A thesis submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfilment of the Degree of Master of Science

> Understanding the Conflict between Wild Boar and Humans in the Department of the Moselle, France

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This thesis is submitted in fulfillment of the Master of Science degree awarded as a result of successful completion of the Erasmus Mundus Masters course in Environmental Sciences, Policy and Management (MESPOM) jointly operated by the University of the Aegean (Greece), Central European University (Hungary), Lund University (Sweden) and the University of Manchester (United Kingdom).



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Jul B

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# ABSTRACT OF THESIS submitted by:

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for the degree of Master of Science and entitled: Understanding the Conflict between Wild Boar and Humans in the Department of the Moselle, France.

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France, like many countries in Europe has seen an explosion in wild boar (Sus scrofa) numbers in the past 30 years. Worldwide, as numbers of certain species and the total human population increase, human-wildlife conflicts often arise. The aim of this study was to identify the elements characterising the conflict between wild boar and humans in the Department of the Moselle, France, through interviews with various stakeholders. Both social and environmental risk factors were shown to fuel the overall conflict. Environmental factors included weather, urban sprawl, farming practices, and the characteristics of hunting lots. The main social factor appeared to be the inequality between stakeholders, with the hunting lobby in the Department possessing the majority of the power. With wild boar being an important game species, the animal appears to have benefited from a degree of protection because of its economic value, with hunting lot prices having increased in the Department in combination with animal numbers. Though management of the animal by hunters appears to be changing, a number of stakeholders remain convinced that more is required on behalf of hunters to manage populations more responsibly. Agriculture is a sector particularly concerned by wild boar because of the damages they cause to crops and though damages are compensated for by hunters it appears that a number of other costs are not, such as damages to ecosystems, the health of fauna and humans, and costs to society such as a loss of amenity associated with the act of hunting.

**Keywords:** Agriculture, Department of the Moselle, France, human-wildlife conflict, hunting, pest, *Sus scrofa*.

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# List of Abbreviations

CSF	Classical Swine Fever			
DCA	Damage Causing Animal			
DDT	Direction Départementale des Territoires (Departmental Management of the Territories)			
FDC	Fédération Départemental des Chasseurs (Departmental Hunting Federation)			
FDIDS	Fonds Départemental d'Indemnisation des dégâts de Sangliers (Departmental Compensation Fund for Wild Boar Damages)			
FDSEA	Fédération Départementale des Syndicats d'Exploitants Agricoles (Departmental Federation of Farmers)			
HANPP	Human Appropriation of Net Primary Production			
HWC	Human Wildlife Conflict			
ONCFS	Office National de la Chasse et de la Faune Sauvage (National Hunting and Wildlife Agency)			
ONF	Office National des Forêts (National Forestry Office)			
PNMS	Plan National de Maîtrisse du Sanglier (National Wild Boar Action Plan)			
SDGC	Schéma Départemental de Gestion Cynégétique (Departmental Game Management Scheme)			
UAA	Utilised Agricultural Area			

#### **CHAPTER ONE – INTRODUCTION**

As human populations increase worldwide so too do the amount of resources being consumed by people to support their own needs (Robinson 2005). Coupled with these increases, conservation efforts undertaken to strengthen certain wildlife populations have resulted in increased encounters between wildlife and humans (Thirgood et al. 2005). Though wildlife is often valued by humans, particularly as a resource or for cultural and social reasons (Robinson 2005), the increased frequency of encounters may be viewed as both positive and negative (Thirgood et al. 2005). Positive views are evident with regards to game species due to their hunting, economic, and social interest (De Klemm 1996). Negative views on the other hand may result from damages which wildlife inflict upon humans, resulting in both direct costs (e.g. human life, livestock, wildlife, and crops) and indirect costs (e.g. time and money) (Thirgood et al. 2005). Conflicts which arise between humans and wildlife ultimately involve people, whose attitudes, beliefs, and values must be understood in order to alleviate the costs of conflict (Redpath et al. 2004). The way in which human-wildlife conflicts (HWC) are managed depends not only on individuals but on political decisions and dialogue between stakeholders (Thirgood and Redpath 2008). Social factors therefore may influence the characteristics of HWCs, with human-human conflicts contributing towards the aspects of the overall conflict (Dickman 2010).

#### **1.1. PROBLEM STATEMENT**

France, like many countries in Europe, has seen an extraordinary increase in the numbers of wild boar (*Sus scrofa*) present on its territory during the last thirty years (Charlez 2008; Schley *et al.* 2008). With the species being highly adaptive and capable of inflicting numerous types of damages, including to croplands, urban lands, vehicles, human and animal health, and the natural environment; concern has risen amongst segments of the French population

surrounding increasing wild boar numbers. Considered both a pest due to the damages it causes and a resource because of its hunting interests, wild boar-human and human-human conflicts have been receiving growing attention in France in the past few years. The Department of the Moselle, located in the North East of France is no exception, with numerous local newspaper articles dating back to 2008, treating the subject of wild boar damages in the region, as well as reports of discontent manifested, for example by farmers towards the Departmental Hunting Federation concerning their management of the conflict. Although attempts have been made by all stakeholders implicated in the HWC to ease the level of conflict, including national measures such as the development of a National Wild Boar Action Plan, conflicts still persist between wild boar and humans and between the implicated stakeholders.

#### **1.2.** AIMS

The primary aims of this research are to analyse the conflict between wild boar and humans in the Department of the Moselle, France and understand the elements which characterise it, using the conceptual framework developed by Dickman (2010), for identifying factors likely to affect the intensity of HWCs. The aim is to display the social and environmental risk factors influencing the costs experienced by those implicated in the conflict, the current responses on behalf of the actors involved, and their associated consequences. The subsequent aim is to provide recommendations, aimed at alleviating the costs associated with the conflict.

# 1.3. RESEARCH QUESTION AND OBJECTIVES

What elements characterise the conflict between people and wild boar in the department of the Moselle, France?

The objectives of this research are to identify the views of the various stakeholders implicated in the human-wild boar conflict surrounding:

- 1. Wild boar damage levels
- 2. Impacts associated with wild boar
- 3. Factors influencing wild boar damages
- 4. Causes of conflict
- 5. Supplementary feeding practiced by hunters
- 6. Wild boar management by hunters
- 7. Role of hunting rights/hunting licences
- 8. Dialogue between farmers and hunters
- 9. Power relationship between stakeholders

### 1.4. OUTLINE

The following chapters aim to contribute towards answering the research question. Chapter Two will present an overview of the literature surrounding human-wildlife conflicts, wild boar, and provide background information surrounding the Department of the Moselle, and an overview of the key stakeholders implicated in the human-wild boar conflict. Chapter Three will present the methods used to conduct the research, with Chapter Four providing an overview of the key results. Chapter Five will discuss the main findings from this research. Answers to the research question will be presented in Chapter Six as well as recommendations surrounding the management of the human-wild boar conflict and ways to help mitigate it.

#### **CHAPTER TWO – LITERATURE REVIEW**

Despite humans (*Homo sapiens*) being only one of millions of animal species on Earth, they govern an unequal fragment of the planet's natural resources compared to other species (Vitousek *et al.* 1986). An overall estimate of the global human appropriation of net primary production (HANPP) was developed by Haberl *et al.* (2007), which represents "the aggregate impact of land use on biomass available each year in ecosystems" and is often used as a "measure of human domination of the biosphere". Although an aggregate global HANPP value of 23% of potential net primary productivity was observed by Haberl *et al.* (2007) this masks the true dominance of humans over the biosphere in certain regions of the globe as demonstrated by HANPP values of 63% in Southern Asia and 52% in Eastern and South Eastern Europe (Haberl *et al.* 2007).

Wildlife is generally valued by humans either as a resource or for cultural and social reasons, though "humans often and increasingly come into conflict with wildlife" (Robinson 2005). Conflicts between humans and wildlife arise when people and wildlife enter into competition for space or resources (Western and Waithaka 2005). As wildlife habitats are lost to human activities, certain animals will inevitably come into competition with human beings (Robinson 2005). This competition can impact upon biodiversity, conservation efforts, human security and the legitimacy of institutions (Anthony *et al.* 2010). Conflicts between humans and wildlife are not restricted to particular species, but involve an array of mammals, birds, fish, insects, and reptiles (Manfredo and Dayer 2004). The majority of research surrounding HWCs focuses on protected areas and their surroundings (see Anthony *et al.* 2010; Hartter *et al.* 2011; Madden 2004; Nyhus and Tilson 2004; O'Dea *et al.* 2006; Pérez and Pacheco 2006; Teel *et al.* 2010) and on protected species in particular. Research involving conflicts between humans and game species which have, over time, profited from advantageous management

approaches due to their hunting, economic, and social interest (De Klemm 1996) are not as common in the literature though much of the research in this area has focused on deer species (see Baker and Fritsch 1997; Decker and Gavin 1987; Fagerstone and Clay 1997; Igota and Suzuki 2008; Kilpatrick *et al.* 2007; Rhoads *et al.* 2010; Rondeau and Conrad 2003; Sullivan and Messmer 2003; VerCauteren *et al.* 2003; Walter *et al.* 2010). The issue of protected areas and their surroundings is also a concern for certain game species, as hunting is not always permitted in protected areas and hunting reserves, and animals originating from these areas may interfere with human activities, causing damage (De Klemm 1996).

