

# Multifunctional Agriculture and Farmers' Attitudes: Two Case Studies in Rural France

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Published online: 28 October 2014  
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**Abstract** Understanding farmers' attitudes towards the environment is essential for the implementation of land management policies. Since 2000 conservation policies in France, as in other countries, have introduced the concept of “multifunctional agriculture” whereby farmers are entrusted with responsibility for environmental and landscape conservation in a peasant tradition that the “Green Revolution” largely eradicated. To assess farmers' and other inhabitants' attitudes towards the conservation of nature, we conducted fieldwork for 3 years (2010–2013) in two French municipalities located in a *bocage* area (farmland with hedges and groves). Results confirm that farmers feel more connected to nature than other rural residents. However, their perception that nature should be under human control, “clean” and “tidy,” contradicts many aspects of conservation policies. Our results also highlight differences between organic and non-organic farmers, especially in the acceptance of protection policies, but their perception of nature is very similar. Local history and social dynamics specific to each municipality have a strong influence on their environmental conditions.

**Keywords** Farmers' attitude · Rural France · Multifunctional agriculture · Environmental impact · Conservation program · Ordinary biodiversity

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## Introduction

Because of the territorial extension of agriculture and livestock farming, farmers are considered major actors in land use regulation and environmental policies (Mattison and Norris 2005). A number of sociological studies have addressed the underlying attitudes behind their practices (Sullivan *et al.* 1996; Ahnström *et al.* 2009; Karali *et al.* 2013). These attitudes are not exclusively grounded in economic rationality, let alone the social reproduction of the production unit. They are oriented by social context (Bieling and Plieninger 2003; Burton 2004; Michel-Guillou and Moser 2006), family history (Ahnström *et al.* 2009), differing sensitivities regarding the environment (Siebert *et al.* 2006), and economic opportunities. Most of these case studies highlight a strong commitment to life “in the open air” and a sentiment of proximity to nature. The longer a family has been settled in a region, the deeper the attachment (Ahnström *et al.* 2009). These studies also show utilitarian appropriation of nature to produce food and also landscapes that reflect man's control over the environment - a less pronounced ideology among organic farmers (Sullivan *et al.* 1996). Their privileged relationship with nature makes farmers averse to the idea that their activities should be supervised by national or local authorities (Léger *et al.* 2006).

Farmers are subject to two main pressures: political pressure (from institutions and public opinion) concerning their practices and behavior towards the environment, and pressure in terms of land use linked to local and regional development processes (residential settlements, industrial or commercial areas, transportation and infrastructure). As a consequence many farmers consider themselves victims of economic harassment. Farmers' behavior is largely constrained by the way these pressures are exerted, by economic conditions (markets, European subsidies) that make them more or less bearable, and finally climate conditions. Since the 2000s, conservation

policies in France, as in other countries (e.g., United Kingdom: (Burton 2004); Switzerland: (Miéville-Ott and Droz 2010)), have introduced the concept of “multifunctional agriculture” that allows farmers not only an economic function, but also a social and environmental role. Farmers, who see themselves primarily as food producers, have thus found themselves entrusted with responsibility for environmental and landscape conservation.

Our study of the socio-environmental factors that influence biodiversity rehabilitation (CLEVERT)<sup>1</sup> was designed to examine the relationship between social dynamics and environmental conditions in two French municipalities located in a *bocage* area (farmland with hedges and groves). Between 2010 and 2013, we conducted qualitative and quantitative surveys, and sampled the biodiversity of the municipalities. This paper presents our results related to the attitude of farmers (active and retired, organic and non-organic) towards common biodiversity and environmental policies in comparison to other rural residents; we also pay a special attention to the historical background and the current economic and social context, such as land pressure and social dynamics.

Our study confirms that farmers feel connected to nature. However, their perception that nature should be under human control, “clean and tidy,” contradicts many aspects of conservation policies. We also show differences between organic and non-organic farmers in their understanding of environmental protection policies, although their perceptions of nature are very similar. Farmers clearly differ from the non-farming population in their negative perception of undomesticated nature and their reluctance to accept protected areas. We show that history and the social dynamics specific to each municipality have a strong influence on the farmers’ attitudes and thus on the state of the environment.

### French agricultural policies and their environmental impact

Agricultural modernization in France began with the Agriculture Orientation Law (LOA) of 1960. The French Government undertook far-reaching structural reforms in the farming sector, well beyond simple financial incentives that were central in other European countries’ policy (Burton 2004). The undeniable success of this policy in technological and economic terms was

accompanied by an environmental impact that is difficult to measure due to lack of ecological data prior to 1970. Environmental awareness, which became significant in the 1980s, was supported by the 1999 LOA.

The industrial revolution in France in the second half of the nineteenth century began a process of fragmentation of agricultural land accentuated by the decline of social and economic value of land (Thébault 2002). The Great War of 1914–18 practically wiped out male rural population as most of the draftees were young peasants. Technology gradually replaced this workforce. After the Second World War (1939–1945) successive governments undertook the transformation of traditional agriculture, oriented primarily towards self-sufficiency, by favoring progressive movements such as the Young Catholic Farmers (JAC). This process culminated with the Agriculture Orientation Law of August 5th 1960, completed in 1962, meant to establish parity between agriculture and other economic activities by professionalizing farmers without upsetting the well-established tradition of family farms (Alphandéry and Dupont 1985: 20). The SAFER (Land Development and Rural Settlement Societies), a decentralized body created by the law of 1960, organized the land market and facilitated access to ownership for tenant farmers and sharecroppers. The reorganization of plots (land consolidation), which expanded in the 1960s, was designed to allow the use of agricultural machinery. The National Institute for Agronomic Research (INRA), created in 1946, was the main instrument for the modernization of agriculture.

The success of this modernization policy, reinforced by the implementation of the European Common Agricultural Policy in 1962, was at the expense of social relations governing tenancy and sharecropping (Cochet 2004) and hedgerow ecosystems in many regions. The expansion of farmers’ access to land ownership resulted in technical innovations but also in a radical landscape transformation and a rapid loss of biodiversity. As a consequence since the early 1980s legislation is moving towards more environmentally sensitive land management by reviving traditional production systems (Alphandéry and Dupont 1985).

The preamble of the Agriculture Orientation Law of 1999, which incorporates into French law the European guidelines for the establishment of the Natura 2000 network (Alphandéry 2001), states: “Agricultural policy takes into account the economic, environmental and social functions of agriculture and supports sustainable development.” This was part of the European strategy for biodiversity conservation derived from the 1992 Convention on Biological Diversity. The Pan-European Ecological Network was expected to complete and make ecologically functional the system of protected areas

<sup>1</sup> The “Socio-environmental conditions for the rehabilitation of ordinary biodiversity” program funded by French Ministère de l’Ecologie between 2010–2012 and by French *Caisse des dépôts et consignations* for 2013–2014, coordinated by F. Kohler.

created by the Birds (1979) and Habitats (1985) Directives (Pinton *et al.* 2007).<sup>2</sup>

The shift introduced by this law is twofold: first, the “multi-functionality” of agriculture, i.e., its economic, environmental and social functions, and second, the regionalization of agricultural policies, which should be adapted to the characteristics of local soils and traditions (Article 1, paragraph 1). According to the LOA, the agents responsible for maintaining the landscapes “for the benefit of all users of the countryside” (*idem*) are the farmers - a cultural revolution for a profession that 30 years ago understood its mission was to “feed the world.” The EU Common Agricultural Policy reform in 2003 introduced a simplified system of subsidies, the Single Farm Payment, as a counterpart of virtuous practices (cross-compliance). The agricultural community is extremely divided about these innovations, especially increased control of their activities by local or national administrations (Léger *et al.* 2006).

The imposition of the Common Agricultural Policy coincided with a period of great vulnerability due to overproduction and to the aggressive policy of purchasing networks in imposing low prices. Furthermore, the competition resulting from improved transportation, population growth and regional economic growth, generated a rise in land values. Land under agriculture in France decreased by 20 % in 50 years, from 35 to 28 million ha; 2.5 million ha were lost to infrastructure and housing, and 4.5 million ha were abandoned as farmland. The conversion of croplands into settlements for the purpose of habitat development, recreational or commercial areas, is associated with the phenomenon of “suburbanization” or “rurbanization.”<sup>3</sup> Maintaining agricultural activity becomes problematic in inhabited areas and land-use conflicts increase (Jeannaux and Perrier-Cornet 2008). The pressure on land was intensified after the transfer of urban planning to municipalities (decentralization laws of 1982). The result was an accelerated land conversion (individual houses, malls, hypermarkets and industrial zones) coupled with a greater loss of agricultural land: between 2006 and 2010 about 78,000 ha per year, or 3,000 km<sup>2</sup> in 4 years (Ministère de l’Agriculture 2010; SAFER (Sociétés d’aménagement foncier et d’établissement rural) 2012). Nevertheless, agricultural land still accounts for more than 50 % of French territory.

<sup>2</sup> The environmental section of the Agricultural Orientation Law of 1999 is enforced by Law No. 2010–788 of July 12, 2010, concerning national commitment to the environment (“Grenelle 2”) that sets the “Green and Blue Frames” (Article 121) so as to “identify or restore, by 2012, a coherent and functional ecological network ... allowing plants and animals to communicate, move, feed, reproduce and rest, so that their survival is guaranteed: biodiversity reservoirs will be connected by ecological corridors, terrestrial (green frame) as well as aquatic (blue frame).”

<sup>3</sup> Rurbanization is the phenomenon by which rural towns next to employment areas become residential, the “rurban” inhabitant commuting between home and work.

Land consolidation, which radically transformed rural landscapes, turning hedged and wooded areas into open fields, has strongly impacted the flora and fauna. Fragmentation of natural ecosystems resulting from inappropriate land consolidation has been recognized as a major cause of biodiversity loss (Poschlod *et al.* 2005). It is, however, necessary to distinguish the loss of habitat, which is always very damaging to biodiversity, from fragmentation, which may have either positive or negative effects (Fahrig 2003).

