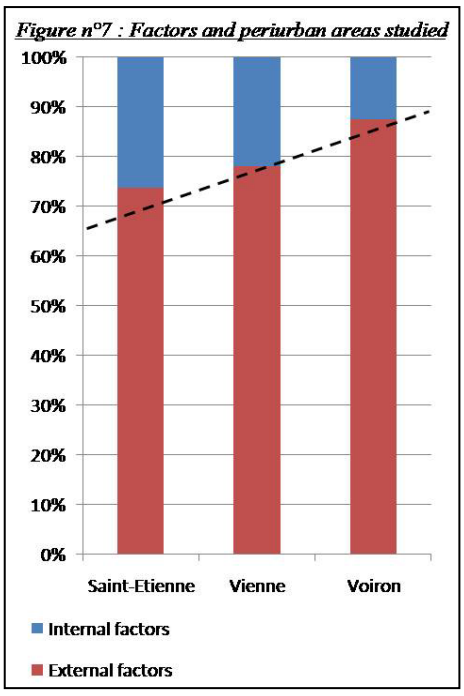
The Figure n°5 shows the distribution of action levers. We notice that *Management of land in producing perspective* is the most used lever, but it is only used for 35% of decisions. *Agricultural practices* are an important lever to adapt the plots system to urban sprawl. Contrarily to what is heard in planning world, the *Property holding management's* is not farmers' priority choice in a situation of urban pressure (10%). Moreover, "social" modes of action – *Social relations* and *Institutional or political positioning* – are incredibly important (respectively 9% and 26%) to drive the space dimension of the farm, compared to "technical" action levers.



The farmers essentially adopt an *Adaptive reactivity* rationale (see Figure n°6). Farmers are globally not very reactive in front of urban sprawl (61%) considering only the *Combative* and *Adaptive reactivities*. But *Strategic passivity* is a non-really passive rationale. This result (13%) shows that whereas farmers sometimes seem unconcerned about urban sprawl, appearances can be misleading. The essential result from this analysis is that *Suffered passivity* represents more than a quarter of rationales. In 27% of cases, farmers don't feel any leeway to make decisions, in studied sample.

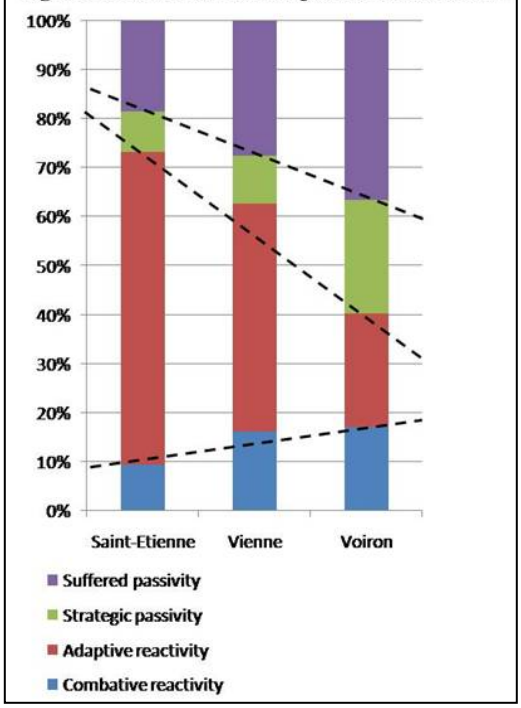
4. A comparative analysis, to reveal domino effects between decision drivers and rationales

In a second time we chose to treat differently each area of interviews to detect its specificities and to avoid the aggregation of over different data in relation with the disparity of the three territories. As we can see on Figure n°7, from the Saint-Etienne's case to the Voiron's one – passing by Vienne –, the external factors increase is observed. Whereas the municipalities nearly face the same level of urban sprawl, the few contextual differences are sufficient to be accurately taken by farmers in their decisions. In the Voiron's case farmers have already experiment the farmland dislocation because of the first business park. So they seriously take the outlook of the



urban project into account, as they know what consequences would occur. It is the same in the Vienne's case, where the business park is provided in the continuity of a current one. But there is still uncertainty on the project concretization, relatively to the process of establishing the planning document. In the Saint-Etienne's case, the municipality never thought such projects. According to farmers the project would certainly rather given up than concretized. Thus these four external factors, when they state, are very decisive to the farmers land rationales and therefore to the periurban farmland evolution.

