

Green belts in the hands and minds of farmers: A socio-agronomical approach to farmers' practices

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Abstract: Biodiversity has dramatically decreased in the last decades: mainly because of urban sprawl and the development of intensive agriculture. In France, this topic is addressed by the “blue and green belts” measure, which is part of the “Grenelle” laws. The objective of this measure is to preserve or re-create paths to allow animal or vegetal species to move from one habitat to another. We carried out a research project (PASSAGES) as part of a research program funded by the French ministry in charge of ecology (DIVA 3). This project aims to analyse how the green belts measures can be implemented, and especially how farming can contribute to preservation of green belts. The objectives of the research are: (i) to identify the different semi-natural elements in farming areas which can contribute to green belts, such as permanent grasslands, hedges, woods, fallows, grass strips, and isolated trees; (ii) to understand farmers' practices and knowledge concerning these elements and the reasons for their practices; and (iii) to point out which characteristics of farms and farmers' practices seem to be favourable for preservation and maintenance of semi-natural features. The methodology combined a cartographic approach to localize semi-natural elements in farming areas with an agronomical and sociological approach to analyse farmers' practices; based on deep interviews among a sample of 20 farmers. The studied area is located in the French Alps, in the periurban context of Grenoble (Valley of Gresivaudan). The farming systems are mainly based on cattle or sheep production in the hillsides and on mixed crops in the plains. The results of this work show that semi-natural elements are differently integrated into farming systems (i) depending on their nature (productive elements such as grasslands versus unproductive ones such as hedges) and (ii) depending on their function and usefulness in farming system (for example isolated trees which can offer shade for cattle or hedges which can host auxiliary insects). However the integration of these elements in farming systems also depends on the territorial context of the farming area as well as on how farmers consider them in a patrimonial, an aesthetic, or a sensitive point of view. Combining those criteria, we identify four different profiles of farmers' behaviours concerning semi-natural elements. These results suggest that the implementation of green belts in agricultural areas should not be only based on technical and economic criteria, but should also take into account both the different types of natural or semi-natural elements to be preserved and the different types of farmers' profiles.

Keywords: green belts - biodiversity – farmers practices – French Alps

Introduction: background and issue

The erosion of biodiversity can in part be attributed to the fragmented habitats of animal and plant species. In France, a “green-and blue belt” regulatory provision was set up by the law known as “Grenelle 2” of 12 July 2010, in order to maintain or restore land and freshwater ecological continuities, and to form a coherent ecological network for species movement. The notion of ecological continuity is underpinned by concepts developed in landscape ecology, which has established that the fragmentation of habitats, the narrowing of their diversity, and the reduction of their surface areas affect movement of species and jeopardise their survival. These landscape transformations have multiple causes, including urban sprawl, expanding transport infrastructure, land consolidation and draining of wetlands, and intensification of farming.

Public policies for preserving biodiversity have a particularly strong effect on agriculture. The negative effects of modernised farming on the natural environment are often pointed out, and the synergies that are possible between agriculture and biodiversity are emphasised (Grashof-Bokdam and Van Langervelde, 2005; Le Roux et al., 2008). Implementing public policy that is designed to preserve biodiversity in, and by means of, agricultural areas is often hindered by insufficient knowledge among relevant decision makers of the diversity in farming practices (Girard, 2006), and of the motivations of farmers within their own frame of reference. Thus Thévenet et al. (2006) have shown that farmers who sign up to a biodiversity management contract as part of an agro-environmental measure are motivated by different reasons that reach beyond simple financial reward, such as attachment to places and traditional practices, recognition of their work, or a feeling that they are protecting a common good. Van Dam et al. (2006) emphasise the role of emotions and sensations in the relationships that farmers have with their natural environment. Social representations of landscape and nature by farmers are also part of how they view their activity (Caillault and Marie, 2009).

In the context of implementing the green belt provision, it is thus of particular interest to analyse farmers’ practices and representations of those semi-natural landscape features that could form part of a green belt, which are often located in farm areas and managed by farmers. The research behind the results reported here is part of the PASSAGES⁸⁴ project, which includes the goal of elucidating the role of green belt features in farms. The first step in addressing this goal is to identify the semi-natural features present in and around farmlands that could contribute to setting-up a green belt (the mapping approach). The next step is to analyse the practices, knowledge and representations of farmers with regard to the semi-natural features of their farm (the sociotechnical approach). In this paper, we focus on the results of the sociotechnical approach to the subject, which aimed to find out how farmers integrated semi-natural features, and more generally the natural environment, into the running of their farms.