Several ecological structures identified as important for the conservation of habitats (Lisec and Pintar 2005) are affected by land consolidation. The destruction of hedges has a significant impact on biodiversity, since these ecological structures are characterized by specific plant composition and provide habitat for many animals, including predators of agricultural pests. They are crucial to the ecological network in the rural landscape and offer protection against evaporation and erosion by water or wind. Land consolidation has also resulted in the elimination of many ecosystems at the edges of cultivated land, or between fields and roads. These ecosystems are dominated by herbaceous vegetation and have a significant importance in agricultural landscapes (Hodgson *et al.* 2005). Ecosystems found along streams, which are important in the protection of aquatic biota against the chemicals used in agriculture (Lisec and Pintar 2005), were also strongly affected by land consolidation, and have been partially or completely suppressed by intensive agriculture. Many projects, such as drainage works, had a strong negative impact on aquatic biodiversity, including fish, invertebrates and riparian vegetation. The eutrophication is amplified by the consolidation, aggravated by row-cropping (Arbuckle and Downing 2001), and the use of pesticides strongly degrades aquatic ecosystems (Beketov *et al.* 2013). In addition, ponds, pools and small water holes were also often destroyed.

Thus, the effectiveness of ecological functions decreases due to the fragmentation of ecosystem networks. With land consolidation, semi-natural habitats are increasingly isolated from each other. Agricultural units have become fewer but larger, resulting in larger areas under intensive management and homogeneous cultivation. The heterogeneity of the landscape, which is associated with higher biodiversity (Benton *et al.* 2003; Smukler *et al.* 2010), is therefore significantly reduced, leading to a sharp decline in biodiversity.

Land consolidation also induces changes in the species composition, such as Carabidae, and reduces the relative abundance of large species, while smaller mobile and ubiquitous species are favored (Millán de la Pena *et al.* 2003). Amphibians, with the highest proportion of endangered species, are particularly affected by habitat loss and fragmentation of the landscape (Cushman 2006). The impact of local destruction of the landscape on pollinators has also been shown to affect solitary bees more than social bees (Steffan-Dewenter *et al.* 2002).

Devictor *et al.* (Devictor *et al.* 2007) have shown that the spatial response to fragmentation and landscape disturbance tends to be even more negative for specialist species of birds. Levrel (Levrel 2006) summarizes the results of the STOC program ("Long-term monitoring of common birds"), established in 1989, until 2001. According to these results, 41 species (out of 89 observed) are declining or threatened, 40 species remained steady, and eight are increasing in numbers. The overall population of common birds has declined by 14 % over 12 years. According to Julliard *et al.* (Julliard *et al.* 2004), this decline is not a result of hunting or new migration strategies, but due to climate change and intensification of agricultural practices.

### The CLEVERT Program

The CLEVERT program, which ran from 2010 to 2013, was a partnership of the *Centre National de la Recherche Scientifique*, the *Institut de Recherche sur le Développement*, and the *Muséum National d'Histoire Naturelle*. The program sought to highlight collective attitudes to explain the environmental impact of successive land reforms and consolidation in two French municipalities located in wooded and hedged areas. The municipal level was chosen as it is the lowest political decision unit, and ecological processes have been shown to be relevant at this scale (van Diggelen *et al.* 2005). Both municipalities have mixed farming and intensive breeding (dairy cows and beef cattle) within family farms; the largest farm covers 133 ha of fodder corn and dairy cows. Organic farms range from two to 2 ha for truck farming, and much larger for dairy breeding (Map 1).

An interdisciplinary program, CLEVERT facilitated frequent and prolonged field work periods, allowing the participant observation. We conducted socio-ecological surveys (see Appendix) of approximately 10 % of the population of each municipality, as well as sampling biodiversity and participatory "sense of place" mapping sessions (McLain *et al.* 2013). The maps reveal the interdependence of spatial, temporal and social representation. We also used the GIS mapping tool to enable our partners to visualize the evolution of familiar landscapes.

Biodiversity sampling protocols were based on the identification of six habitats (urban habitat; edges of cultivated fields; meadows; groves; wetland; hedges) duplicated in each municipality (i.e., 12 sampling points per municipality). In each sampling point, plant, rhopalocera, bat and pollinator surveys were conducted according to the protocols developed by the Vigienature program (Vigiflore protocols, Propage, Vigienature-bats, Spipoll) (<http://vigienature.mnhn.fr>). These are simple and replicable protocols for participatory science programs (Couvet *et al.* 2008).

Saints-en-Puisaye (Yonne) and La Genétouze (Vendée)

Saints-en-Puisaye (Yonne, 600 inhabitants, 2,770 ha) is located in the Puisaye region of Burgundy. This region of forest and wetlands is renowned for a tradition of resistance to central administration: Protestants in the sixteenth and seventeenth centuries, anarchists ("communards") in the nineteenth century, and communists in the twentieth century found shelter here during periods of persecution.

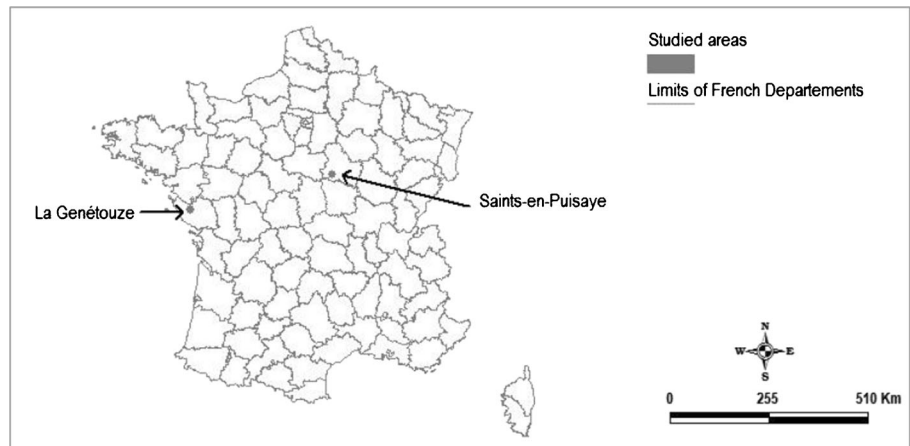
The village of Saints-en-Puisaye has two major soil types: in the west, a calcareous soil ideal for cereal crops, while in the east there is a clay soil suitable for mixed farming. This municipality is relatively far from urban centers (Auxerre is 50 km away and Joigny 60 km). This relative isolation has created a virtuous circle in favor of organic farming particularly on the part of the neo-rural<sup>4</sup> inhabitants and there is a marked environmentalist atmosphere.

Land consolidation was conducted in 1962, and while it strongly impacted hedgerows (Table 1), it had little impact on the overall landscape. However, in the early 1970s the dairy factory situated next to Saints-en-Puisaye closed, bankrupting many breeders. A few managed to survive, and two became pioneers in organic dairy production, which restored healthy environmental conditions and fostered the settlement of young organic producers and the conversion of other farmers to organic production. The field interviews revealed a strong commitment to the local landscape and biodiversity (Kohler *et al.* 2013). The land consolidation (Map 2) has had little impact on the nature of land ownership: smallholders predominate, creating favorable conditions for social cohesion, which, in turn, facilitates social control on environmental practices (Rosin and Campbell 2009). Young neo-rurals are rapidly integrated into social activities (organic market, theater, cultural activities, etc.) and share the general consciousness about the virtues of environmental health. The people of Saints began a voluntary replanting of hedges to partially restore the tree cover and facilitate the return of small game. It is hardly surprising that the current mayor is an organic dairy producer, strongly committed to green political movements; his authority, mostly derived from being a native, allows him to enforce environmental legislation on his sometimes reluctant citizens.

At La Genétouze (Vendée, 1800 inhabitants, 1,310 ha), land consolidation took place relatively late (1968 to 1972) to modernize local agriculture. The *bocage* landscape then disappeared, which was seen at the time as a positive development by the majority of inhabitants. Land consolidation coincided with access to land ownership for many

<sup>4</sup> Neo-rurals are inhabitants who abandoned their urban life to live and work in the countryside. They generally share a libertarian ideology and green sensibility, but unlike their predecessors (those who became farmers or sheep and goat breeders after the 'Revolution' of May 1968), the economic success of their farm is essential for them.



**Map 1** Localization

farmers and sharecroppers. This phenomenon occurred while the Department of Vendée, on the Atlantic shore, was experiencing a touristic and industrial boom (Renard 2005).

The sense of social and technical backwardness among the inhabitants of La Genétouze intensified the transformation of landscape by destroying more hedges than necessary (Table 2), even where they should have remained in place at roadsides and property borders: “The hedge was the enemy. It had become a constraint that no one could bear anymore” commented the surveyor (now retired) who operated the land consolidation in the municipality. Nowadays, most farmers continue to practice mixed farming and breeding, but intensive breeding predominates (three out of four farms).

At the same time, the nearby and extremely dynamic urban center of La Roche-sur-Yon (7 km) intensified the pressure on land, fostering an active building policy and, in parallel, a concentration of farms. The population is currently composed mostly of urban commuters and agricultural retirees, the farmers now being in minority. Land-use conflicts between farmers and urban commuters provoke social tensions most often resolved in favor of the latter. Urban settlements accompanied population growth (from less than 600 inhabitants in 1970 to more than 1800 in 2012—Data French Institute of Statistics - INSEE), now covering almost 10 % of La Genétouze area (Map 3).

### Results of biodiversity sampling in the two municipalities studied

Biodiversity sampling conducted in the municipalities helped to highlight some differences between Saints-en-Puisaye and La Genétouze (Tables 3 and 4).

#### Pollinators

The study of the proportions of pollinators by order helped to highlight the differences between Saints and La Genétouze (Chi2 test,  $P=0.001$ ). At La Genétouze, almost half of the identified insects are Diptera; this phenomenon can be explained by the numerous cattle farms that attract a lot of flies. In Saints, Diptera are present but are less represented. Rather, the results show a good balance between the three main groups, which may reflect heterogeneity in the landscape. Saints is also distinguished by its quantity of beetles, representing 32 % of the insects identified. This order includes species that are mostly xylophages, especially as larvae. Their presence here can be related to the amount of forests and hedges in this county.