Wild boar (*Sus scrofa*) is a game species which is receiving increasing attention in the field of wildlife management research, with a growing number of conferences, symposia, and articles treating issues surrounding wild pigs in general (Ditchkoff and West 2007) with a marked focus on wild boar damage to crop land globally, including in Africa (Hill 1997), Asia (Brooks *et al.* 1989; Cai *et al.* 2008), Australia (Izac and O'Brien 1991), Europe (Schley *et al.* 2008; Thurfjell *et al.* 2009; Wilson 2004), and North America (McCann and Garcelon 2008). According to West *et al.* (2009) wild boar are perhaps the "most prolific large mammal on earth" and "the greatest vertebrate modifiers of natural plant communities". As well as inflicting damage to crop land, wild boar can carry and transmit diseases to livestock and humans (Mowlavi *et al.* 2006), cause collisions with vehicles (Primi *et al.* 2009), damage in residential areas, and impact both positively and negatively upon the ecosystem in which they are present (Cahill *et al.* 2003).

Many countries in Europe have seen a striking increase in the level of wild boar populations in the last thirty years (Schley *et al.* 2008). Coupled with this population increase there has been an increase in the level of conflict between humans and wild boar, particularly in regions where wild boar damage levels are high. According to Messmer (2000), in order to address the issue of potentially overabundant wildlife populations, our understanding of "how and why human-wildlife conflicts occur" needs to be improved as well as that of "the magnitude and public perceptions of the damage". Without understanding clearly these four key elements, strategies to resolve human-wild boar conflicts are less likely to succeed.

# 2.1. HWC IN THE GLOBAL CONTEXT

#### 2.1.1. Nature of the damages in HWCs

Globally, HWCs pose a number of threats to humans, domestic animals, wildlife, and crops. Threats include the transmission of diseases from wild animals to domestic animals (Donnelly *et al.* 2003; Gortázar *et al.* 2006; Solaymani-Mohammadi and Petri 2006) which in turn may pose a threat to human health and biodiversity (Daszak *et al.* 2000), attacks on domestic animals by wild predators (Dar *et al.* 2009; Graham *et al.* 2005; Sangay and Vernes 2008; Schiess-Meier *et al.* 2007), threats to human life (Hazzah *et al.* 2009; Treves and Karanth 2003), the destruction of agricultural lands such as permanent grassland and annual crops (Schley *et al.* 2008), and the destruction of forest vegetation and soils (Reimoser and Gossow 1996).

The true nature of damages fuelling HWCs is not always evident, with the interpretation varying based on the opinions and reports of the various stakeholders which in turn are influenced by emotional issues which may exaggerate the true scale of the issue (Anthony *et al.* 2010). The issue of 'hyper-awareness' of risk raised by Dickman (2010) may play a key role in determining the perceived nature of the conflict at the individual, community, and national level. Individuals may magnify either deliberately or accidentally the losses they experience due to wildlife, which has the potential to "elevate the fear of damage in other people, even if they have never personally experienced it" (Dickman 2010).

The way in which damages and risks are portrayed in the media may also play an important role in influencing the perceptions of individuals surrounding the nature of damages. A study by Goulding and Roper (2002) of "Press responses to the presence of free-living Wild Boar (*Sus scrofa*) in southern England" revealed that media coverage of wild boar related issues was largely negative. The main messages presented by "newspaper and magazine articles were that the animals constituted a danger to the public, damage agricultural crops, predate livestock and transmit disease" (Goulding and Roper 2002) whilst only a few claimed that wild boar should be protected, primarily as a source of game. Environmental issues were given little attention, with the main spotlight being placed on adverse effects the animals have on native flora and fauna.

The tolerance of individuals towards damages by wildlife may vary not only based on their perceptions of risks but also on their respective situations. For example Decker and Brown (1982) found that farmers cultivating higher value crops which were susceptible to damages by wildlife (e.g., apples, nursery plants) have a lower acceptance level towards wildlife than other farmers.

## 2.1.2. Motives for conflict

The damages which wildlife inflict upon humans are rarely the sole root cause of HWCs and human-human conflicts often play a role in arousing hostility, including those between individuals and the authorities, or between individuals who share different cultural values (Dickman 2010). The motives for the existence of HWCs are seldom simple and instead involve a combination of ecological, social, legal, and economic elements (Conover 2002). The perceptions and opinions of stakeholders therefore are based on an array of elements which include, as well as facts and personal experiences, "wider societal experiences, cultural norms, expectations and beliefs" (Dickman 2010). What makes conflicts between humans and

wildlife especially contentious is that the resources in question often have economic value whilst the damage causing animals (DCAs) are esteemed and often protected in some way (Graham *et al.* 2005) either legally or otherwise. Trade-offs between the benefits and costs associated with DCAs may therefore be required by certain actors, with Anthony and Szabo (2011) stating that "recognising and articulating inherent management trade-offs amongst diverse actors are requisite if HWC is to be fully understood, and mitigated".

Urbanization is an integral element of European civilisations (Antrop 2004). Whilst initially, the differentiation between urban and rural territories represented a decisive factor in landscape dynamics (Antrop 2004), the "increasing urbanization of rural landscapes has created new challenges for wildlife management" (Patterson *et al.* 2003). Whilst also altering the natural environment, urbanisation influences the socio-cultural landscape and more importantly, as direct encounters with wildlife and urbanised societies become less frequent, the cultural meanings of 'wildlife' become distanced from the functional/profitable standpoint of agrarian systems (Patterson *et al.* 2003). It is no longer solely wildlife which fuels HWCs but rather deeper socio-political considerations such as "equity, tradition, private property rights, government control, power, and acceptable forms of knowledge" (Patterson *et al.* 2003). Research surrounding the issue of perceived behavioural control indicates that many farmers on the edge of protected areas often feel that they do not have sufficient control to influence conflict situations (Manfredo and Dayer 2004).

#### 2.1.3. Responses to conflict

Without any external control, rational individuals in conflict with wildlife would for example apportion their time between hunting and farming in such a way that the returns on allocating a bit more resources to each of the undertakings yield the same return (Bulte and Rondeau 2005). With outsiders often dictating what conflict responses individuals have the right to employ, conflicts between wildlife and humans may illicit a variety of responses which are not always proportionate to the level of wildlife damages in question (Dickman 2010). Responses can be directed either towards DCAs, individuals, organisations, or the authorities. Those directed at DCAs can be either lethal or non-lethal. Lethal control has often been regarded as the least costly and most practical method for reducing damages particularly by large vertebrates (Treves and Naughton-Treves 2005). Dickman (2010) presents a comprehensive overview of the various lethal and non-lethal approaches directed at DCAs in response to conflicts (Table 1).

Conflict	Techniques	Examples
approach		
Physical	Fencing/enclosing	Livestock enclosures; placing fences, electric
separation of	resource	fences, trenches, fladry, trenches, netting or
species and		other defence structures around resource
resources		<b>X7' 1 11 / 11 /</b>
	Repellents/deterrents	Visual repellents, acoustic repellents,
	and scaring devices	repellents), rubber bullets or other projectile
		deterrents, radio-activated guard boxes
	Fencing protected areas	Electric fencing or other fencing around
		boundaries of protected area
Guarding assets	Guarding and warning	Specialized livestock guarding dogs, other
	animals	guardian animals such as donkeys and llamas,
	Human guardians	Human guarding of resources, for example
	Trainan Suaranano	staying in crop fields to scare away
		herbivores, herders going out with stock or
		staying in/around enclosures to protect from
		carnivores
	Physical devices on	Protection collars, king collars, cyanide
Habitat use and	Habitat manipulation to	Mowing vegetation around airports to reduce
modification	reduce Conflicts	hird strikes increasing heather on grouse
mounication		moors to reduce grouse predation, burning
		vegetation to reduce cover for wild animals
	Habitat zoning	Demarcate habitat into different land use
		zones to prioritize human or wildlife use

Table 1. Summary of Technical measures used to mitigate human-wildlife conflict. Adapted from Dickman (2010).