After presenting our working method, we will highlight a diversity of farming practices concerning the semi-natural features of the farms, and we will propose a typology of farmers based on the level of integration of the natural environment into the running of the farm. These results will be discussed, and we will emphasise certain findings from this work that could contribute concretely to the implementation of the green belt provision by public authorities.

Method

There is no current consensus in the literature on the definition and identification of the potential features of a green belt. Here we will focus on the landscape features that can form channels for the movement of fauna and flora, and so could act as biological corridors; favouring functional links between ecosystems or habitats of diverse species, and thereby allowing their dispersion and

⁸⁴ PASSAGES project: “Ecological networks in the Rhône-Alpes region, translations into planning projects and testing in agriculture”, conducted as part of the research program DIVA III (public action, agriculture and biodiversity) funded by the French Ministry of Ecology, Sustainable Development and Energy.

migration (COMOP TVB, 2010)⁸⁵. We consider that these features: (i) have to display permanency (Plantureux et al., 2012), which rules out, for example, temporary grasslands and annual crops; and (ii) have to be managed in a relatively extensive manner. The features that were finally retained were: permanent grasslands which had been untilled for at least the last 5 years, fallow lands, grassed strips (or buffer strips), woods, hedges, and isolated trees. Hence spatially, these features can form surfaces, lines or points. They can be productive, in the sense that they serve as a support for a farm production activity, or non-productive, by which we mean that they have no direct role in production.

Our work was based on a survey conducted in a sample of farmers in Grésivaudan, which is upstream of the town of Grenoble in the Isère river valley and located between two mountainous massifs: La Chartreuse and Belledonne. This area, lying in a periurban setting, is important for the movement of fauna between the massifs. A distinction can be made between:

- The plain of the Isère river, where residential urbanisation, business parks and commercial areas, roads, motorways and railways, and the Isère river, can form obstacles to the movement of fauna. The agricultural land is sharply confronted with periurban issues. There are diversified crops: arable crops (in particular maize), walnut and fruit orchards, market gardens, and grasslands.
- The hillsides form the transition between the plain and the mountains, and are where the abundant grasslands are used for stock farming (cattle and sheep) based on grassland systems⁸⁶. This area is also subject to a degree of urban pressure and is affected by agricultural decline, which causes in particular the emergence of scrubs and forest encroachment.

The area specifically retained for the study comprised nine communes of Grésivaudan, located some 40 km from Grenoble. It was selected as of interest for the topic studied, with the presence of numerous semi-natural landscape features, diversified agriculture, periurban influences, and environmental issues.

The interviews conducted with the farmers comprised:

- A mapping approach intended to locate the semi-natural features of the farm on aerial photographs to provide a basis for discussion during the rest of the interview,
- A semidirective interview intended to let farmers express their knowledge of the farm's semi-natural features, their practices concerning these features (conservation or destruction, upkeep and management, use, etc.) and their justification, their perception of the natural environment (wild fauna and flora), and lastly their knowledge of the regulatory provisions in favour of biodiversity, and how they saw their contribution to the preservation of biodiversity and landscape.

Each interview lasted on average 1.5 hours, and also provided information on farming systems, the farmer's main strategies, a description of workforce organisation, and how the farmers conceived their activity.

In all, we surveyed 20 farmers. Their remarks were recorded and transcribed for analysis. The choice of the farmers was made to reflect the diversity of farming in Grésivaudan, and to give a large place to livestock farmers, in view of the spatial importance of grasslands in this area. The main technical and economic orientations among the farms surveyed were: livestock in 10 cases (suckler cattle in 6 cases, suckler sheep in 3 cases, and suckler sheep and goats in 1 case), arable

⁸⁵ We therefore leave out of this work the biodiversity reservoirs formed in particular by protected areas.

⁸⁶ Grasslands systems are supported *inter alia* by alpine grasslands located in uplands where livestock are put out to pasture in summer.

crops in 3 cases (cereals and tobacco), walnuts (3 cases), fruit (3 cases), and market gardening (1 case). Farm size was very heterogeneous in terms not only of utilised agricultural area (from 2 ha for the market garden to 200 ha for one livestock farm), but also of herd size in the case of livestock farming (30–100 cows, 60–1000 sheep).