#### Details on Local Biodiversity

Plant diversity at La Genétouze is comparable to the national average. When it comes to pollinators, it is the county with the most unbalanced results, with some highly predominant species groups compared to others, for example, the preponderance of

**Table 1** Areas by habitat type at Saints-en-Puisaye in 1957, 1980 and 2009

	Forested areas (in hectares)		Settlements (in hectares)		Croplands (in hectares)		Hedge (in meters)	
Saints-en-Puisaye	1957	314,23	30,73		2,380,70		357,698,05 (estimated surface: 107 ha)*	
	1980	340,69	33,23		2,352,18		149,635,90 (estimated surface: 45 ha)*	
	2009	365,41	365,41		2,316,48		91,912,54 (estimated surface: 28 ha)*	

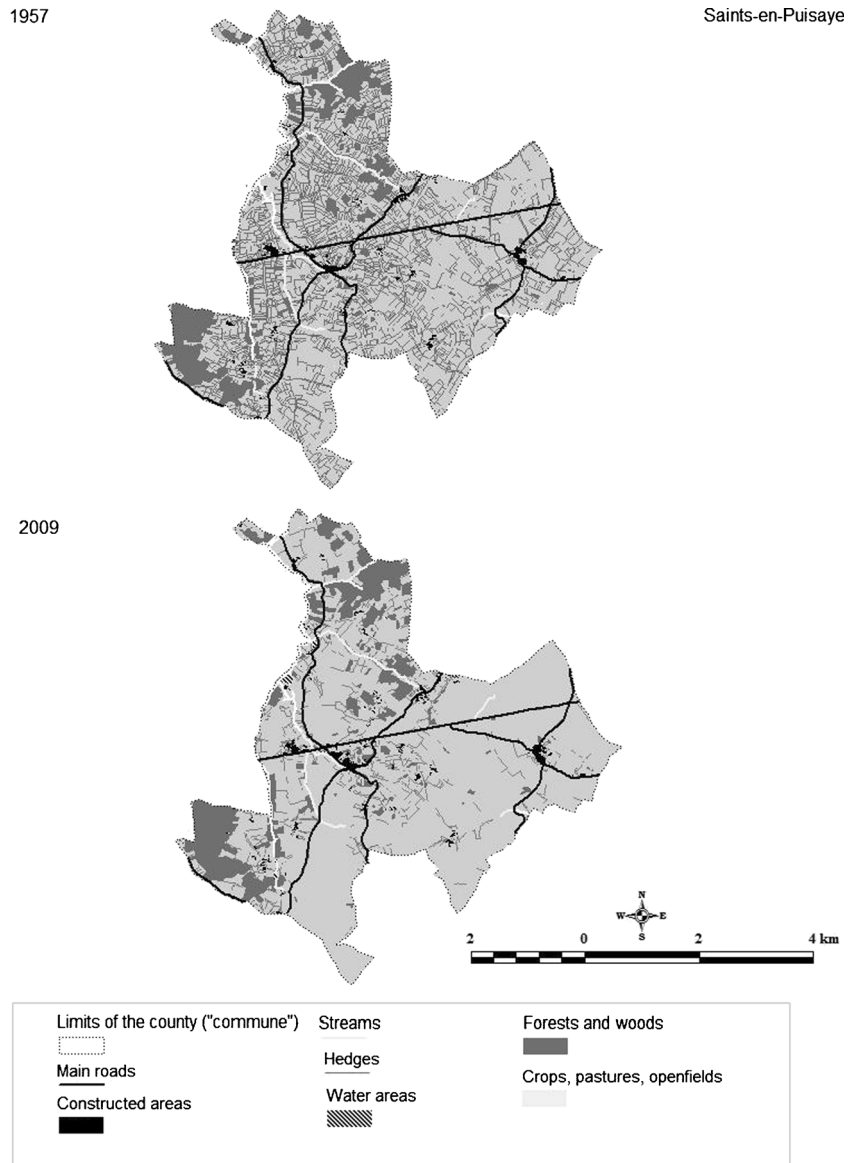
\*NB: The estimated hedges area is not included in the total area, which is constant (2,770 ha)

**Map 2** Evolution of the habitats at Saints-en-Puisaye between 1957 and 2009

1957

Saints-en-Puisaye

2009



flies due to cattle farms, or the ubiquity and abundance of the Meadow Brown butterfly (*Maniola jurtina*). In general, the abundance of butterflies is positively correlated with large-scale heterogeneity of the landscape (Weibull *et al.* 2000). In addition, the presence of this species sensitive to urbanization (Bergerot *et al.* 2010) seems to be a sign of good ecological health. It is the same for the Western Barbastelle (*Barbastella barbastellus*)

which is sensitive to human impact (*lato sensu*) and is absent for example in Ile-de-France (Arthur and Lemaire 2009).

Saints vegetation is quite diversified and different from the national average. This municipality is also the most diverse in terms of butterflies and bats, and sensitive species such as the Barbastelle and the Meadow Brown were also identified. In addition, the number of pollinating insects by order is similarly

**Table 2** Areas by habitat type at La Genétouze between 1958, 1985 and 2008n

		Forested areas (in hectares)	Settlements (in hectares)	Croplands (in hectares)	Hedge (in meters)
La Genétouze	1958	24,75	20,41	1,343,01	242,847,43 (estimated surface: 72 ha)*
	1985	23,01	68,91	1,287,63	42,006,20 (estimated surface: 12 ha)*
	2008	50,50	101,71	1,219,95	26,636,25 (estimated surface: 9 ha)*

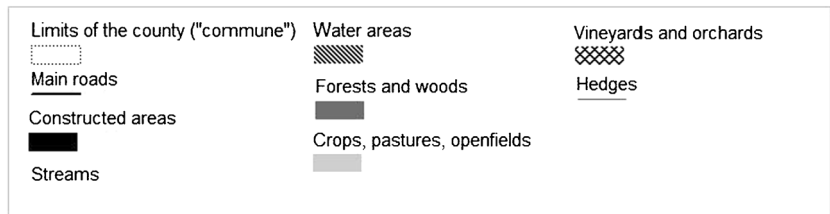
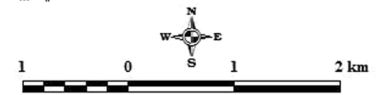
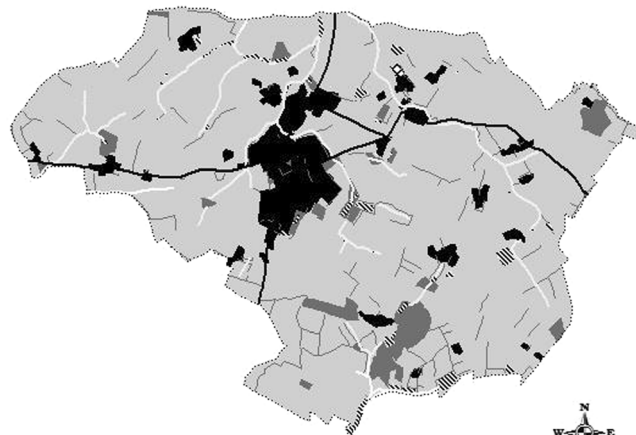
\*NB: The estimated hedges area is not included in the total area, which is constant (1,380 ha)

**Map 3** Evolution of the habitats at La Genétouze between 1958 and 2008

1958



2008



**Table 3** State of biodiversity sampled in both municipalities

	La Genétouze	Saints-en-Puisaye
Flora	Quite diversified	Diversified
Rhopalocera	Abundant but not diversified	Quite abundant and diversified
Pollinators	Diptera predominate	Balance between orders
Chiroptera	Diversified	Diversified
General state	Quite good	Good

**Table 4** Repartition of pollinator per order (including spiders) at Saints-en-Puisaye and la Genétouze

Order	Saints-en-Puisaye	La Genétouze
Hymenoptera	30 %	24 %
Diptera	24 %	46 %
Coleoptera	32 %	13 %
Heteroptera	5 %	3 %
Spiders	3 %	2 %
Lepidoptera	3 %	3 %
Others and unidentified	3 %	9 %

balanced. This reflects local ecological health and the heterogeneity of landscape. Indeed, the diversity of habitats increases with landscape heterogeneity (Rosenzweig 1995), which indicates a higher probability for arthropods to find an optimal site for hibernation, oviposition or larval development (Weibull *et al.* 2003). In addition, the diversity of butterflies was positively correlated with small-scale heterogeneity of the landscape (Weibull *et al.* 2000). The overall diversity of the municipality could also be related to organic farming practiced on many plots. It has been noted that the diversity of butterflies could be increased by the joint action of increasing landscape heterogeneity and organic farming (Maisonhaute 2010).

### General attitude Towards Environment and Public Policies

For the anthropological survey, 72 inhabitants were interviewed at Saints (12 % of the population) and 117 at La Genétouze (7 %).

After comparing several categories of people through data filtering (rural and urban; hunters/fishermen and others; retired and active), we noted that there were significant differences between people from the agricultural sector and other inhabitants. We further refined our filtering to keep only the farmers and then separated organic farmers, active conventional farmers and retired conventional farmers. At Saints, organic farmers account for 40 % of all farmers in the commune (10 farmers out of 25). We interviewed five organic farmers, eight active conventional farmers and six retired conventional farmers. At La Genétouze, there is only one organic farmer compared to 18 active conventional farmers; consequently we decided not to include the data concerning this organic farmer when comparing farmers of both municipalities.<sup>5</sup> Data was gathered from 11 active conventional farmers and 12 retired conventional farmers. Most of the questionnaires were accompanied by open-ended conversations to better understand the profile of surveyed farmers and gather contextual information.<sup>6</sup>

The results of the anthropological study are presented in two parts: the comparison between people from the agricultural

<sup>5</sup> All the organic farmers surveyed are small producers who sell their produce in nearby markets or AMAP (Association for Preservation of Peasant Farming) circuits. See <http://www.reseau-amap.org/>: AMAP Associations “are intended to promote family and organic farming. They are struggling to survive against the agro-industry. The principle is to create a direct link between farmers and consumers, the latter being committed to purchase seasonal products at a fair price and to pay in advance.”