Behaviour modification of	Physical aversion	Electric collars on conflict-causing animals to avert them from approaching resource
conflict-causing species	Conditioned taste aversion	Lithium chloride and other chemicals applied to resource, to cause discomfort and aversion after consumption
Behaviour modification of humans	Livestock management	Synchronizing breeding, more conscientious herding, guarding, enclosing stock, carcass disposal and avoidance of conflict hotspots
responsible for resource	Relocation of people	Local people encouraged or made to move out of wildlife areas
	Education and awareness	Reducing own risk factors, e.g. reducing driving speed to avert deer-vehicle conditions, increasing knowledge of the ecology of conflict-causing species and the best techniques for reducing conflict, use of conflict verification teams to help people correctly identify species causing conflict
Use of buffer resources	Buffer crops	Planting of buffer crops to reduce
	Artificial provision of alternative food sources Maintenance of alternative food sources	Diversionary feeding for conflict-causing species Maintenance of wild prey for carnivores, maintenance of wild crops for herbivores to
Lethal control of conflict-causing species	Population control	Widespread killing of conflict-causing species to avoid conflict, selective culling to limit
	Retaliatory killing	Killing of conflict-causing species as a response to on-going conflict
Non-lethal control of	Problem animal control Sterilization	Targeted lethal control of 'problem animals' Contraception, physical sterilization of conflict-causing animals
conflict-causing species Reducing costs of conflict	Removal of problem animals Alleviating economic costs of conflict Economic incentives to	Translocation, relocation, placement of wild conflict-causing animals into captivity Compensation schemes for wildlife losses, insurance cover for resources Direct payments for conservation of conflict-
	causing species	causing species
	Alternative income generation Increasing benefits of wildlife	Diversitying income sources away from pure dependence upon resource under Competition Increasing economic benefits of wildlife, e.g. through tourism, revenue-sharing schemes or wildlife-related employment, and/or increasing lifestyle benefits, e.g. providing recreation opportunities through activities such as wildlife viewing or hunting, or provision of meat from wildlife hunting

As alluded to by Anthony *et al.* (2010), HWCs can threaten biodiversity, conservation efforts, and human security including through poorly implemented and controlled lethal mitigation strategies. Responses directed at individuals, organisations or the authorities generally involve the voicing of concerns either vocally or physically by the individuals who have suffered from wildlife damages in an attempt to instigate the implementation of mitigation strategies by those who have the power and legal right to do so (see: Chasseurs de l'Est 2010; Le Républicain Lorrain 2009). The failure to implement mitigation strategies can for example threaten human security and the legitimacy of institutions (Anthony *et al.* 2010).

Although a vast array of methods exist for reducing damages caused by wildlife, conflicts often persist even after mitigation actions have been taken, implying that conflict resolution demands innovative and comprehensive attitudes to succeed in the long-term (Dickman 2010).

#### 2.1.4. Dickmans' Conceptual Framework

Given the complexity of elements involved in the relationship between humans and the environment, there is an array of risk factors which contribute toward conflicts between humans and wildlife, the anticipated and genuine costs of conflict, the riposte manifested by humans, and the repercussions for wildlife from this riposte (Dickman 2010). A conceptual framework has been developed by Dickman (2010) in order to organise these risk factors in an attempt to understand the intricate relationship between cultural, social, and personal elements which fundamentally affect how costly a DCA is understood to be and in turn, the degree of opposition expressed by individuals towards their presence (Dickman 2010).

Risk factors have been divided by Dickman (2010) into environmental and social, each engendering a particular cost, which in turn elicits a given response and has consequences for

the HWC in question (Fig. 1). The environmental and social risk factors will vary depending on the context of the HWC in question, however having an understanding of these factors helps to identify the elements which characterise conflicts which in turn enables the determination of actions which can aid in their resolution. Dickman (2010) presents an overview of some of the environmental and social risk factors which are common to HWCs; although the list is not exhaustive it serves as a starting point for the analysis of specific conflict situations.



**Environmental risk factors** 

Fig. 1. Conceptual framework of some of the factors likely to affect the intensity of human-wildlife conflict. Adapted from Dickman (2010)

# 2.1.4.1. Environmental Risk Factors

Environmental risk factors which may influence the level of damage wildlife cause include the environmental characteristics of a given location, e.g. the distance of crops from the edge of forests having an influence on the intensity of damages caused by wild boar to croplands (Linkie *et al.* 2007; Schley *et al.* 2008). Land use and management practices can also play a role in altering the probability of conflict occurrence, with Herrero *et al.* (2006) showing in their study that wild boar exhibit stenophagous behaviour, preferring to feed on only a few particular crops over others. The management by humans of their assets and of conflict causing species can affect the level of damages which wildlife inflict, including the use of enclosures, dogs, and shepherds to safeguard livestock from attacks by wildlife (Woodroffe *et al.* 2007) and the culling of animals either proactively or retroactively in order to reduce livestock and game depredation (Baker *et al.* 2008). The behaviour of DCAs has the ability to affect the level of damages experienced by individuals as does the density of wild and domestic animals (Baker *et al.* 2008).

#### 2.1.4.2. Social Risk Factors

Factors such as inequality and power between stakeholders may affect the conflict-related costs which stakeholders perceive (Patterson *et al.* 2003), with individuals being "willing to accept voluntary risks roughly 1000 times greater than involuntary risks" (Starr 1969), demonstrating that the perception of costs may be influenced by the power relationship between stakeholders in HWCs. Distrust and animosity between stakeholders in HWCs is also important, with Swenson and Andrén (2005) citing an example in Norway where sheep-raising organisations were not in favour of extra costs associated with livestock protection measures funded by the state, because they did not trust the state, believing that the funding may disappear in the long term as well as insisting that sufficient areas of adequate pastures to implement the measures did not exist. The vulnerability and wealth of individuals can also alter their perception of HWC-associated costs, with both factors influencing an individual's/household's capacity to cope with damages by wildlife and the subsequent losses (Naughton-Treves and Treves 2005). Ultimately it is the beliefs and values of individuals

which influence their perceptions of wildlife damage costs and which determine human/animal relationships, spanning from "animals as "family" members ("children in fur coats"), animals as property, or for human consumption to idealized beings in need of protection" (Nash and Sutherland 1991).

## 2.2. WILD BOAR Sus scrofa

#### 2.2.1. Distribution worldwide

*Sus scrofa*, referred to in English as either wild boar or Eurasian wild pig has "one of the widest geographical distributions of all terrestrial mammals" (Fig. 2) with its' distribution being expanded by humans through introductions on every continent except Antartica, including numerous oceanic islands (Oliver and Leus 2008). Where present, wild boar have long been the source of prey for subsistence hunters, and more recently one of the most important species for recreational hunters (Oliver and Leus 2008). Only in the British Isles, Scandinavia, parts of North Africa, and large areas of the former Soviet Union have wild boar been exterminated through land use changes and over-hunting (Oliver and Leus 2008). Reintroductions have since taken place in Sweden and Britain, being either accidental, with animals escaping into the wild from farms, or deliberate (Goulding 2006; Lemel *et al.* 2003).

Locally abundant wild boar populations are common, with the species being considered a pest in many countries due to its ability to inflict damages to crops (Oliver and Leus 2008). In Europe, the population of wild boar has undergone a substantial increase across the region during the past decades (European Russia, Czechoslovakia, Finland, France, Spain, and Switzerland: Sáez-Royuela and Tellería 1986; France: Charlez 2008; Gérard *et al.* 1991; Klein 2010; Luxembourg: Schley 2000; Norway: Rosvold and Andersen 2008; Sweden: Lemel *et al.* 2003; Thurfjell *et al.* 2009). The explosion in wild boar populations reportedly began around the 1960's (Sáez-Royuela and Tellería 1986) and the end of the 1970's (Schley *et al.* 2008) in certain regions, becoming particularly abundant in France in the last fifteen years (Charlez 2008). During the same period of time there has been an increase in the number of reports of damages to crops by wild boar (Schley and Roper 2003).



Fig. 2. Eurasian range map of Wild Boar Sus scrofa. Adapted from Oliver and Leus (2008).

Numerous explanations exist for this increase in wild boar populations in France and across Europe in general over the past several decades, including higher average temperatures particularly in winter and spring (Geisser and Reyer 2005), areas left un-hunted which act as reserves for wild boar populations (Tolon and Baubet 2008), reintroductions (Lemel *et al.* 

2003), the innate ability of populations to adapt and grow rapidly in favourable conditions (West *et al.* 2009), the provision of feed for wild boar by hunters (Bieber and Ruf 2005), and a loss of small game habitats causing a shift in hunting from small game to wild boar (Erasmy *et al.* 2008), which has promoted management practices in favour of increased wild boar populations to satisfy the interests of hunters.

## 2.2.2. Biology

#### 2.2.2.1. Breeding and reproduction

Wild boar have the ability to rapidly colonise new areas due to their high growth rate and adaptability, particularly under favourable environmental conditions (Waithman *et al.* 1999). West *et al.* (2009) cite the following four reasons for this trait: (1) the young age at which pigs become sexually mature, (2) the ability for females to give birth up to two times per year, (3) the large size of litters, and (4) the relatively low rate of natural mortality compared to other species. Litter sizes in Europe vary on average between 3.6 - 6.9 young per female (Rosvold and Andersen 2008).

#### 2.2.2.2. Longevity and mortality

An average life expectancy of 1.5 years for wild boar was reported in an area of Poland where hunting of wild boar takes place (Fruzinski 1995) though higher average longevity could be expected in regions where wild boar are not hunted. Given that in theory the annual growth of young wild boar populations is 100%, with higher rates possible under good conditions and amongst older populations, even reports of annual hunting harvests higher than 100% of the population size established before reproduction (Fruzinski and Łabudzki 2002) may not severely impact populations under average conditions. Though wild boar mortality associated with predation does occur where predators are present; rates are generally lower than those

associated with hunting, starvation, and disease (see Jedrzejewski *et al.* 1992; Melis *et al.* 2006; Nores *et al.* 2008).