The analysis of the farmers' remarks comprised:

- An approach per semi-natural feature, revealing the diversity of knowledge, practices and attitudes among the farmers with regard to each feature,
- An approach per farmer, which revealed profiles of behaviour towards semi-natural features and different degrees of integration of the natural environment in farming activity.

Management and upkeep of semi-natural features on farms

Here we address the choices made and their justification by the farmers concerned: (i) the conservation, removal or implantation of semi-natural features, and (ii) the practices ensuring the upkeep of these features, and in particular their intensity. We can define different categories of reasons explaining the choice of whether to remove or maintain semi-natural features, or to implant new ones, that vary according to the type of feature considered.

Conservation or implantation of semi-natural features

The first category of reasons given for conserving or implanting semi-natural features concerned exclusively permanent grasslands in farms where these were necessary for production activity. The management of grasslands relied on two types of practice: (i) soil amendment, mowing, grazing and forage production, which are production practices, and (ii) brush clearing and trimming back of plot perimeters, which are considered as upkeep practices. These two sets of practices could be of variable intensity.

For the production practices, the level of intensity fitted into the overall technical and economic functioning of the farm. The most intensive practices in our sample included regular soil amendment of grasslands (organic or chemical), several grazing periods or mowings per year (up to three), and sometimes with wrapping. We found these practices in farms where livestock farming was the main activity and where forage was consumed on-farm. They were justified by reasoning in terms of food production optimisation for herds, and an objective of feed self-sufficiency. Production practices were less intensive when livestock farming or forage activity was a secondary activity. Plot configuration (shape, slope, accessibility, setting) and the distance of plots from the farmstead also conditioned the nature and intensity of productive practices.

The survey showed that the upkeep of grasslands and their approaches was not linked to the choice of productive practices: intensive upkeep (frequent brush clearing and trimming, more than once a year, by mechanical or chemical means) was not necessarily associated with intensive production practices, and *vice versa*. Farmers could justify relatively intensive practices for the upkeep of hedgerows and adjoining woodland with technical and economic arguments, such as to optimise neighbouring crop areas or forage quality, or to preserve fences. However, they also stated other reasons that corresponded to how they perceived the farm landscape context or how they viewed their activity. For most of the livestock farmers surveyed, upkeep of grassland approaches was part of a fight against encroachment, and also reflected their concern about land abandonment and the future of livestock farming in the area. For others, this upkeep was above all a question of orderly farming and a show of work properly done: “*cutting back edges makes tidy meadows*”.

The second category of reasons given for conserving semi-natural features (other than permanent grasslands) on a farm stemmed from the farmer's perception of a utility, which was often not solely technical or economic, balanced against the constraints arising from the presence of the

feature. This was the case in particular for woods, hedges and isolated trees. The utility might be linked to the productive activity: livestock farmers emphasised that trees provide comfort for grazing animals by offering shade or a surface to rub against. Hedges and woods can serve as natural boundaries (*“keeping the animals from straying”*), protect the animals from dangerous areas (e.g. rocky ledges), help to stop land erosion, or harbour auxiliary insects: *“some insects, like Antochoris, hibernate in hedges, near fruit trees, near walnut trees. We don’t pull them up because they can give shelter”*. The utility justifying the conservation of semi-natural features could also be more personal, such as production of firewood, or for picking or collecting fruit for family consumption (walnuts, cherries, apples, etc.). Some farmers also pointed out the heritage or landscape value of trees or hedges. Others stated a historical, cultural or sentimental attachment to trees, or were receptive to their aesthetic value: *“these trees around the farm really let me breathe”*. Lastly, for some farmers, semi-natural features favoured the presence and movement of wildlife, which can offer a pleasure for the eye or game to hunt as a leisure activity. However, we note that most of the farmers surveyed did not explicitly link the presence of this fauna to the conservation and management of semi-natural features, with wildlife being most often seen in crop fields or alpine meadows. Decisions to conserve or remove semi-natural features, together with upkeep practices, thus varied widely in time and space and according to the individual farmer. Choices were guided both by the nature of the feature, and by its density in the farm and its distribution over the agricultural area. The notion of a tolerance threshold was often implicit: features would be conserved so long as their utility outweighed their inconvenience.

The absence of any hindrance (*“it’s not in the way”*), or the longstanding presence of the feature (*“the hedges are there, so we keep them, that’s all”*), formed the third category of reasons given to conserve semi-natural features on the farm.