<sup>6</sup> Our sample is not representative but merely illustrative as far as general population is concerned. We were highly dependent on people’s availability as the qualitative and quantitative interview took approximately one and a half hours. We interviewed more than half of the farmers (organic, conventional and retired) in each municipality.

sector and the rest of the population, and the comparison between the farmers. Finally, concerning the statistical treatment of the data from the questionnaires, Chi2 tests were performed for the qualitative variables. For quantitative variables, and for qualitative variables that could be restated into semi-quantitative variables, Student’s *t* tests were performed to compare the results after checking the normality and homoscedasticity of the samples. When they did not follow a normal distribution, U Mann–Whitney tests were used for comparisons. Due to the presence of *ex-aequo* in the data, the results may be slightly biased but provide a good representation of the differences or similarities observed between samples.

### Surveyed Farmers

The average age of active conventional farmers was 46 years at Saints (22 to 58 years) and 48 years at La Genétouze (25 to 58 years). Organic farmers (at Saints only) had an average age of 41 years (range 27–53 years). For retired farmers, the average age was 75 years at Saints and 72 years at La Genétouze. Respondents were overwhelmingly deeply rooted locally, with duration of presence on the town of 42 years as an average at Saints and 44 years at La Genétouze (Table 5).

Differences in age and time lived in the region between the retired farmers and active farmers, whether organic or conventional, are significantly different at Saints (Student Tests,  $p=9.27e-05$  and  $p=6.84e-05$ ). However, the average ages of organic farmers and conventional farmers do not differ, which excludes this criterion as an explanation of the differences, as is the case for time lived in the town. This result is consistent with Napier and Forster’s (Napier and Forster 1982) conclusion that the propensity of a farmer to adopt new conservation practices is not influenced solely by age (Sullivan *et al.* 1996). However, our own results show a discrepancy between generations, and a tendency for each generation to define itself by contrast with the previous one.

At La Genétouze, retired and active conventional farmers are proportionally equally rooted locally. The study conducted in the

**Table 5** Profile of surveyed farmers (Organic/Active conventional/Retired conventional)

		OFs	ACFs	RCFs	ACFg	RCFg
Age	Mean =	40.80	46.00	75.50	47.82	72.25
	S.D. =	11.32	11.10	5.54	10.88	9.50
Time in commune	Mean =	21.8	33.25	71.00	38.60	48.91
	S.D. =	21.25	18.38	8.37	16.82	21.05

OFs Organic farmers (Saints); ACFs Active Conventional farmers (Saints); RCFs Retired Conventional Farmers (Saints); ACFg Active Conventional farmers (La Genétouze); RCFg Retired Conventional farmers (La Genétouze)



context of a comparison between the attitudes of Saints’ farmers and those of La Genétouze showed differences regarding the time lived in the region, the most important being that retired farmers of Saints were more anchored locally than the retired farmers of La Genétouze (Mann–Whitney test,  $p=0.018$ ). Strong local roots are supposed to favor an attachment to landscapes (Ahnström *et al.* 2009). Our results show that this commitment is subject to the social dynamics that punctuated local history.

A local example of conversion to organic farming

Mr. B., aged 54, at Saints, converted to organic dairy production in 2006 after 20 years of conventional farming. He underlines his commitment to the place by citing the fact that he was born in the exact same room where he receives us. Despite his sensitivity to environmental issues, he has worked extensively in conventional agriculture (corn silage). Pressure from his children led him to feel guilty about conventional farming: “I felt bad every time I would treat my fields.” Finally, in 2002 nitrate pollution of the water supply of the municipality provoked his conversion to organic farming. He describes his environmental awareness as based on his concern with human health rather than ecological issues.

Differences Between People from the Agricultural Sector and Other Residents

Closeness to Nature

Our results show that people from the agricultural sector feel closer to nature than the rest of the population (Chi2 test,  $P=0.015$ ), and this is more marked for people from the agricultural sector at Saints (Table 7). Other studies confirm this identification with nature observed among farmers (Sullivan *et al.* 1996). As they are constantly working in open air, farmers develop a

Table 6 Closeness to nature among agricultural sector and others

Closeness to nature	Total agricultural sector	Total others
Did not answer	0 %	3.7 %
Me and nature are one and the same	26 %	13.1 %
Me and nature are strongly imbricated	56 %	47.6 %
Me and nature are weakly imbricated	0 %	17.3 %
Me and nature are separated but close	18 %	16.8 %
Me and nature are distant	0 %	1.6 %

strong collective identity based on their intimacy with nature (Bieling and Plieninger 2003) (Graphic 1, Table 6 and 7).

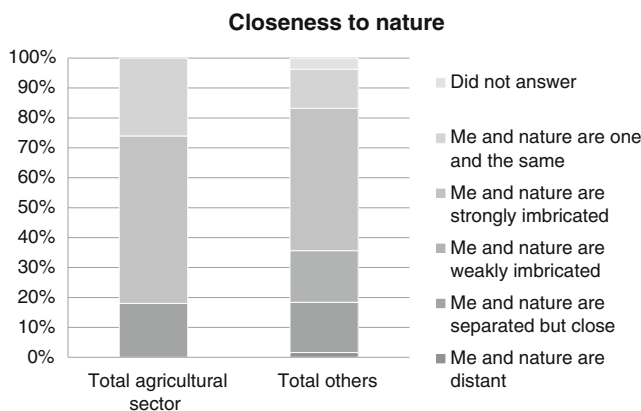
Definitions of Nature

The most commonly used terms by people from the agricultural sector to define nature are “biodiversity,” “ecosystems” and “environment” (21.3 %). The concepts of “beauty” or “sensitivity” and that of “well-being and quality of life” are less cited by farmers than by other residents (respectively 12.8 % against 16.9 and 9.6 % against 16.3 %). The aesthetic of landscape is present among farmers, but is strongly associated with the tidy aspect of croplands. Abiotic natural elements (earth, water, soil) are in turn much more cited by farmers than by others (respectively 11.7 % against 4.5 %), probably because they are necessary to their activity (Graphic 2).

We also noted the farmers’ more utilitarian view of nature for its usefulness as food and resources were mentioned by 30.5 % of them (19.9 % for others). As Mr. A., 58, conventional farmer at La Genétouze, puts it: “Nature is the agricultural world. Of course it is useful because it is used to feed us. It certainly is good for other things, maybe health or whatever, but it feeds us.” (Graphic 3)

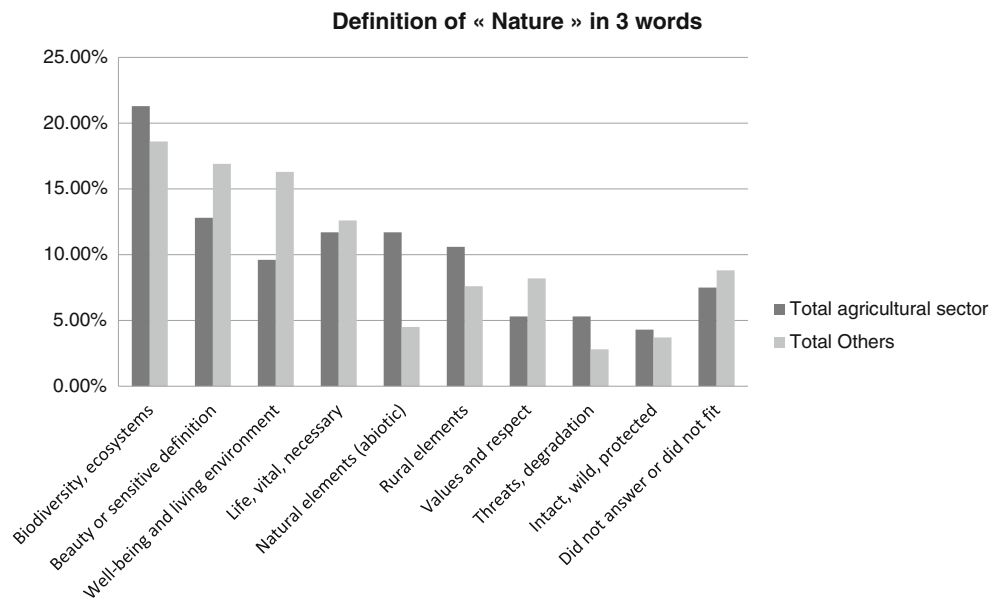
Table 7 Closeness to nature among agricultural sector and others, by county

Closeness to nature	Agricultural sector Genétouze	Agricultural sector Saints	Others Genétouze	Others saints
Did not answer	0 %	0 %	4.3 %	2 %
Me and nature are one and the same	12.5 %	36.4 %	8.6 %	16 %
Me and nature are strongly imbricated	58.3 %	54.5 %	52.7 %	48 %
Me and nature are weakly imbricated	0 %	0 %	18.3 %	8 %
Me and nature are separated but close	29 %	9.1 %	15.1 %	15.1 %
Me and nature are distant	0 %	0 %	0 %	0 %