#### 2.2.2.3. Diet

Wild boar are opportunistic omnivores, feeding on almost anything (Rosvold and Andersen 2008). Schley and Roper (2003) conducted one of the most holistic researches on wild boar diets in Western Europe, citing vegetable foods as the most common component of the animals' diet. Vegetable foods consisted primarily of "mast, roots, green plant matter and agricultural crops" (Schley and Roper 2003) though energy-rich feeds including "acorns, beechnuts, chestnuts, pine seeds, olives, cereal grains" represented a substantial element in their diet. Animals form a limited component of wild boar diets, including "insects, earthworms, birds, and mammals" as well as "amphibians, reptiles, gastropods and myriapods" (Schley and Roper 2003). Despite a reported dietary preference for mast when available over agricultural crops, as well as supplementary feeds such as maize and oats (Groot Bruinderink *et al.* 1994), wild boar diets vary annually, seasonally, and according to their location (Schley and Roper 2003).

#### 2.2.2.4. Habitat

Santos *et al.* (2004) describe wild boar as having low habitat specificity. Factors influencing their home range include the quality of the environment, the availability of food resources, the density of populations, and seasonality, with the range being extended where food availability, habitat quality, and population densities are low (West *et al.* 2009). In recent decades, wild boar have started to appear in urban areas with for example an estimated five thousand individuals living in urban and suburban areas of Berlin (Jansen *et al.* 2007). Where agricultural lands exist, wild boar generally inhabit the areas on the forest-field edges, giving

them access to both food and cover, and during the summer and early autumn they may seek refuge in fields where the crop stands are high (e.g. maize and wheat) providing them with both food and shelter (Fruzinski and Łabudzki 2002). Moisture is essential for wild boar, with muddy areas required for wallowing, which aids thermoregulation, the disinfection of wounds and serves as a tool for combatting ectoparasites (Fernández-Llario 2005).

### 2.2.3. Impacts associated with Wild Boar

Given the high adaptability of wild boar to different habitats and their opportunisticomnivorous diet, the species is capable of inflicting damages with its' behaviour in numerous environments. Sometimes referred to as 'nature's plough' (Goulding 2006) because of the rooting it practices in search of food and the exposed areas of soil it creates which provide patches for plants to recolonize (see images in Appendix 1). Whether or not such activity benefits biodiversity depends on local contexts such as wild boar population density, plant species, level of disturbance, and the susceptibility of habitats (Bratton 1974; Welander 1995). What is evident is that the behaviour of wild boar may greatly alter the environment, including populations of non-plant species such as insects, earthworms, amphibians, reptiles, birds, and other small animals (Schley and Roper 2003).

It is the risks that the species poses to agriculture, in particular the damages they cause to crops which tend to receive the most attention (Calenge *et al.* 2004; Geisser and Reyer 2004; Herrero *et al.* 2006; Schley and Roper 2003; Schley *et al.* 2008; Wilson 2004) and, in combination with threats to human security, appear to be the main source of conflict between humans and wild boar in Europe. Wild boar damages occur primarily in the form of grassland sward destruction due to rooting by individuals for food and to annual crops through the consumption of fruit and trampling of plants (Schley *et al.* 2008). According to Schley *et al.* (2008) when maize is present, it nearly always suffers the highest amount of damage amongst

annual crops, with wheat coming second followed by other cereals. Damage to grassland is often seen as more problematic, being the only form of damage to permanent crops (Schley *et al.* 2008) and creating subsequent problems for farmers including risks to animal health and milk quality due to the presence of soil in silage, a loss of time and effort required to restore land, and the possibility of damage to machinery (Widar and Luxen 2009).

Damages in rural, semi-urban, and urban areas have been reported including damages to gardens, football pitches, parks, green areas along the edges of roadways, and fencing (Kotulski and König 2008). Wild boar also pose a safety risk to humans in collisions with vehicles (Groot Bruinderink and Hazebroek 1996) as well as attacks on humans, which have been known to result in death in rare cases (Manipady et al. 2006), and as vectors of disease (Meng et al. 2009). Wild boar are capable of hosting a wide range of viruses, bacteria, and parasites which can be transferred to domestic animals and humans (Meng et al. 2009). Diseases which are transmissible from wild boar to domestic animals include classical swine fever (CSF), brucellosis, trichinellosis, Aujeszky's disease, tuberculosis, porcine reproductive and respiratory syndrome, and toxoplasma gondii (see: Albina et al. 2000; Gethöffer et al. 2007; Meng et al. 2009; Rossi et al. 2005; Ruiz-Fons et al. 2006; Santos et al. 2009; Vicente et al. 2006). In April 2002, in the Department of the Moselle, two cases of CSF were reported, one in a domestic pig and one in a wild boar, followed by one case on a pig farm in Germany which had received pigs from the French farm (DGAL 2002; MAAPRAT 2007). Diseases which wild boar may transmit to humans include hepatitis E, tuberculosis, leptospirosis, trichinellosis, brucellosis, and Tulameria (Al Dahouk et al. 2005; Meng et al. 2009).

From a management perspective it is important to understand the factors which play a role in the transmission and the spread of diseases amongst wild boar populations. Ruiz-Fons *et al.* (2006) identified higher risks of disease prevalence in areas with denser wild boar
populations, with factors such as fencing, supplementary feeding, and water resources playing a role in concentrating individuals in a given area.

# 2.2.4. Supplementary feeding

Supplementary feeding of wild boar in areas where the species has traditionally been managed has been extensively used since the 1970s, after the emergence of maize as a commonly grown crop (Vassant 1997). The activity consists of humans providing artificial feed which can include potatoes, beets, residues from dairy products and restaurants (Magnien 1994), though the most common feed provided is maize (Calenge *et al.* 2004; Geisser and Reyer 2005; Schley *et al.* 2008). The motives for supplementary feeding are numerous:

- To prevent wild boar from venturing onto farmlands and causing damages (Geisser and Reyer 2004).
- To attract wild boar for hunting (baiting) which consists of only providing large quantities of feed during the hunting season (Magnien 1994).
- To provide feed when the animals need it the most (support feeding) such as during the winter months and when females are giving birth (Magnien 1994).
- To observe animals from a fixed post (Magnien 1994).
- To shoot animals at a fixed post (Magnien 1994).

How effective supplementary feeding is in preventing damage to crops will depend on the amount of time it occupies the animal, with wild boar reportedly spending approximately 25% of their time in search of food, how attractive the food source is compared to what else is available in the environment, and the placement of the food source, with the territoriality of wild boar affecting which individuals will come to feed (Magnien 1994). Regulations surrounding supplementary feeding practices for wild boar vary even within France, with the "Plan National de Maîtrisse du Sanglier (PNMS)" (National Wild Boar Action Plan)

providing guidelines and a set of actions which each Department can choose to implement depending on their local context (MEEDDM 2009).

## 2.2.5. National Wild Boar Action Plan (PNMS)

The PNMS, developed in 2009 by the "Ministère de l'Écologie, de l'Énergie, du Développement Durable, et de la Mer" (Ministry for Ecology, Energy, Sustainable Development, and the Sea) is composed of a range of measures, described in a set of 13 individual action plans intended to be implemented across France (MEEDDM 2009). It is up to the "préfets" (prefects), the representatives of the state in France at the regional and Departmental level, in association with the concerned institutions, to select from the plan the measures most adapted to their local context and ensure that they are put into practice (MEEDDM 2009). The 13 individual action plans are as follows:

- 1. Establish an inventory of the situation of wild boar at the Departmental level
- 2. Establish a zoning at the Departmental level relating to the risk posed by wild boar
- 3. Establish a diagnosis of the 'hotspots' where wild boar damages are highest
- 4. Define the supplementary feeding practices for wild boar which are acceptable
- 5. Develop a hunting plan and game management plan
- 6. Define the management indicators
- 7. Improve knowledge concerning wild boar culled
- 8. Practice effective wild boar hunting
- 9. Increase the vulnerability of wild boar during hunting situations
- 10. Regulate the populations of wild boar in hunting reserves and protected areas
- 11. Control the conditions for rearing and releasing wild boar
- 12. Organise wild boar culls in peri-urban and/or industrial areas
- 13. Communicate and organise consultations

It is the responsibility of all the actors concerned (e. g. hunters, farmers, Departmental Hunting Federations, National Forestry Office, National Hunting and Wildlife Federation, Prefects, and Sub-Prefects) to ensure that the necessary measures from the plan are implemented at the Departmental level and thus reduce the threats which wild boar pose to society, with particular reference to the hotspots where damages are highest.

# 2.3. THE DEPARTMENT OF THE MOSELLE

## 2.3.1. Key Facts

The Department of the Moselle (Fig. 3) is located in the north east of France, in the Lorraine region, bordered by the Departments of the Meurthe-et-Moselle (Lorraine) to the west and the Bas-Rhin (Alsace) to the east, as well as the countries of Luxembourg to the north west and Germany to the north and north east. The Department covers an area of approximately 6,250 km<sup>2</sup> (SSP 2009), with a total population of around 1,043,000 inhabitants in 2009 (INSEE 2010). The Department is divided into 9 districts, which are divided into 51 cantons, and subsequently 730 communes (CG 2011).



Fig. 3. Location of the Department of the Moselle (in red). Adapted from source: Google Earth 2010a.