The fourth and last category of reasons answered an obligation: regulatory obligations for grassed strips, or linked to land ownership when the owner wanted to conserve woods, hedges or isolated trees: *“sure, without all these hedges we’d have one big field there! They could go... but it’s not easy when you’re not the owner”*. A farmer could also opt to conserve features, when they bounded a plot, to maintain good relations with neighbours. Upkeep practices in such cases were most often minimal.

Removal of semi-natural features

Three main reasons were given to justify the choice of removing semi-natural features from farms.

The first reason came from the ending of a regulatory or ownership obligation, and concerned essentially grassed strips and fallow fields, together with hedges and other woody features that did not belong to the farmer. However, some farmers who had been obliged to set in place, or conserve, these features later found them useful, and so conserved them even after the legal obligation had ended. For example, fallow lands were converted into permanent grassland. Secondly, the absence of any perceived utility in keeping semi-natural features could also be a reason for removing them. Lastly, the farmer might remove a hedge or an isolated tree to avoid certain constraints or hindrances linked to production activities, such as damage caused to farm machinery by trees, or the time and effort required for upkeep: *“the cabs get knocked about, mirrors get broken, so we have to raise the branches (...) the old folk had the time to trim back the thorns, but we haven’t got the time any more”* explained a livestock farmer. The reasoning also concerned the reduction of available crop area (fallows); the competition of hedges, trees and woods with immediately adjoining crops; and nuisance effects, such as shade, damp, and the risk of disease appearing in crops. Some species were particularly unwelcome, such as acacia and other such *“thorns”*, and firs.

To conclude, the choice of conserving or removing semi-natural features present on the farm, and their upkeep practices, were justified not solely on technical or economic grounds. Other stated factors included aesthetic, heritage or sentimental concerns, and attention to the well-being of livestock.

Four farmer profiles

We were able to define four farmer profiles based on similar practices, or reasons for practices, concerning non-productive semi-natural features (woods, hedges, isolated trees, fallow fields and grassed strips). These choices of practice proved to be closely correlated with how the farmers saw the natural environment in general, and the role they lent these features in the functioning of the farm. The natural environment was viewed through farmers' representations of landscape and through their knowledge and perception of the wild flora and fauna. The four farmer profiles we found were graded according to the extent to which the natural environment was integrated into their farming activity.

Natural environment to be controlled, semi-natural features to be removed

The first group of farmers (5) were characterised by the absence of any integration of the natural environment into the farming operation. These farmers viewed the natural environment as a threat to production activity. Their knowledge of the wild fauna and flora was scant. Wild animals were perceived essentially as “*pests*” insofar as they could damage crops and farm equipment, or disturb livestock activities. Wild boar were particularly incriminated, and to a lesser extent deer, rabbits, rodents and crows: “*damned wild boar can do a lot of damage to maize*”, complained one farmer. Such damage was not tolerated, and the animals causing it were hunted down. Non-crop vegetation was essentially viewed as encroachment, and described in negative terms: “*thorns*”, “*all these messy oak sprouts, rough weeds*”, and “*bushes, brambles, brushwood*”. Landscapes that were found to be attractive were those that were farmed and well-kept, and where a human presence was fully visible. Tidiness was emphasised and associated with work well done. For this group of farmers, the wild state, whether of animals or plants, must be controlled and kept well apart from crops and livestock.

These farmers tended to remove any non-productive semi-natural features present on the farm, unless there was an obligation to conserve them. Grasslands, when they formed an important part of the production system, were managed intensively. No special attention was paid to mowing direction to let fauna escape: « *I sometimes cut up game! Sometimes you cut its hind legs, [of deer], you stun it, if it's small we get rid of it, if it's a big one, we take it down at midday, skin it and eat it*”. Upkeep of grassland approaches was intensive, including treatment with chemicals. When financially possible, this upkeep was contracted out to a service company. Conversely, when grassland was not essential for production activity, and clearing it was too much trouble, then it might be left to overgrow.

Natural environment tolerated, semi-natural features generally conserved

The second group of farmers (5) were characterised by partial integration of the natural environment into the running of the farm. The natural environment was present, with its attendant constraints, but with its possible advantages, and so the farmers accepted it. They had ranging knowledge of wild fauna and flora, which they occasionally enjoyed, or to which they were indifferent. They tolerated damage done by wild animals, considering it to be either minor, or unavoidable: “*there are more and more wild boar, I don't know what to do*”.