Graphic 1 Closeness to nature, by sector

**Graphic 2** Definition of Nature in 3 words, by sector



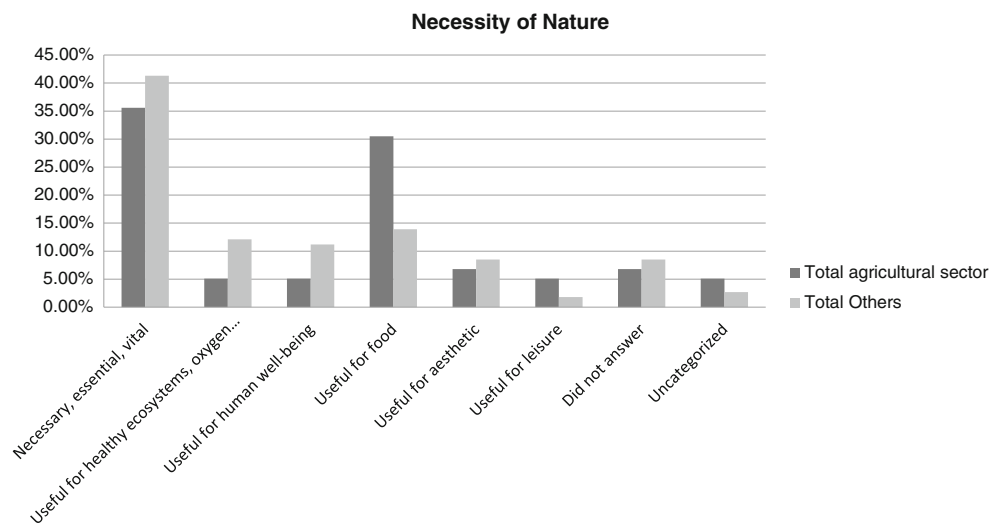
**Knowledge About Nature and Response to Protected Areas**

We asked interviewees if they were aware of local areas that had been recognized as important for biodiversity, and how they rated their knowledge of animal and plant species. The results show that people from the agricultural sector tend to view their knowledge as superior to other residents, whether for protected areas or identification of species (Mann–Whitney tests,  $p=0.027$  and  $p=0.0029$ ) (Table 8).

In general, farmers also believe that their knowledge of nature is superior to that of scientific experts; 61.2 % estimate themselves as having a fine to distant knowledge of important areas for biodiversity (37.3 % for other respondents), and 54 % believe they have rather good knowledge of plant and animal species (26.2 % for other respondents). The resistance of farmers in the

implementation of conservation measures, especially at La Genétouze, results from their feeling of insufficient consultation, and their belief that the areas to be protected (here, wetlands) are chosen arbitrarily. Of farmers surveyed, 38 % reported that they were not consulted over decisions to protect or degrade nature. In the case of the creation of a protected area, only 28 % are absolutely in favor, compared to 54.7 % of the other inhabitants. However, the qualitative survey suggests that it is not the lack of consultation that is the issue, but the fact that protected areas reduce available agricultural land. Mr. A., 58, a conventional farmer at La Genétouze, stated “We should stop considering nature over to humans. Humans come first, animals come after. Human work is the priority. We need to stop looking in the ponds to see what’s in there, and think about the farmers, who are already in place, who were here before. Ok, animals were also

**Graphic 3** Necessity of nature according to the interviewees, by sector



**Table 8** Naturalistic knowledge, among agricultural sector and others

		Agricultural sector	Others	Test statistic
Knowledge of important areas for biodiversity (a)	Mean =	2.64	2.19	$w=4742.5$
	S.D. =	1.17	1.17	$p=0.027$
Knowledge of plant and animal species (b)	Mean =	3.43	3.01	$w=5,720$
	S.D. =	0.71	0.97	$p=0.0029$
Are you sufficiently solicited for any decision to protect or degrade nature? (c)	Mean =	2.12	2.63	$w=2,936$
	S.D. =	1.20	1.28	$p=0.021$

<sup>a</sup> Scale was 1 = No, I do not know, 2 = I have vaguely heard about it, 3 = Yes, I know and I have a distant knowledge of the areas, 4 = Yes, I know and I have a thorough knowledge of the areas

<sup>b</sup> Scale was 1 = Very low, 2 = Quite low, 3 = Average, 4 = Rather good, 5 = Excellent

<sup>c</sup> Scale was 1 = Not at all, 2 = Yes, but weakly, 3 = Yes, but only moderately, 4 = Yes satisfactorily, 5 = Yes very satisfactorily

there, but we must first think of the agricultural work.” (Graphics 4 and 5, Table 9)

It is interesting to note the difference of the reaction to the hypothetical creation of a protected area between people from the agricultural sector and other inhabitants (Test chi2,  $P=0.0023$ ). The creation of a protected area is seen as an obstacle to the activities of farmers. It is also notable that the State, in the context of conservation laws, is seen as the main threat (cf. Bieling and Plieninger 2003). At La Genétouze, an example of this phenomenon was the wetland classification of parts of agricultural parcels, to which Mr. A., 58, a conventional farmer at La Genétouze, responded: “There are too many burdensome rules, administration today is unbearable. These wetlands tore out our right to drainage or construction, and the administration still wants to enlarge these areas. The agricultural sector has been totally screwed up. (...) I’m tired of this obsession with nature and environment. It should not be exaggerated; I know it because I work in the middle of it every day. There are more important things.”

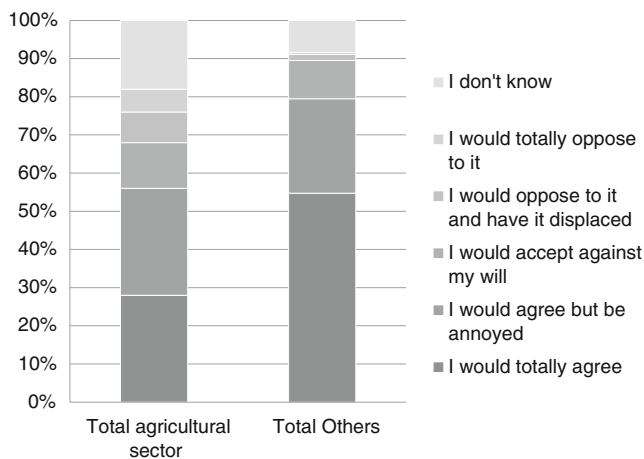
We observe a paradox here, which was repeatedly noted, that a “connection” or closeness to nature that gives meaning to the farming profession is associated with hostility to environmental protection policies far more intense than that of other social groups.

### Spaces for Wilderness

We posed a twofold question in the questionnaire: “What place do you consider good to leave to wild nature a) in your garden b) in your municipality.” The responses revealed an opinion split between people from the agricultural sector and the other residents (Test of Chi2,  $P=0.0097$ ). More than half the people (51 %) having worked or working in the agricultural sector wish to leave no space at all to nature in their garden, 34.7 % would allocate less than a quarter, 8.2 % would allocate one-third and 6.1 % a half or more. In contrast, 30 % of non-farming residents responded “Nothing” and 37.1 % responded “less than a quarter” (Graphic 6)

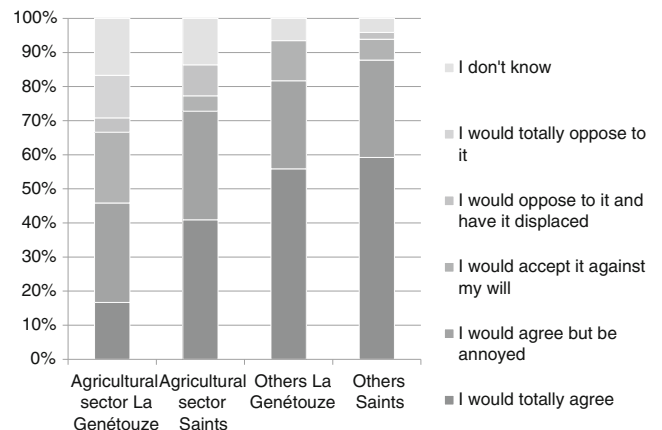
Concerning the area to be left to wilderness in municipal territory, the differences are again very clear (Chi2 test,  $P=$

**Reaction to the creation of a protected area, by sector**



**Graphic 4** Reaction to the creation of a protected area, among agricultural sector and others

**Reaction to the creation of protected areas, by district**



**Graphic 5** Reaction to the creation of a protected area, by county

**Table 9** Reaction to the creation of a protected area among agricultural sector and others

Reaction to the creation of a protected area	Agricultural sector	Others
I don't know	18 %	8.4 %
I would be strongly opposed	6 %	0.5 %
I would oppose to it and would propose another solution	8 %	0 %
I would accept, against my will	12 %	10 %
I would accept, but would be annoyed	28 %	24.7 %
I would be totally in favor	28 %	54.7 %

7.83e-07). The vast majority of people from the agricultural sector do not want to leave any space (34.8 %) or less than a quarter of the territory (37 %) to wilderness. For example Mr G., a retired conventional farmer at La Genétouze, commented: “I will not let anything to the wild because it does not fit our village! It has to be tidy, and wild plants should not pollute other plants.” The Same opinion was expressed at Saints by Mr. F, 45, conventional farmer (referring to the abolition of the use of herbicide for the maintenance of the town): “The town is dirty and poorly kept. It’s a shame.”

The non-farming population indicated they would leave less than a quarter or a third (36.1 % for these two answers) of municipal territory to wilderness. It is interesting to note that in both categories (farmers and non-farmers), people are more likely to allocate space for wilderness in the municipality rather than in their garden (Graphic 7).