The landscape of the Department of the Moselle is varied with the main constituent being the Lorrain plateau, a relatively flat expanse of land with a few small valleys, situated between the mountainous region of the Vosges to the east and the valley of the Moselle to the west (Debard 2006). The other elements of the Departments' landscape include the heavily forested region of the Vosges Mountains to the south east; the depression of the Warndt to the north east, a green basin characterised by coal mining; the plateau of the "Pays-Haut" (High land) to the west, covered by forests and overlooking the valley of the Moselle; the valley of the Moselle, a highly urbanised region containing numerous industries and communication routes; a rural area in the centre of the Department, and to the south an area called the "Pays du Sel" (Land of the Salt) which has conserved it's agricultural characteristics and numerous lakes (Debard 2006).

# 2.3.2. Hunting in the Department of the Moselle

The region known as Alsace-Moselle, of which the Department of the Moselle is part, has different regulations concerning hunting compared to the rest of France, with the organisation and operation of hunting subject to special arrangements which have been in place in the region since the Departments of the Alsace region (Haut-Rhin and Bas-Rhin), and the Moselle formed part of the German Empire (FDCM 2007). Like the rest of France, the landowner possesses the hunting rights on his/her land however he/she cannot do as he/she wishes (FDCM 2007). In order to establish hunting territories where sound management can take place, continuous expanses of land which are less than 25 ha in size (5 ha for water bodies) and owned by a single tenant on a given commune are pooled together by the municipality and the hunting rights auctioned. Only landowners possessing more than 25 ha of continuous expanse of land have the right to manage the hunting rights autonomously on those lands, called "chasses privés" (private hunting lots). Hunting rights on lands and waters contained

within the territory of a commune are grouped together into lots called "chasses communales" (communal hunting lots), whose management is organised by the commune, on behalf of the landowners (FDCM 2007). Every 9 years the communal hunting lots are leased out via public auctions, by mutual agreement or via bidding, depending on the standard terms of reference for each lot, set by the Prefect. This lease confers to the tenant the exclusive rights to hunt on the leased land, in accordance with the methods of hunting allowed. Tenants of communal hunting lots may choose to associate themselves with other individuals in order to pay for the cost of the hunting rights or invite individuals to hunt on their lots during organised hunting sessions; in both cases the individuals who are invited have the same rights and obligations as the tenant.

As in the rest of France, the hunting rights in lots of forest which are owned by the state and managed by the "Office National des Forêts (ONF)" (National Forestry Office) are allocated in a similar manner to communal hunting rights. Such hunting lots are termed "chasses domaniales" (domanial hunting lots) and are leased via public auctions, generally for a period of 12 years though in certain cases they may be leased for 6 years following a mutual agreement, for example between the ONF and the "Office National de la Chasse et de la Faune Sauvage (ONCFS)" (National Hunting and Wildlife Agency) for wildlife and hunting reserves or scientific organisations (for studies) (ONF n.d.*a*).

The main game species which are hunted in the Department of the Moselle are large game, primarily wild boar (*Sus scrofa*), red deer (*Cervus elaphus*), and roe deer (*Capreolus capreolus*). The three primary hunting practices are hunting from hides, stalking, and drive hunts (involve more than 10 armed hunters together) (FDCM 2007). Unlike red deer and roe deer, limits are not set for the number of wild boar which each hunting lot is allowed to shoot and the species is classified as a pest species due to the high level of damages they cause. This

means that wild boar can be hunted all year round from a hide or by stalking, while drive hunts are only permitted during a fixed period of the year.

According to the French Environmental Code (CE 2011), the act of hunting is "any voluntary act relating to the search, pursuit, or the awaiting of game with the aim or results being the capture or death of the latter". The act of hunting in its integrity must respect the criteria for sustainability (FDCM 2007). A Departmental Game Management Scheme, entitled "Schéma Départemental de Gestion Cynégétique (SDGC)" exists in the Department of the Moselle in order to meet the sustainability objectives of hunting defined in the French Environmental Code (see: CE 2011). This SDGC includes the following which are relevant for the management of wild boar (FDCM 2007):

- game management plans;
- measures relating to the safety of hunters and non-hunters;
- actions to improve the act of hunting such as the design and implementation of approved management plans, the setting of maximum authorised hunting bags, the regulation of pest species and predators, the release of game species, the search for injured large game, and the requirements for feeding of animals;
- appropriate measures to preserve, protect, and restore natural habitats for wildlife;
- provisions to achieve the balance between agriculture-forestry-hunting.

The SDGC is established for a period of six years, and is drawn up by the "Fédération Départemental des Chasseurs (FDC)" (Departmental Hunting Federation), in conjunction with the chamber of agriculture, representatives of private rural properties, and the representatives of the interests of the forestry community. The SDGC takes into account the Departmental document for the management of agricultural and forestry areas as well as the regional guidelines for the management and conservation of wildlife and its habitats.

In areas where damages by wild boar to crops are considered too high by experts of the "Fonds Départemental d'Indemnisation des dégâts de Sangliers (FDIDS)" (Departmental Compensation Fund for Wild Boar Damages), the owners of the hunting rights in the area concerned are notified (FDCM 2007). If subsequently the damages continue to remain high, drive hunts may be organised for wild boar even outside of the permitted period in the case of a "battue concertée" (concerted drive hunt) or a "battue administrative" (administrative drive hunt). It is the owner of the hunting rights who organises a concerted drive hunt, during which he/she must allow local farmers to participate either as hunters or as beaters<sup>1</sup> in the spirit of transparency and partnership (FDCM 2007). If despite all these actions, wild boar damages to crops in the area continue to remain too high, an administrative drive hunt may be organised by the Mayor or the Prefectural Administration (FDCM 2007). In the case of an administrative drive hunt, it is organised and controlled by a "lieutenant de Louveterie", an individual appointed by and under the control of the administrative authority (art. L427-1 of the CE 2011) and who is in charge of the destruction of animals classified as pests.

Figures from 2004, taken from the SDGC (FDCM 2007) show that in the Department of the Moselle there were 1,138 communal hunting lots, 183 domanial hunting lots (representing 75,200 ha of forest, the most in terms of area in France/per Department), and 1,693 private hunting lots (representing 100,000 ha in area, including hunting lots on military lands). The revenue from communal hunting lots goes either to the commune or to the individual

landowners based on a 2/3 majority vote of landowners representing 2/3 of the land area. In 2006, 80% of revenues from communal hunting lots went to the communes (FDCM 2007). Figures from the SDGC (FDCM 2007) show that in the Department of the Moselle a total of 6,64 million euros in rental fees and taxes from hunting rights were divided as follows between agencies:

- ONF: 2,17 million euros
- Communes: 3,52 million euros
- Landowners: 0,95 million euros

Other sectors of the economy may benefit indirectly from the act of hunting, including hotels, restaurants, and gun shops. It is important to note that hunting takes place primarily between October and January, a period which represents the off-peak season for many hotels (FDCM 2007). In the Department of the Moselle the term 'hunting tourism' may be used (FDCM 2007), with approximately 650 hunting licences delivered to foreigners out of a total of 8,700 on average (see Appendix 2), and between 4,000-5,000 hunters from other Departments coming to hunt in the Department at least once in the year. The Department of the Moselle has the largest business establishment in France in the field of hunting (FDCM 2007).

#### 2.3.3. Farming in the Department of the Moselle

According to annual agricultural statistics (SSP 2009), of the 625,090 ha of land in the Department of the Moselle, 319,399 ha were being used by agriculture in 2009, of which 196,100 ha was arable land (Fig. 4), 339 ha had permanent crops (vines, fruit crops, tree nurseries, and others), 119,500 ha was grassland, 3,000 ha were family gardens and orchards of non-farmers, and 1,000 ha was permanent grassland outside of farms. Non-agricultural land uses in the Department of the Moselle in 2009 represented 305,691 ha (Fig. 5).



Fig. 4. Agricultural land uses in the Department of the Moselle. 2009. Source: SSP (2009)



Fig. 5. Non-agricultural land uses in the Department of the Moselle, 2009. Source: SSP (2009)

Livestock in the Department of the Moselle is primarily bovines (269,290) of which 42,270 are dairy cows and 54,403 are nurse cows (SSP 2009). In 2009, there were 93,400 sheep (SSP 2009). No data were available regarding the numbers of pigs, goats, horses, rabbits or poultry however it is evident that the breeding of these animals does exist in the Department with an online search in the French telephone directory (http://www.pagesjaunes.fr), using the following key words "elevage" (Breeder) and "Moselle" reporting a total of: 21 horse breeders; 17 poultry and/or rabbit breeders; 11 sheep and/or goat breeders; and 3 pig breeders.

This may not represent the totality of the farming practices in the Department of the Moselle however it does give an overview of the common farming systems which exist and therefore the implications which the presence of wild boar may have for agriculture in the region.

## 2.3.4. Compensation for Crop Damages

As discussed in section 2.2.3 wild boar may impact on human activities in a number of ways including the infliction of damage to agricultural crops. In the Department of the Moselle the damages which wild boar cause to crops are compensated for by the FDIDS (see Appendix 3 for an overview of these costs). The FDIDS is funded by hunters, with the exact make-up of contributions being voted upon annually by individuals who own hunting rights on lots of land, elected members of the FDIDS, and members of the ONF. For the hunting season 2010/2011 the contributions were as follows:

- 10% of the cost of the hunting rights for each year for each lot;
- 1,12  $\in$ /ha of forest and 0,19  $\in$ /ha of grassland on the lot;
- Personal contribution of  $30 \notin$  on behalf of each wild boar hunter.