These farmers adopted practices for the general conservation of semi-natural features present on their farms, because of some particular utility (trees and grasslands) or an obligation (reserved grassed strip), and most often because these features had always been seen there and were not a great hindrance: “*the cows graze under the hedges, there's no problem (...) the trees, if they really get in the way, yes, we fell them, but if they're in a corner or on a mound...*” Upkeep was minimal

and general: *“I go all round with the brushcutter”*. Although permanent grasslands were farmed with varying intensity, the upkeep of their approaches was usually nominal. It depended generally on the time available, the cost and the work effort required.

Natural environment to be optimised, semi-natural features to be managed in a differentiated way

Like the second group, the third group of farmers (7) partially integrated the natural environment into the running of the farm, but this integration was differentiated. In certain places, to a certain degree, certain wild animal or plant species could be useful for the farming activity and so warranted conservation; for example beneficial organisms used for biological control. By contrast, other species were to be eliminated because the damage they caused was only tolerable up to a certain threshold. While the tolerance threshold was not reached for some farmers, *“wild boar, we live with it, we have problems, we live with it”*, for others it was crossed, and they organised themselves accordingly: most often with hunting federations: *“wild boar are a big concern, we have kilometres of fences; we’re pleased when the hunters kill a boar, it’s good riddance”*. The natural environment was perceived essentially from a utilitarian standpoint. The farmers in this group had varied knowledge and appreciation of the natural environment, which was not only from the point of view of farm production, but also according to other criteria: *“walnut trees look nice”* or *“sometimes I’ve mown down a little deer, it’s upset me for the rest of the day”*. They liked tidy landscapes (*“I hate to see overgrown meadows”*) and farmed in a diversified way with the presence of trees and hedges, in which the farmer is appreciated for his role in maintaining this type of landscape. *“it’s the variety that make it look nice”*, *“if you’ve got just one crop in the valley, it’s boring, and it’s horrible because there’s no life!”*; *“the countryside without farmers would just be woods(...) just thorns and brush, it wouldn’t make you want to go for a walk in the country”*. They deplored the encroachment of woodland due to the abandonment of agriculture on hillsides: *“we put the cows out to graze in the meadows, that way they’re cleared, otherwise it wouldn’t look nice.”*

The management of semi-natural features was differentiated: they were removed when they were a hindrance, but conserved when they could be useful, according to their nature and their location in the farmland. For example, hedges were removed where they got in the way of farm machinery, but kept near fruit trees where they harboured auxiliary insects. This group of farmers were also characterised by their strategies of optimisation and adaptation. Reserved and compulsory grassed strips were positioned on the plots that were on the steepest slopes, were the least accessible and were the least productive. The management of permanent grasslands (production and upkeep of approaches) was also strongly differentiated according to the localisation and configuration of the plot and the destination of the forage. The farmers in this group seemed to have a greater knowledge of their forage composition, and paid particular attention to its nutritional quality and its attractiveness for their livestock: *“[in my meadows], there’s a bit of clover, cocksfoot, fescue, and where it’s not so good, there’s plantain and a few tufts of alfafa”* explained one farmer, whereas for most of the persons surveyed, their meadows were composed only of *“grass”*.

An integrated natural environment, management of semi-natural features to be improved

The fourth group of farmers (3) were those who integrated the natural environment most fully into the running of the farm. They had good knowledge of wild and domestic fauna and flora, and appreciated the natural environment: even wild boar: *“Once I saw a herd of boar (...) there were thirty or forty, lovely sight (...) I didn’t have a camera, but I enjoyed seeing them!”*. They accepted crop damage done by animals, and tried to limit it, while at the same time respecting the wildlife. For them, their farm formed an integral part of the natural ecosystem, and they felt the need to disturb it as little as possible. They asked themselves questions about the impact of their activity on the ecosystem functions or on the lives of animals. They appreciated landscape where the human presence remains discreet. Unlike in the other three groups, tidiness was not important to them, but they were aware of its importance to others: *“it’s not easy having people looking at plots [grassed orchards] and finding them untidy”* explained a fruit grower. The farmer is appreciated for his role in preserving land and landscape from urbanisation.