The “wilderness” is viewed negatively by some farmers, who often seek to control wildlife on their land. Farmers want habitats “clean” and “tidy,” delivering to other farmers the message that the owner of the land is a good manager (Burton 2004; Ahnström *et al.* 2009). Mr. G., 35, conventional farmer

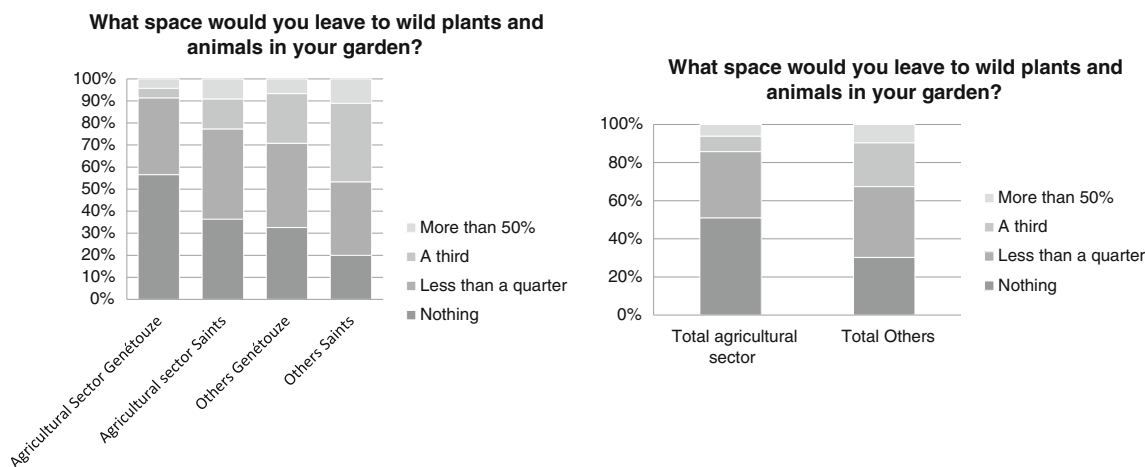
at La Genétouze commented: “I’m not keen on organic farming, I don’t like to see thistles everywhere. Hedges are fine, but over time it will distort the roads. It’s ok when it protects from the wind and when it is tidy.”

Mrs F., 45, conventional farmer at Saints, held a similar opinion: “Many people complain about the abandoned roadsides. Time ago, hunters used to put traps for magpies and ravens, now we’re not allowed to do anything because of the environmentalists, but we should regulate, it’s full of pests destroying the crops. Moreover, there are predators that bring diseases too. So we should know what we want! ”

An organic farmer from the village of Saints-en-Puisaye (Mr. E., 30, settled for 5 years in the region) observed that what created a unity among farmers, organic and conventional, was the common pleasure they felt at seeing vegetables in regular rows, which seems to indicate that the idea of “tidy” landscape transcends the categories of farmers.

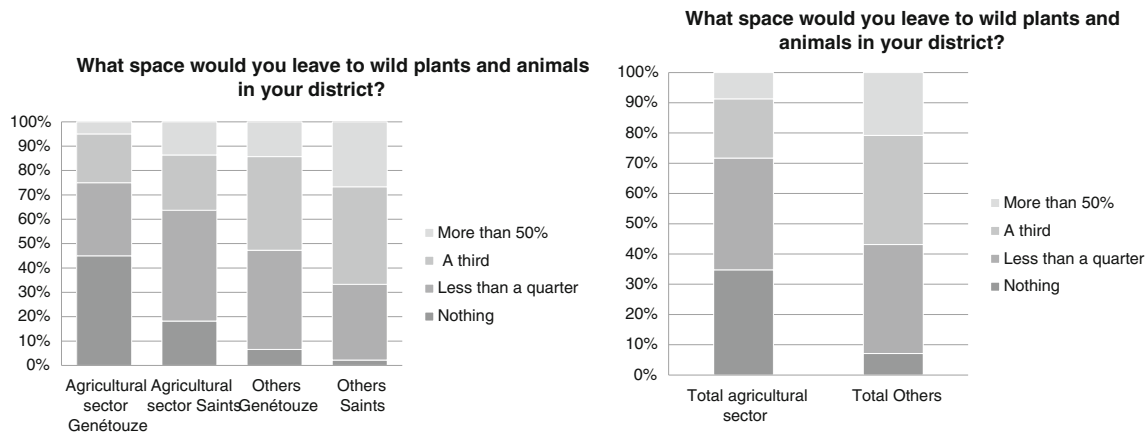
However, organic farmers seem more inclined to leave room for wilderness in their municipality than conventional farmers (Mann–Whitney test,  $p \leq 0.06$ ). This observation can be correlated with the idea that conventional farmers seek to control nature, while organic farmers are more ready to “go with the flow of nature” (Ahnström *et al.* 2009). However, it is the variable significance of the concept of “nature” that can account for these nuances. The organic farmer cited above explained his desire to create an “ideal garden” respecting the balance between man and nature: “the human hand reveals the landscape, elevating nature by making it better.” This quotation suggests that the “tidiness” repeatedly mentioned is also an aesthetic of landscape derived from human labor (Winkler 2005) (Table 10).

Organic and conventional farmers also differ when it comes to protecting certain species. None of the conventional farmer thinks it is “unrestrictedly useful» while 40 % of organic farmers do. Organic farmers are also unanimous on



**Graphic 6** Space allowed to wild plants and animals in the garden, by sector and by county





**Graphic 7** Space allowed to wild plants and animals in the county, by sector and by county

the necessity of protecting areas, unlike conventional farmers, whose answers are more disparate (Tables 11 and 12).

**Comparison Between Saints and La Genétouze Farmers**

Active conventional farmers from Saints seem to feel closer to nature than those in La Genétouze (Mann–Whitney test,  $p=0.029$ ). Belonging to one or to the other village,

however, retired farmers show no differences either for their closeness to nature, or the places they would allocate to wilderness. Active conventional farmers seem to have similar reactions on the protection of species, whether at Saints or at La Genétouze. Still, a greater percentage of farmers at La Genétouze responded that they regard it as useless. As for retirees, the results are more disparate. A third did not know how to answer the question at La Genétouze, but 41.7 % admit that some species should be

**Table 10** Perception of and space allowed to nature among organic, conventional and retired farmers at Saints-en-Puisaye

		Organic farmers (Saints)	Active conventional farmers (Saints)	Test Statistic
Closeness to nature (a)	Mean =	4.40	4.50	Not significant
	S.D. =	0.55	0.53	
Space for nature in garden (b)	Mean =	2.40	2.12	Not significant
	S.D. =	1.14	1.13	
Space for nature in district (b)	Mean =	3.20	2.00	$W=33, p\leq 0.06$
	S.D. =	0.84	0.93	
		Organic farmers (Saints)	Retired conventional farmers (Saints)	Test Statistic
Closeness to nature (a)	Mean =	4.40	3.67	Not significant
	S.D. =	0.55	0.82	
Space for nature in garden (b)	Mean =	2.40	1.50	Not significant
	S.D. =	1.14	0.55	
Space for nature in district (b)	Mean =	3.20	2.17	Not significant
	S.D. =	0.84	0.98	
		Active conventional farmers (Saints)	Retired conventional farmers (Saints)	Test Statistic
Closeness to nature (a)	Mean =	4.50	3.67	$W=38, p=0.039$
	S.D. =	0.53	0.82	
Space for nature in garden (b)	Mean =	2.12	1.50	Not significant
	S.D. =	1.13	0.55	
Space for nature in district (b)	Mean =	2.00	2.17	Not significant
	S.D. =	0.93	0.98	

<sup>a</sup> Scale was 1 = I and Nature are distant, 2 = I and Nature are separate but close, 3 = I and Nature are weakly nested, 4 = I and Nature are strongly nested, 5 = I and Nature are one and the same

<sup>b</sup> Scale was 1 = nothing, 2 = less than one quarter, 3 = a third, 4 = half or more

**Table 11** Utility of protecting species, according to organic, conventional and retired farmers at Saints-en-Puisaye

What do you think of the current tendency to protect species that was once controlled or destroyed? Organic farmers (Saints)	Organic farmers (Saints)	Active conventional farmers (Saints)	Retired conventional farmers (Saints)
I do not know	0 %	0 %	0 %
I do not consider myself fairly knowledgeable about the issue	0 %	12.5 %	16.7 %
I find it useful without restriction	40 %	0 %	0 %
I find it useful, but it depends on the species concerned	60 %	62.5 %	33.3 %
I do not understand the purpose of this approach	0 %	12.5 %	50 %
I find it unnecessary	0 %	12.5 %	0 %

protected, although this depends on the species. At Saints, half of retired farmers do not understand the purpose of protecting species, a third think it is useful depending on the species, and the others do not consider themselves sufficiently informed on the issue. There might be, then, a slight generational discrepancy linked to educational and social background (Tables 13 and 14).

The quantitative data allowed us to identify two main differences between farmers of the two municipalities (organic farmers were excluded from the comparison): active farmers from Saints are more connected to nature and less hostile to the creation of protected areas. The qualitative survey, combined with biodiversity

samplings, allows us to understand the difference: firstly, a better preserved environment at Saints where there is high percentage of organic farmers (40 %, for a national average of 4.5 % in 2011 according to the French Agency for the Development and Promotion of Organic Agriculture (<http://www.agencebio.org/la-bio-en-france>)). What happened in Saints-en-Puisaye was a spread of organic farming dating back to the 1970s, amplified after various conflicts (nitrate pollution of the Gondard water supply in the 2000s), which explains the good environmental condition of the municipality - almost imperceptible if we use only the quantitative survey (questionnaires), which tends to smooth the

**Table 12** Acceptance of protected areas among organic, conventional and retired farmers at Saints-en-Puisaye, and among conventional and retired farmers at La Genétouze

		Organic farmers (Saints)	Active conventional farmers (Saints)	Test statistic
Acceptance of a protected area (a)	Mean=	5.00	4.00	Not significant
	S.D.=	0.00	1.26	
		Organic farmers (Saints)	Retired conventional farmers (Saints)	Test statistic
	Mean=	5.00	3.6	$W=25, p=5.58e-03$
	S.D.=	0.00	0.89	
		Active conventional farmers (Saints)	Retired conventional farmers (Saints)	Test statistic
Acceptance of a protected area (a)	Mean=	4.00	3.6	Not significant
	S.D.=	1.26	0.89	
		Active conventional farmers (La Genétouze)	Retired conventional farmers (La Genétouze)	Test statistic
	Mean=	2.56	3.89	$W=16.5$
	S.D.=	1.42	0.60	$p=0.030$
		Active conventional farmers (Saints)	Retired conventional farmers (La Genétouze)	Test statistic
Acceptance of a protected area (a)	Mean=	4.00	2.56	$t=2.0078, df=13$
	S.D.=	1.25	1.42	
		Retired conventional farmers (Saints)	Retired conventional farmers (La Genétouze)	Test statistic
	Mean=	3.6	3.89	Not significant
S.D.=	0.89	0.06		