In order for farmers to receive compensation for damages caused by wild boar, they must first fill in a form, stating the details of the damage before sending it to the FDIDS. An estimator will then be sent to the farm by the FDIDS in the subsequent days and will provide an estimate of the damages in terms of the amount of crop lost. The estimate is made based on the average crop yields for the Department. It is then up to the FDIDS to calculate the level of compensation which the farmer will receive in accordance with the market prices for crops. In the case of pastures, farmers are eligible for supplementary compensation, intended for the restoration of the field. If farmers do not agree with the level of compensation, he/she may request a counter-expertise from the FDIDS or he/she can call upon the district court within eight days of the estimation in order to designate an expert to re-examine the damages.

It is only direct damages to crops which are compensated for by the FDIDS but as mentioned in section 2.2.3 indirect damages may also occur including damage to material, health, time loss, and loss of fodder. Farmers who erect electric fences to protect their crops may receive compensation from the FDIDS for the cost of the fences. The main mitigation methods which exist for wild boar damage are electric fences and frightening devices (e.g. gunshot noise) which according to West *et al.* (2009) are ineffective. Lethal control through shooting and hunting is the most widely used method for wild boar damage mitigation in the Department of the Moselle with other methods such as trapping, snares, toxicants, vaccination, and contraception suggested by West *et al.* (2009) as possible population control methods but not advocated at present as suitable measures in the Department of the Moselle. Oral vaccination of wild boar was used in the Department of the Moselle following the outbreak of classical swine flu (CSF) in the Department in 2002 (Pol *et al.* 2008).

# 2.4. OVERVIEW OF THE KEY STAKEHOLDERS IMPLICATED IN THE CONFLICT

#### 2.4.1. Society as a whole

Wild boar pose a number of threats to the security of individuals, including through collisions with vehicles, as hosts for diseases potentially transmissible to humans, as the culprits of certain damages caused for example to gardens, parks, sports pitches, and as a species which may under rare circumstances attack humans. However society as a whole may also feel concerned by the actions of hunters, in particular surrounding the issue of drive hunts. In France, Sunday is by far the day when most drive hunts take place, followed by Saturday (Scherrer 2002) and therefore the issue of cohabitation between hunters and other members of society becomes important. With hunters often sharing space with other users of nature, the issue of who's right it is to be in a particular place, who is the intruder, and who is causing

trouble to who, may become a source of tension as well as the dangers associated with potential accidents involving firearms (Scherrer 2002). With the hunting of wild boar being proposed by the authorities as the main solution for dealing with the wild boar population and its associated impacts in the Department of the Moselle, such interactions and tensions between hunters and other users of nature must be accounted for.

# 2.4.2. Hunters

Hunters in the Department of the Moselle, through their management of wild boar may have important localised effects on the populations present depending on the power they have to affect boar numbers. Elements such as numbers of hunters, regulations, local terrain, availability of individuals, experience and knowledge of an area, financial and technical resources, level of skills in hunting wild boar, willingness to shoot wild boar, ability to sell wild boar which have been killed, supplementary feeding regimes, and population management objectives may play an important role in determining how hunters influence wild boar populations.

#### 2.4.3. Farmers

Of the stakeholders implicated in the conflict between wild boar and humans farmers play one of the most important roles as modifiers of the environment. The choice of which crops to plant where and when may influence wild boar damages, with Schley *et al.* (2008) suggesting that farmers should aim to plant trichomatous cereals closer to forests rather than annual crops such as maize and non-trichomatous cereals which wild boar tend to prefer.

# 2.4.4. FDC (Departmental Hunting Federation)

The FDC represents hunters at the Departmental level and is also involved together with the ONCFS in organising training required to receive a hunting licence. The FDC also aims to

assist in the prevention of poaching, conduct informational campaigns, provide education and technical support for land managers and hunters, and conduct actions aimed at preventing damage by game species and ensure via the FDIDS the compensation for these damages (CE 2011). As mentioned in section 2.3.2, the FDC also participates in drawing up the SDGC and therefore may influence how wild boar populations are intended to be managed from an administrative point of view.

## 2.4.5. FDIDS (Departmental Compensation Fund)

The FDIDS together with farmers are the two stakeholders who are the best placed to identify where wild boar damages to crops are highest and in turn to advise individuals on how to act either through for example changes in cropping patterns, supplementary feeding of wild boar, hunting methods, etc., and therefore meet one of the aims of the FDC. Apart from the educational role the FDIDS plays in mitigating damage by game species, the fund is also responsible for evaluating damages to crops by wild boar and administering compensation to farmers who have suffered those damages, as described in section 2.3.4.

#### **2.4.6.** FDSEA (Departmental Federation of Farmers)

The "Fédération Départementale des Syndicats d'Exploitants Agricoles (FDSEA)" (Departmental Federation of Farmers), represents farmers at the Departmental level and at the national level in association with the National Federation of Farmers. A number of services are provided to farmers by the FDSEA in order to advise them on issues such as economical, structural, environmental, legal, accountability, and areas of expertise including wildlife damages to crops and to businesses (FDSEA 57 n.d.). The FDSEA also has a special "wild boar file" (Henry pers.comm.), focussing on issues surrounding wild boar and agriculture, and

participates in numerous meetings with other stakeholders (including the ONCFS, ONF, FDIDS, and FDC) to discuss the issue of wild boar damages in the Department.

# 2.4.7. ONCFS (National Hunting and Wildlife Agency)

The ONCFS is a public agency which is administered conjointly by the "Ministère de l'Écologie, du Développement Durable, des Transports et du Logement" (Ministry of Ecology, Sustainable Development, Transportation, and Housing) and the "Ministère de l'Agriculture, de l'Alimentation, de la Pêche, de la Ruralité et de l'Aménagement du Territoire" (Ministry of Agriculture, Food, Fisheries, Rurality and Regional Development) (ONCFS 2005). The ONCFS remains in close contact with farmers, foresters, and hunters, and aims to ensure "the development of the huntable wildlife stocks while respecting their biological equilibrium" and encourage sustainable hunting practices (ONCFS 2005). The missions of the ONCFS include (ONCFS 2005):

- The "monitoring of wildlife and the environment by ONCFS agents, as well as the policing of hunting by national wildlife protection officers."
- Providing "Technical support to administrations, or groups and people involved in rural development, to assess the distribution, trend in numbers and health status of wildlife, and monitor its management, the validation of hunting licenses and adoption of legal measures for a better integration of wildlife into public policies."
- "Study, applied research and experimentation for the conservation, restoration and management of wildlife and their habitats both at national and international levels."

In the case of the conflict between humans and wild boar, the ONCFS is responsible for ensuring compliance with the hunting regulations in place such as those surrounding the supplementary feeding of wild boar but also for conducting research into "the causes of and remedies for crop and forest damage by wildlife, wildlife mortality due to highway and railroad traffic, losses of species to predators and wildlife diseases and their consequences for wildlife itself but also for domestic animals and man" (ONCFS 2005). The ONCFS has 5 National Centres for Applied research, and 5 specialised groups, with one group focused on cervids and wild boar, including the management of these game species and their habitats.

#### 2.4.8. ONF (National Forestry Office)

The main objectives of the ONF are the management of domanial forests, public forests which fall under the Forestry Plan as well as the achievement of the general tasks assigned to it by the state (ONF n.d.*b*). In the Department of the Moselle, in the context of the conflict between wild boar and humans, the ONF is responsible for the policing of hunting practices in the domanial hunting lots, such as the supplementary feeding of wild boar by hunters. The ONF is also responsible for preserving biodiversity in the forests it manages and is therefore concerned by some of the damages which wild boar may cause to the fauna and flora of the forests as discussed in section 2.2.3.

# 2.4.9. Animal welfare and nature protection movements

According to Scherrer (2002) the fundamental difference between animal welfare and nature protection movements can be found at the philosophical level, with animal welfare movements representing more biocentric views compared to nature protection movements which tend to have more anthropocentric views, questioning the balance between humans and nature. In the context of the conflict between humans and wild boar, nature protection movements may be in favour of hunting if it can reduce the levels of environmental damages caused by the species as it is often not the fundamental principle of hunting which is challenged by these movements, but rather they argue that hunting only makes sense for subsistence purposes or for regulation purposes (Scherrer 2002). Animal welfare movements

on the other hand are opposed to cruel hunting practices, trapping, and often advocate that there should be refuges for wildlife, days without hunting, and denounce the attacks on the natural environment and the disturbances caused by hunting (Scherrer 2002). No such movements were found in the Department of the Moselle following an extensive online search and questioning of members of the public however the general views of such movements must be accounted for when developing mitigation strategies to deal with the conflict between humans and wild boar.

## 2.4.10. Lieutenants de Louveteries

The Lieutenants de Louverteries are considered experts in the field of cynegetic management, are appointed by the prefecture of the Department of the Moselle and serve as volunteer employees of the prefecture. They are responsible for ensuring the regulation of wildlife species, including maintaining in the forests, fields, mountains, humid zones, and maritime coasts, a level of wildlife which is compatible with agriculture, forests, livestock rearing, and human activities in general (PPO n.d.). They are required to intervene in the field whenever necessary. It is they who ensure the organisation and the technical responsibility of ordained hunts, and municipal and administrative drive hunts. As mentioned in section 2.3.2, they are in charge of the destruction of animals classified as "pests", such as wild boar.