Figure n°8: Land rationales and periurban areas studied



At the same time, we can depict the four land rationales distribution for each of the three studied areas (Figure n°8). These distributions are contrasting, with a frank tendency to decrease of *Adaptive reactivity* from Saint-Etienne to Voiron. A correlation is visible between the rate of external factors in the decision drivers (fig. n°7), and the rate of *Suffered passivity* and *Combative reactivity* (fig. n°8): the more the four external factors are important, the more the *Adaptive reactivity* decreases. In this case, constraints become so eventful that all leeways disappear in the farming system. *Adaptive reactivity* gives place to *Combative reactivity* or *Suffered passivity*. Overall, when urban sprawl is intensive, the only way to continue the activity is to modify directly the constraints. This can only be done by the *Institutional or political positioning* in the structures of land governance. This mode of action stands as the last chance for farmers, or as a global crusade for the conservation of periurban farmland. This impassioned situation should not be conducive to dialogue. These latter decisions may need too much motivation in comparison with the successful opportunities. In this context *Suffered passivity* would be the other issue. It might be adopted by old farmers, or farmers who take part in agricultural sectors in crisis where there are other concerns.

5. Discussion

Some elements of this survey had to be questioned at the end of this article. In particular when we set aside farmers decisions that seemed to match a "normal" context (the others being considered as decisions taken in an obvious periurban context). In this case, the periurban context can be observed as a decision-driver or as a decision's achievement driver. It shows a potential inaccuracy in the survey. Indeed the farmer, anticipating the constraints that would undermine its business, may esteem them as constants instead of variables, and therefore might even not include them in his argumentation. These data become automatic in its decision tree. And so we can't capture this in such a survey. Otherwise, the survey's statistical analysis reveals a noteworthy link between internal and external factors, which distribution would deserve to be specified in an ulterior work. In particular, we could prospect whether some factors' combinations would appear redundant.

Several things could also be learnt from this study. First, we noticed that there is a "periurbanity gradient" expanding from the Saint-Etienne case to the Voiron's case. The more intensive the

urban sprawl is, the less the farmer considers the internal characteristics of his farm or his proper outlooks to develop it (internal factors). In this latter case, a disconnection between his strategy or rationale, and his practices does exist. We propose the exposed method to understand and analyze decision-making process of farming system in the specific cases of very constrained contexts. As we observed the traditional decision theory hypothesizes that practices of farmers always arise from their objectives and strategy. And agricultural activities are nowadays being driven in a more and more intensive constraints environment. We believe this method would be particularly relevant to study other types of farming systems' structural changes in constraining context (climate change, Agricultural European Policy change, laws in managing of water resources…). It would need a previous definition of its different concepts, some decision/motivation couples gathering, and a classification between external and internal factors, modes of action and rationales. Our research problematic about land issues in periurban areas can be taken as a particular example. Naturally this method could present some defaults and bias. The searcher has to pay attention to his attitude. Indeed the farmer can redefine the coherence of his actions during the interview, depending on the interviewer judgment. So this study necessarily needs an important acuteness and a comprehensive behavior as sociology advocates. Considering this example, direct applications should be made. There is as many focused analysis as there are types of decision drivers, action levers or rationales. By combining them, we detect domino effects in a very complex system. Understanding this permits to spread a knowledge that generally lacks in dialogue between public authorities and farmers. Indeed misleading appearances produce some false analyses which are after shared between actors. So it is a good way of avoiding a misuse – or worst – a demagogic use of certain information.

Second, the "periurbanity gradient" we measured from Saint-Etienne to Voiron could be interpreted as a time-scale, if we suppose that territories with current moderate urban sprawl are tomorrow's urban spaces. On one side, farmers are armed against urban sprawl and integrate how to defend their activity after the dislocation has been made. Indeed they enter the cooperation when they already evaluated that there is no way their farm system can adapt itself. On the other, the *Institutional or political positioning* of farmers in very constrained contexts is either non-existent, or too violent. It shows a misleading appearance of farmers' implication about the subject. And it may be ineffectual given these two conditions. Our study sustains that to avoid a virulent and sterile debate; public powers have to associate farmers really early in the governance process. They should involve all farmers, even those who won't seem to be yet concerned in a largest perimeter than just the first crown in contact with the urban front.

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