This representation of the natural environment was reflected in conservation practices and even implantation of new semi-natural features: especially tree-based. Upkeep of these features was not intensive, but above all selective. Constraints were turned into advantages. The observation of semi-natural features was a source of inspiration for adapting agricultural practices. Concerning hedges, a fruit grower explained: *“the point is to try and keep the species in place and not add any more, not to turn out beneficial organisms; why would I want to bring in a species that’s not adapted here? (...) we’re going to preserve what’s here the best we can, we’ll see over the years as we go along (...) we’ll adapt.”* Permanent grasslands were managed with an eye on the quality of the forage produced for animal feed, and with attention paid to mowing direction so as not to hurt animals: *“when you mow meadows you see game; I’m careful (...) last year I was starting to mow this plot (...) I saw a lovely green lizard (...) I was careful, (...) I was pleased, he got away.”*

Discussion and conclusions

Methodological limits

Some biases and limits of our work are inherent to this type of survey: in particular a limited sample of farmers, uncertainty in the remarks of the person surveyed, and subjective interpretation of the researcher. This work is being continued, as part of the PASSAGES project, by surveys of the same type in two other areas with different characteristics, which will allow a comparison and enrichment of the results.

Our approach to the subject through farmers’ practices and the choice not to address the issue of biodiversity and its links with farming practices frontally, probably enabled us to avert inhibition in the interviews and to obtain a fairly high degree of freedom of expression. Even so, we did not always avoid the pitfall of collecting general comments on what “others” think or do, and it will be necessary to consider how to allow a more personal and more reflexive discourse from the persons surveyed on their practices and perceptions of the natural environment and landscape.

Advancements and discussion of results

The results of our survey confirm that the justifications given by farmers for their practices and representations concerning semi-natural features do not refer solely to technical and economic criteria, but also draw on more personal ones such as heritage or aesthetic interest or family use (Thevenet et al., 2006; Larrère et al., 2007).

The main outcome of our work is that it highlights the diversity of farmers’ attitudes and practices, diversity according to the semi-natural feature considered, diversity in space and time, and diversity according to the farmer. Thus according to its location, a semi-natural feature (in partic-

ular a hedge) will not have the same status, the same role or the same representation for the farmer. We also found that farmers' practices and representations could evolve during the lifetime of the farm; such as according to experience gained, the evolution of the workforce organisation, changes in context, and meetings, or sometimes conflicts, with other players. The landscape and territorial context, such as agricultural abandonment and overgrowth of hillsides, periurbanisation, and local farming dynamics, also influence farmers' representations of semi-natural features, and thereby their upkeep and management practices. However, the farm landscape is still often described with reference to productive agricultural activity, as noted by Petit (2012): an overdeveloped hedge hinders the movement of farm machinery; the quality of grassland is evaluated by the attractiveness of the grass for livestock, or by the quality of the hay that can be harvested; and isolated trees are accepted, or even desired, to give shade to animals or to let them rub themselves on the trunks.

Land ownership was found to be a very important factor for the upkeep of hedges and woods: farmers are often tenants of at least part of their land and so must respect the wishes of landowners. In addition, the existence of short tenancy agreements, which are frequent in periurban areas, leads some farmers to eschew the replanting of hedges and to avoid spending too much time on their upkeep.

Conclusions and perspectives

The farmers surveyed displayed very wide-ranging but generally scant knowledge of the "green belt" policy. Many of them considered it as potentially one more constraint and divorced from the everyday reality of farming.

The evidence for different farmer profiles was based on the degree to which the natural environment was integrated in their farms. The different profiles argue for differentiated approaches in the implementation of the green belt provision by the public authorities, and in particular, a communication policy to fit the different farmer profiles. Farmers of type 1 seem to be not very receptive to the preservation of biodiversity, and seem to favour economic efficiency. By contrast, those of type 4 seem more amenable to adapting their practices to pay greater attention to biodiversity, and even extend this to trying out new practices. Farmers of types 2 and 3 display varied receptiveness to biodiversity issues. Their perception of semi-natural features can be variably influenced by highly diverse factors that extend well beyond mere technical and economic justifications, and can stem from personal preferences, the local territorial context, or how they view their occupation.

Our work can help to reduce the distance separating the world of farming and that of nature conservation: two worlds that differ in the values, standards and knowledge that legitimate and govern their activities (Billaud and Steyaert, 2004). We provide a deeper knowledge of farmers' practices and representations concerning semi-natural features, of their perception of the natural environment, and of the justification of these practices, that can also enable public authorities to ease conflicts and find compromise solutions for combining environmental objectives and farmers' practices and perceptions, as noted by Henle et al. (2008).

Recommendations and communication for the implementation of the green belt policy should take into account the farmer profiles that we have identified, as well as the different practices and representations that coexist among semi-natural features on the same farm. By suitably adapting the messages delivered, and taking into account the farmer's frame of reference, it should be possible to foster a true integration by farmers of practices that favour the preservation or reconstitution of green belts.

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