## 2.4.11. Prefecture

The prefecture is the state representative at the Departmental level in France and in the context of the conflict between wild boar and humans is responsible for instituting decrees relating to wild boar and hunting as well as the nomination of lieutenants de louveteries. Examples of decrees instituted by the prefecture include Decree  $n^{\circ} 2006 - DDSV - n^{\circ} 129$  dated December 14, 2006 relating to classical swine fever in wild boar, Decree  $n^{\circ} 2007 - DDSV - n^{\circ} 2007 - DDS$ 

DDAF - 3 - 183 dated June 8, 2007 establishing the new procedures for night shooting of wild boar in the Department of the Moselle, and Decree n<sup>o</sup> 2002 - AG/2 - 240 dated August 29, 2002 delegating the authority to mayors of some communes in the Department of the Moselle to organise drive hunts aimed at the destruction of wild boar under the provisions of Article L 427-7 of the Code of the Environment (PM n.d.).

# **2.4.11.1.DDT (Departmental Management of the Territories)**

The "Direction Dépatementale des Territoires (DDT)" (Departmental Management of the Territories) includes part of the services of the prefecture of the Department of the Moselle, the "Direction Départementale de l'Agriculture et de la Forêt" (Departmental Directorate for Agriculture and Forestry), and the "Direction Départmentale de l'Équipment" (Departmental Directorate of Equipment). The DDT is responsible for implementing public planning policies and the sustainable development of the territories of the Department (DGME 2009). Their tasks are to promote sustainable development in both urban and rural territories, implement agricultural policies and develop quality food chains, and to implement policies relating to the environment, urbanisation, planning, housing, construction, and transport (DGME 2009). With the impacts of wild boar extending beyond forests and into rural, sub-urban and urban areas as mentioned in sections 2.2.2.4 and 2.2.3, the role of the DDT in collaboration with the other stakeholders is key to ensuring sustainable development in these territories.

#### 2.5. SYNOPSIS

From the literature reviewed it is clear that cases of HWCs are common worldwide, with many situations involving species which are somehow protected. The nature of the protection varies from highly endangered species which cannot be hunted through to game species which are protected because of their hunting and economic value. Wild boar (*Sus scrofa*), a

game species in many countries, whose range and numbers have been growing across Europe in the last few decades, has the potential to adversely affect the activities and health of humans and animals through damages to crops, collisions with vehicles, attacks on individuals, and the spread of diseases. Although direct damages by wildlife appear to be cited as the main instigator of HWCs, it is evident from the literature sources treating the topic that deeper socio-political-cultural factors may also influence the level of conflict. The remainder of this thesis aims to interpret the views of the various stakeholders implicated in the conflict between humans and wild boar in the Department of the Moselle and from this, provide an overview of the various environmental and social elements which characterise the conflict in order to suggest management actions which may help mitigate the conflict.

#### **CHAPTER THREE – METHODOLOGY**

The study involved an in depth exploration of the conflict between wild boar and humans in the Department of the Moselle, and the elements which characterise it. Both primary and secondary data collection methods were used to gather information. The majority of the relevant information obtained from the secondary data search is presented in Chapter Two. The results from the primary data collection are presented in Chapter Four. In order to identify the elements which characterise the conflict between people and wild boar in the Department of the Moselle, an area within the Department was selected following an analysis of a number of criteria (section 3.1). A maximum amount of relevant stakeholders implicated in the conflict were also selected in order to conduct semi-structured interviews and distribute questionnaires (section 3.2.2.1).

## 3.1. STUDY AREA

Given the high adaptive capabilities of wild boar and the complex nature of the conflict between the species and humans in the Department of the Moselle, a study area which was representative of these complexities was selected. For these reasons an area to the north west of the Department of the Moselle, surrounding the commune of Thionville, to the west of the Moselle River, was selected as the study area in which semi-structured interviews would be carried out with farmers (Fig. 6). Initially a total of 15 communes were selected (Fig. 7). The justifications for this choice of communes were based on a map of the level of wild boar damages to crops/100 ha of utilised agricultural area (UAA) in 2010, by commune (Appendix 4), recommendations from the FDIDS, an analysis of the land use in the area, the types of farming in the area, and the types of hunting lots present.



Fig. 6. Location of study area (yellow, green, and orange points). Adapted from source: Google Earth 2010b.



Fig. 7. Initial 15 communes (yellow and orange points) selected for the study area. Adapted from source: Google Earth 2010c.

The initial study area which was selected included communes with: relatively sub-urban and urban areas (particularly the communes of Knutange, Nilvange, Hayange, Serémange-Erzange, Florange, Terville, Thionville, Vitry-sur-Orne, Fameck, and Uckange) illustrated by greyer areas in Fig. 7; relatively rural areas (Ranguevaux, Neufchef, Fontoy, Havange, and Algrange) illustrated by a patchwork of shades of green and brown in Fig. 7; forested areas with both communal hunting lots (e.g. Thionville communal forest) and domanial hunting lots (e.g. Florange domanial forest and Moyeuvre domanial forest) illustrated by darker green masses in Fig. 7; and agricultural fields with a range of farming practices including cereal, livestock and combined cereal and livestock. Private hunting lots were also present (Dauendorffer pers.comm.) on lands where farmers had reserved the right to hunt. This heterogeneous landscape composed of communal, domanial, and private hunting lots, urban areas, rural areas, forested areas, and agricultural fields (with cereal, livestock and mixed farming practices) was intended to provide a good representation of the complexities involved in the conflict between wild boar and humans in the Department. The map in appendix 4 clearly shows that the issue of damage to crops by wild boar in the Department of the Moselle is limited to a few areas (light yellow – dark yellow – light orange – dark orange – red), with farmers in 175 (white) out of 730 communes not reporting damages to their crops by wild boar to the FDIDS. The communes therefore which were initially selected (Fig. 7) included at least one commune from each of the 6 categories of damage levels (white - red) from the map in appendix 4.

Having selected the initial 15 communes for the study area, an e-mail was sent to a member of the FDIDS requesting contact details for farmers and owners of private hunting lots in the 15 communes. An e-mail was also sent to a member of the FDSEA requesting contact details of farmers in the 15 communes. As well as requesting contact details for farmers and owners of

hunting rights in the 15 communes, a search was performed online for farmers in the selected communes using the online telephone directory (http://www.pagesjaunes.fr), with the following terms being used: 'Agriculteur' (farmer) for the field 'Quoi/qui' (what/who), and the 'name of the commune' for the field 'Où' (where). A list of the farmers and owners of private hunting rights was then compiled using the three sources of information (FDIDS, FDSEA, online telephone directory). This list of 31 farmers was used as an initial means of identifying the farmers and owners of private hunting rights in the selected communes. Where available, each individual from the list was interviewed or received a questionnaire (section 3.2.2.1.1). Some farmers were not available either because they had passed away, did not answer their phone or doorbell, or were not present at the time interviews were carried out. Each farmer was asked if they knew any other farmers in the region who would be willing to participate in the study and contact details for these individuals were taken. The initial range of the study area was expanded to 33 communes (Fig. 8) following the questioning of farmers and the receipt of contact details for other farmers. No farmers were found to farm on 4 of the initial 15 communes (orange points in Fig. 7), following the contact details which were obtained.



Fig. 8. Map of wild boar damages to crops in the final study area (communes highlighted in yellow). Adapted from source: ©IGN – BD CARTO® 2011.

#### 3.2. METHODS

## 3.2.1. Secondary data collection

In order to identify the elements which characterise the conflict between humans and wild boar in the Department of the Moselle, a secondary data search was carried out during the months of February and March 2011, in which published literature surrounding HWCs in general, and existing legislative and policy frameworks surrounding the HWC in question were analysed. A review of the relevant stakeholders implicated in the conflict was also undertaken. The findings from this secondary data search can be found in Chapter Two.

#### 3.2.2. Primary data collection

Primary data was collected in order to enhance the secondary data and incorporate the elements which the various stakeholders felt characterised the HWC. Data was collected from a total of 5 categories of stakeholders:

- 1. ONF ranger, responsible for hunting and mayor of a commune
- 2. FDIDS wild boar crop damage estimator
- 3. FDSEA vice-president in charge of the 'FDSEA wild boar file'
- 4. ONCFS ranger responsible for patrolling the area around Thionville
- 5. Farmers in the study area

Notes were also taken during the general assembly of the FDIDS on January 31<sup>st</sup>, 2011 at which the president of the FDIDS, the president of the FDC, a lieutenant de louveterie, a member of the DDT, and the director of the FDIDS were present. An overview of the outcomes (financial and other) for the FDIDS was given for the year 2010. Each party also presented their views surrounding the issue of wild boar damages in the Department and the actions of the various stakeholders. The presentation was followed by a question and answer

session in which members of the public (mainly owners of hunting lots) were given the chance to ask questions to the various parties.