<sup>a</sup> Scale was 1 = I will be absolutely against, 2 = I will be against and seek to make it move elsewhere or allow access, 3 = I will accept, forced to be, 4 = I will be rather for, but bothered, 5 = I will be absolutely for

**Table 13** Perception of and space allowed to nature: comparison between conventional and retired farmers at Saints-en-Puisaye and La Genétouze

	Active conventional farmers (La Genétouze)	Retired conventional farmers (La Genétouze)	Test Statistic
Closeness to nature (a)	Mean = 3.55 S.D. = 1.04	3.55 1.04	Not significant
Space for nature in garden (b)	Mean = 1.55 S.D. = 0.93	1.50 1.71	Not significant
Space for nature in district (b)	Mean = 1.73 S.D. = 0.90	1.71 0.95	$W=33, p\leq 0.06$
	Active conventional farmers (Saints)	Active conventional farmers (La Genétouze) (Saints)	Test Statistic
Closeness to nature (a)	Mean = 4.50 S.D. = 0.53	3.55 1.04	Not significant
Space for nature in garden (b)	Mean = 2.12 S.D. = 2.13	1.55 0.93	Not significant
Space for nature in district (b)	Mean = 2.00 S.D. = 0.93	1.73 0.90	Not significant
	Retired conventional farmers (Saints)	Retired conventional farmers (La Genétouze)	Test Statistic
Closeness to nature (a)	Mean = 3.67 S.D. = 0.82	3.55 1.04	$W=38, p=0.039$
Space for nature in garden (b)	Mean = 1.50 S.D. = 0.55	1.50 0.71	Not significant
Space for nature in district (b)	Mean = 2.17 S.D. = 0.98	0.71 0.95	Not significant

<sup>a</sup> Scale was 1 = I and Nature are distant, 2 = I and Nature are separate but close, 3 = I and Nature are weakly nested, 4 = I and Nature are strongly nested, 5 = I and Nature are one and the same

<sup>b</sup> Scale was 1 = nothing, 2 = less than one quarter, 3 = a third, 4 = half or more

**Table 14** Utility of protecting species: comparison between conventional and retired farmers at Saints-en-Puisaye and La Genétouze

	Active conventional farmers (La Genétouze)	Retired conventional farmers (La Genétouze)
What do you think of the current tendency to protect species that was once controlled or destroyed?		
I do not know	8.3 %	33.3 %
I do not consider myself fairly knowledgeable about the issue	0 %	8.3 %
I find it useful without restriction	0 %	8.3 %
I find it useful, but it depends on the species concerned	58.3 %	41.7 %
I do not understand the purpose of this approach	8.3 %	0 %
I find it unnecessary	25 %	8.3 %
What do you think of the current tendency to protect species that was once controlled or destroyed?	Active conventional farmers (Saints)	Active conventional farmers (La Genétouze)
I do not know	0 %	8.3 %
I do not consider myself fairly knowledgeable about the issue	12.5 %	0 %
I find it useful without restriction	0 %	0 %
I find it useful, but it depends on the species concerned	62.5 %	58.3 %
I do not understand the purpose of this approach	12.5 %	8.3 %
I find it unnecessary	12.5 %	25 %
What do you think of the current tendency to protect species that was once controlled or destroyed?	Retired conventional farmers (Saints)	Retired conventional farmers (La Genétouze)
I do not know	0 %	33.3 %
I do not consider myself fairly knowledgeable about the issue	16.7 %	8.3 %
I find it useful without restriction	0 %	8.3 %
I find it useful, but it depends on the species concerned	33.3 %	41.7 %
I do not understand the purpose of this approach	50 %	0 %
I find it unnecessary	0 %	8.3 %

differences between the two villages, as evidenced by biodiversity sampling. The environmental conditions in each municipality result from various factors related to their local history.

Among the determining factors, the land status in the period that preceded and accompanied land consolidation (small land-owners in Saints, a majority of tenant farmers and sharecroppers at La Genétouze) is relevant; access to ownership, while concomitant with the consolidation period, resulted in a higher environmental impact (Kohler *et al.* 2013). Social changes therefore have an amplifying effect. The proximity of urban centers is also an important factor. La Genétouze is 7 km from the nearest employment center, La Roche-sur-Yon, which resulted in a rapid and intense “suburbanization” of the village: the population increased from 600 to 1,800 inhabitants between 1972 and 2012. This demographic change modified the profile of the population, now mostly “rurban,” focusing on leisure and transportation facilities, relatively disconnected from agricultural and environmental issues.

Saints-en-Puisaye, on the other hand, is 50 km from the nearest employment zone. Its population has remained stable since the 60s, and the settlement area remained unchanged due to the low demographic pressure, and with landscapes relatively well preserved. This wood and hedge landscape in turn attracted a small neo-rural population, thus increasing the number of organic farmers.

Therefore, we argue that environmental conditions cannot be understood and measured outside the context of local history. The social context, in its many aspects, ultimately determines the disposition of farmers to accept more eco-friendly practices. The way pressures are exerted on farmers is also crucial to understanding the development of environmental responsibility in the agricultural profession.

## Conclusion

As in other European countries, agricultural policy in France has experienced several policy shifts since the 1960s, from productivism accompanied by an intense land consolidation, resulting in biodiversity loss, decline of traditional societies and disappearance of familiar landscapes, to a better integration of environmental and social issues in policy orientation. Since 1999, farmers have been designated as major players in land management by assigning to agriculture economic, social and environmental functions. However, the success of the transition to multifunctional agriculture, after decades of productivity sustained by technical progress, is far from being obvious, firstly because of the inertia of the agricultural profession dealing with shifting public policies. Each generation of farmers grew up in a

certain ideological context from which their farming practices are derived. There is a gap in perceptions between two generations of farmers revealed both by the quantitative survey and the qualitative interviews. Each generation either carries on prior practices or derides the “backwardness” of the previous generation comparing it to the progress of their own generation (according to this point of view, organic farming is often seen as a step backwards).

The second reason is a paradox already pointed out: if farmers, more than other population groups, feel strongly connected to nature, it is because of the definition of nature they rely on. Farmers consider themselves as “producers” of nature in the sense that they shape the landscape and make it productive. Their vision of nature is transcended by the social and symbolic value of regular or harmonious croplands, which in turn reveal human agency. Other categories of residents are more inclined to consider nature associated with leisure or well-being.

When the issue of space for wilderness, i.e., unmanaged nature, is raised, the proportions are reversed: the farmers, irrespective of category (organic or non-organic, retired or active) tend to minimize the space allocated to ordinary biodiversity, be it in their garden or at the municipality level. Tension arises from the fact that most of the village area in both our case studies is dedicated to agriculture, and that any protective measures would restrain this activity.

These results refute the idea that farmers would be better able and more willing to take over the management of the environment at the landscape level. Our survey reveals that social context, a result of historical configurations, is a critical component to guide agricultural practices towards greater environmental concern. The presence of organic farmers plays a positive role in these orientations, not so much because of their perceptions and representations of nature - broadly similar to that of conventional farmers - but as a result of their practices, which are much more regulated and dependent on consumers’ proximity and confidence.

**Acknowledgments** Many people contributed to this paper including Isabelle Laudier (*Caisse des Dépôts et Consignation*), Eduardo Brondizio (*Indiana University*), Anne-Caroline Prévôt-Julliard (*Museum National d’Histoire Naturelle*), Elena Ciccozzi, Anna Greissing and Carlos Amorena, whom we thank. We also wish to thank the *Commissariat Général au Développement Durable* of French *Ministère de l’Ecologie*.

The authors are extremely grateful to Jean Massé, Mayor of Saints-en-Puisaye, Eliane Blé, Mayor of La Genétouze, and friendly inhabitants from both municipalities, Didier and Gervaise Massé, Gaëlle Massé, Isabelle and Joël Brunet, Cyril Guiet, and many others.



## Appendix

## Questionnaire CLEVERT

2010-2012 - CREDA/MNHN

Nous sommes une équipe de recherche pluridisciplinaire.

Nous réalisons une étude sur les perceptions des habitants de la commune à propos de la biodiversité. Pour cela il nous paraît intéressant de recueillir votre opinion.

La participation à ce questionnaire sera anonymée.

**1. Nom de la commune sur laquelle a eu lieu l'enquête**

1. Flagy  2. Génétouze  3. Saints

**2. Code de l'enquête**

genetouze= 85XXX ; Flagy= 77XXX ; Saints = 89XXX

**3. Lieu d'origine des parents**

1. Père natif  2. Père région (rural)  
 3. Père région (urbain)  4. Père autre (rural)  
 5. Père autre (urbain)  6. Mère native  
 7. Mère région (rural)  8. Mère région (urbain)  
 9. Mère autre (rural)  10. Mère autre (urbain)

Réfléchir à la pertinence de ce genre de variable dans SPHINX (variable informative ou pouvant servir à des croisements)

**4. Lieu d'origine de la personne interrogée**

1. natif  2. région urbain  3. région rural  
 4. autres urbain  5. autres rural

**5. Sexe de la personne interrogée**

1. Masculin  2. Féminin

**6. Âge de la personne interrogée****7. Catégorie socio-professionnelle de la personne interrogée**

1. Employé secteur privé  
 2. Chef d'entreprise  
 3. employé secteur public  
 4. Fonctionnaire  
 5. Ouvrier  
 6. Artisan  
 7. commerçant  
 8. Agriculteur exploitant  
 9. Ouvrier agricole  
 10. Etudiant  
 11. Sans activité professionnelle (hors retraité)  
 12. Retraité  
 13. autre

**8. Si "autre" précisez :**


La question n'est pertinente que si CSP = "Etudiant"

**9. Si retraité de quelle profession ?**


La question n'est pertinente que si CSP = "Ouvrier agricole"

**10. Quelle est votre définition de la nature en trois mots ?**


Notez vraiment que trois mots ou expression

**11. Occupez-vous ou avez-vous occupé un emploi en lien avec la nature ?**

1. Oui  2. non

**12. Si oui, lequel ?**


Codification déjà élaborée

**13. Depuis combien de temps vivez-vous dans cette commune ?**

**14. Pour quelle raison vous êtes-vous installé ici ? Raison familiale, foncière, professionnelle**


Codification déjà élaborée

**15. Quelle est la situation qui décrit le mieux votre relation à la nature ?**

1. A. Moi et Nature distants  
 2. B. Moi et Nature séparés mais proches  
 3. C. Moi et Nature faiblement imbriqués  
 4. D. Moi et Nature fortement imbriqués  
 5. E. Moi et Nature ne forment qu'un  
 6. absence de réponse

Les réponses proposées ici reprennent l'ordre du questionnaire original

**16. En quoi la nature peut-elle être utile ou inutile à l'homme ?**

**17. Les questions liées à la nature vous intéressent-elles ?**

1. Oui  2. Non  3. Je ne sais pas  
 4. absence de réponse

**18. Pourquoi êtes-vous intéressé ou non ?**


Codification déjà établie

**19. Participez-vous à des activités en lien avec la nature ?**

1. Jamais  2. Très rarement  
 3. Rarement  4. Parfois  
 5. Souvent  6. Très régulièrement

**20. Quelles activités ?**


*Codification existante*

**21. Pourquoi participez-vous à ces activités ou non ?**


*Codification déjà établie*

**22. Êtes-vous membre d'une ou de plusieurs associations ?**

1. Oui (actuellement)  2. oui (autrefois)  3. Non

**23. Si oui, lesquelles ?**


*Pour faciliter le traitement, récupérer les noms officiels d'associations pour harmoniser les résultats*

**24. Est-ce que vous chassez ou avez-vous chassé?**

1. Oui (actuellement)  2. oui (autrefois)  3. non

**25. Pratiquez-vous des activités de chasse**

1. Petit gibier (lâché)  2. Petit gibier sauvage  
 3. Gros gibier sauvage

*Vous pouvez cocher plusieurs cases.*

*La question n'est pertinente que si `chasse_etat_actuel = "Oui (actuellement)"` ou `chasse_etat_actuel = "oui (autrefois)"`*

**26. Où chassez vous ?**

1. À l'intérieur de la commune  
 2. À l'extérieur de la commune

*La question n'est pertinente que si `chasse_etat_actuel = "Oui (actuellement)"` ou `chasse_etat_actuel = "oui (autrefois)"`*

**27. Est-ce que vous pêchez ou avez-vous pêché ?**

1. Oui (actuellement)  2. Oui (autrefois)  3. Non

**28. Pêchez-vous ?**

1. espèces sauvages  2. espèces lâchées

*Vous pouvez cocher plusieurs cases.*

*La question n'est pertinente que si `peche_etat_actuel = "Oui (actuellement)"` ou `peche_etat_actuel = "Oui (autrefois)"`*

**29. Où pêchez-vous ?**

1. À l'intérieur de la commune  
 2. À l'extérieur de la commune

**30. Est-ce que vous cueillez ou avez-vous cueilli des champignons ou des plantes sauvages ?**

1. Oui (actuellement)  2. oui (autrefois)  3. non

**31. Que cueillez-vous (mentionner les espèces)?**


*Si l'objectif est d'établir le nombre moyen d'espèces cueillies par personne il ne faut pas limiter le nombre de citation.*

**32. De quelle façon traitez-vous votre jardin et/ou votre potager ?**

1. À la bouillie bordelaise  
 2. Avec des pesticides et insecticides communs  
 3. Avec des produits naturels (comme le foin, des herbes coupés, des coquilles d'huîtres, des plantes qui repoussent les insectes, etc.)  
 4. Avec de pesticides et insecticides biologiques  
 5. Autre  
 6. Pas de jardin  
 7. pas de traitement

*Vous pouvez cocher plusieurs cases (5 au maximum).*

**33. Si "autres traitement" lesquels ?**


*La question n'est pertinente que si `traitement_jardin = "Autre"`*

**34. Décrivez en trois mots l'environnement actuel de votre commune.**


*Trois mots ou expressions seulement*

**35. Comment s'organise votre vie sociale(ordonnez par importance)?**

1. Famille                      2. Voisins  
3. Association(s)            4. Amis  
5. Collègues de travail    6. Rien de tout cela

*La question sur les échanges d'expérience a été mal saisie par les enquêtés= si l'on veut observer les réseaux de sociabilité mieux vaut ce type d'intitulé*

**36. Depuis votre arrivée dans la commune quels sont les changements les plus marquants que vous avez observé concernant les plantes sauvages, les animaux sauvages ou les insectes ?**

1. Moins de plantes sauvages  
 2. Plus de plantes sauvages  
 3. Répartition d'espèces végétales rares ou disparues  
 4. Invasions de plantes exotiques  
 5. Moins d'animaux sauvages  
 6. Plus d'animaux sauvages  
 7. Répartition d'espèces animales rares ou disparues  
 8. Invasions d'animaux exotiques  
 9. Moins d'insectes  
 10. Plus d'insectes  
 11. Répartition d'insectes rares ou disparus  
 12. Invasions d'insectes exotiques  
 13. je ne sais pas  
 14. je n'ai pas assez de recul pour me prononcer

*Vous pouvez cocher plusieurs cases (12 au maximum).*

**37. Selon vous à quoi sont dus les principaux changements concernant les espèces animales et végétales ?**

1. Les pratiques agricoles extensives
2. Des comportements plus raisonnés en agriculture
3. La destruction des habitats
4. La récupération des habitats
5. Les changements climatiques
6. Des mesures de protection inadaptées ou inefficaces
7. Des mesures de protection adaptées ou efficaces
8. Des événements naturels négatifs (Maladies, appauvrissement génétique)
9. Des événements naturels positifs (des populations suffisantes et en bonne santé)
10. Une certaine indifférence des sociétés humaines
11. Une prise de conscience des sociétés humaines
12. je ne sais pas

La question sur les changements doit être entièrement repensée que cherche-t-on à savoir ????

**38. Si vous cherchez des informations sur l'histoire humaine ou naturelle de votre commune vers qui vous tournez-vous ou vous tournerez-vous ?**

1. Les services d'archives
2. Internet
3. Des membres de votre famille
4. La municipalité (nouvelle ou ancienne équipe)
5. Des personnes identifiées comme savantes (ancienne ou nouvelle génération)
6. Les informations de ce genre ne m'intéressent pas
7. Je ne sais pas

Suppression de l'ancienne question sur les toponymes (réservées aux entretiens anthropo), question axée sur les réseaux de connaissance

**39. Dans votre jardin et/ou potager quelle place estimez-vous nécessaire de laisser à des plantes sauvages ?**

1. Rien       2. Moins du quart       3. Un tiers
4. La moitié et plus

**40. Dans votre commune quelle place estimez-vous nécessaire de laisser à la nature sauvage en tant que telle ?**

1. Rien       2. Moins du quart       3. Un tiers
4. La moitié et plus

**41. Quelles sont les espèces animales que vous considérez comme nuisible ?**

**42. Quel sort doit-on leur réserver ?**

1. L'extermination
2. la délocalisation où elles ne peuvent pas nuire (réserves)
3. la tolérance sous certaines conditions (extermination en cas de forfait avéré, contrôle légal sélectif)
4. la tolérance sans condition
5. Une simple régulation des effectifs
6. Elles méritent protection

**43. Que pensez-vous de la tendance actuelle à protéger des espèces qui autrefois été contrôlées ou détruites ?**

1. Je trouve ça inutile
2. Je ne comprends pas l'objectif de cette démarche
3. je trouve cela utile mais cela dépend des espèces concernées
4. je trouve cela utile sans restriction préalable
5. je me considère pas assez informé sur la question
6. je ne sais pas

**44. Les questions liées à la protection de la nature sont l'affaire de (classer dans l'ordre d'importance)**

1. Décideurs politiques
2. Scientifiques et experts
3. Populations locales, échelle communale
4. individus

Ordonnez 3 réponses.

**45. Savez-vous si certaines parties de votre commune ont été reconnues comme étant importante pour la diversité animale et végétale**

1. Oui je le sais et j'ai une connaissance fine des espaces concernés
2. Oui je le sais et j'ai une connaissance lointaine des espaces concernés
3. J'en ai vaguement entendu parler
4. Non je ne sais pas
5. Cela ne m'intéresse pas
6. Je considère ne pas avoir été assez informé à ce sujet

**46. Comment qualifiez-vous l'intervention de l'équipe municipale pour la protection de la nature ?**

1. Très bonne       2. Bonne       3. Moyenne
4. Faible       5. Très faible

**47. Si un jour un espace que vous fréquentez régulièrement ou qui possède pour vous une valeur particulière était destiné à protéger une ou des espèces animales ou végétales, comment réagiriez-vous ?**

1. Je serai absolument pour
2. je serai plutôt pour, mais ennuyé
3. j'accepterai, bien forcé de l'être
4. je serai contre et chercherai à la faire déplacer ailleurs ou à en autoriser l'accès
5. Je serai absolument contre
6. Je ne sais pas

**48. Considérez-vous avoir suffisamment votre mot à dire pour toute décision destinée à protéger ou dégrader la nature ?**

1. Oui, de manière très satisfaisante
2. oui de manière satisfaisante
3. oui mais moyennement
4. oui mais faiblement
5. non pas du tout
6. je ne sais pas

**49. Comment qualifiez-vous votre connaissance des espèces animales ou végétales ?**

1. Excellente                       2. Plutôt bonne  
 3. Moyenne                               4. Assez faible  
 5. Très faible                             6. Je ne m'y intéresse pas  
 7. Je ne sais pas

**50. D'une manière générale souhaiteriez-vous en apprendre plus sur les espèces animales ou végétales ou sur les mesures destinées à les étudier ou les protéger ?**

1. Oui, j'y serai très favorable  
 2. Oui j'y serai plutôt favorable  
 3. pourquoi pas  
 4. non  
 5. je ne sais pas

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