#### 3.2.2.1. Questionnaires and semi-structured interviews

Questionnaires and semi-structured interviews were chosen as the preferred methods to gather primary data from the various stakeholders because of their adaptability to various situations and the ability to make interviewees feel more at ease. Three sets of questionnaires were created, one for farmers, one for the vice-president of the FDSEA, and one for the ONF ranger and mayor of his commune.

## 3.2.2.1.1. Farmers' Questionnaires

For the farmers' questionnaire a pilot questionnaire was created initially. The pilot questionnaire was written in English first before being translated into French. The French version of the questionnaire was then verified by a native French speaker before being distributed. The distribution of the pilot questionnaire to farmers was carried out by the vice-president of the FDSEA in order to maximise the number of respondents and increase the efficiency of the process. A total of 10 questionnaires were handed over to the vice-president of the FDSEA and were collected 5 days later. A total of 9 questionnaires were returned, having been answered by farmers.

Following an analysis of the answers given in the pilot questionnaires, problem questions were identified, rephrased or removed and further questions included, where more details from the respondents was considered a requirement. The final version of the questionnaire for farmers (in French) was verified by a native French speaker (Appendix 5). The questionnaire was then translated into English (Appendix 6). The questionnaire consisted of a mixture of closed-ended questions where the answers were mainly 'yes' or 'no' and open-ended

questions where the interviewees were required to answer in their own words. The questionnaire began with a series of factual questions (e.g. sex, age, area of land farmed, level of damages, damage mitigation measures etc.) which were intended to be relatively easy for the interviewee to answer, followed by a series of questions where many of the answers required the interviewee to express their views surrounding certain topics (e.g. the role of wild boar, supplementary feeding of wild boar, dialogue with local hunters, and changes in agricultural practices) interspersed with questions requiring 'yes' or 'no' answers, as well as a series of questions for farmers who also hunted.

The distribution of the questionnaires was carried out face-to-face during a one week period. The aim was, where possible, to go through the questionnaire with each of the farmers in person in order to conduct a semi-structured interview in which follow-up questions, which were not in the questionnaire could be posed to the interviewees, so as not to overlook any views and opinions which would not have otherwise been revealed from the fixed questions alone. Separate notes were therefore taken in such circumstances as well as answers to the questionnaires. Where it was not possible to go through the questionnaire in person with the farmers because of time constraints or their absence, every effort was made to ensure that farmers could comfortably answer the questionnaire in their own time.

A total of 19 farmers received and completed (partially or in full) the questionnaire either face-to-face (14) or via one of the participants, a family member or in their letter box (5). Of the 14 individuals who received the questionnaire face-to-face, a semi-structured interview was carried out with 10 of them, with the 4 others preferring to answer the questionnaire in their own time and submit it later.

One of the 10 respondents with whom a semi-structured interview was carried out one individual wished only to answer the first 7 questions at which point he said "you know the

answers, I trust you to fill it in for me", insisting that he did not have the time to answer more and refusing to answer them in his own time. Where questionnaires were collected from farmers in person, they were asked how they felt the questionnaire went and if they had any further comments. When distributing the questionnaires, each interviewee was made aware of the context of the study and provided with the terms of confidentiality, ensuring them that their answers would remain anonymous. The researchers' contact details were given to each interviewee to allow them follow up on any issues or further comments they may have had concerning the study.

#### 3.2.2.1.2. FDSEA and ONF Questionnaires

The contact details for the vice-president of the FDSEA (also involved in the FDSEAs' 'wild boar file') were obtained from a technician at the FDSEA (Henry pers.comm.). Contact details for an ONF ranger were obtained based on recommendations following a discussion with the head of the ONF agency in Metz (Department of the Moselle) about the topic of the research (Bainville pers.comm.). The ONF ranger in question was responsible for hunting affairs in the Department and was also the mayor of his commune. Meetings were subsequently organised with the vice-president of the FDSEA and the ONF ranger. A questionnaire was designed for each of these meeting, with the questions intended to serve as guidelines for a semi-structured interview. The questionnaires were drafted in French and reviewed by a native French speaker. The final questionnaires (Appendices 7 and 9) were then translated into English (Appendices 8 and 10).

The FDSEA questionnaire consisted primarily of open-ended questions surrounding the topic of wild boar damages to crops in the Department of the Moselle, with a few closed-ended questions requiring 'yes' or 'no' answers. The ONF questionnaire consisted of both openended and closed-ended questions surrounding the topic of wild boar damages in general in the Department of the Moselle, with particular reference to damages within forests and the views of society surrounding the management of wild boar and the act of hunting in general. The aims were, to assess the views of the individuals surrounding the state of the situation at present (including the level of damages), the perceptions of individuals surrounding the problem and the way in which it is managed, the root causes and ways in which the problem could be better managed in the future.

## 3.2.2.1.3. Semi-structured interviews with stakeholders

Semi-structured interviews were carried out with farmers where possible, with the ONF ranger, and with the vice president of the FDSEA, with questions from the prepared questionnaires serving as guidelines. Answers to each question were noted, with some questions being left out as they had already been answered or did not seem appropriate, whilst other questions were added where necessary during the interviews.

Semi-structured interviews were also carried out with an estimator from the FDIDS in charge of estimating damages caused by wild boar to crops in the study area chosen, and with an ONCFS ranger working in the region of Thionville and its surroundings. Details for these two stakeholders were obtained from the FDIDS (Dauendorffer pers.comm.) and following recommendations from one of the members of the ONCFS at the Interregional Delegation of the ONCFS, Moulins les Metz, France. No formal questionnaires were prepared in advance for these interviews; instead issues which could be raised with the individuals were noted and brought up during the interviews. Depending on the answers given by the individuals further questions were asked in order for them to elaborate on certain topics which were raised.

The main topics discussed with the ONCFS ranger were surrounding the issue of compliance by hunters with the regulations in place (e.g. surrounding supplementary feeding and hunting practices), the functioning of the hunting system in the Department of the Moselle compared to the rest of France, and the actions of farmers.

During the interview with the FDIDS estimator, the reactions of individual farmers to damages, the level of damages in the Department, and the potential management options for the issue of wild boar damages to crops were discussed.

# 3.3. LIMITATIONS

The main limitation was the number of stakeholders which were available for interviews, particularly farmers, many of whom did not have the time to be interviewed or were not available, and preferred instead to fill in the questionnaire in their own time. Not all stakeholders were interviewed, with no official animal welfare and nature protection movements being found in the Department of the Moselle. Although no 'lieutenants de louveterie' or members of the DDT were interviewed, their views surrounding the issue were expressed at the general assembly of the FDIDS and were noted. Random members of society were not interviewed, as the efficiency of such a technique in collecting relevant information would probably have been low, therefore it is the mayor of one of the communes who was asked to give his opinions on the concerns of society and the inhabitants of his commune, surrounding damages by wild boar and the actions of hunters in particular.

The sensitivity of the subject meant that many stakeholders may have either moderated or overstated their answers depending on how they perceived their answers would be interpreted and/or utilised. Being from Luxembourg and not from the Department of the Moselle may have also constituted a limitation with regards to gaining the trust of the various stakeholders despite the efforts which were made to account for potential cultural, language, and political barriers. Being a hunter myself, may have also constituted a limitation, however during the

research I aimed to draw upon my experiences in the field of hunting as well as farming and agricultural science to avoid the formulation of questions which would favour particular positions advocated by the various stakeholders.

Although the process of farmer selection was carried out in such a way that names were obtained from four sources (FDIDS, FDSEA, telephone directory, and individual farmers) in an attempt to include as many farmers as possible, the names which were given may have been influenced by the opinions and views of the parties bestowing the information. The distribution of the pilot questionnaire was carried out by the vice-president of the FDSEA in an effort to maximise the amount of respondents, however the individuals' choice of respondents may not have been representative of the views of farmers in the Department.

One of the main limitations with the semi-structured interview method is that unconscious signals may have been sent out to interviewees, guiding them towards certain answers. An effort was however made to not make any comments or pose questions which might influence the responses given. As each respondent may not have been asked the exact same questions it is difficult to create standardised results and draw generalised conclusions from the responses.

#### 3.4. SYNOPSIS

Chapter Three reviewed the methods used to collect primary and secondary data in the study. The subsequent chapters aim to present the results which were obtained following the data collection (Chapter Four), discuss the complexities involved in the conflict between wild boar and humans in the Department of the Moselle and provide an overview of the elements which characterise the conflict (Chapter Five), and conclusions surrounding the conflict in question as well as recommendations for improving the management of the conflict and similar HWCs which may arise elsewhere (Chapter Six).

#### **CHAPTER FOUR – RESULTS**

In this chapter, an overview of the socio-demographic and farming characteristics of the farmer questionnaire respondents is given, as well as a summary of the key findings, rather than the totality of the answers, and an overview of the main results from the semi-structured interviews with the various stakeholders (ONF ranger and mayor of commune, FDIDS estimator, vice-president of the FDSEA, and the ONCFS ranger). The results are divided into sections according to the issues raised during the interviews and questionnaires. A summary of the key issues raised during the general assembly of the FDIDS is also presented.

# 4.1. FARMER QUESTIONNAIRE

## 4.1.1. Socio-demographic and farming characteristics

All 19 questionnaire respondents were male, with an average age of 47 (min.= 26: max.= 72). On average, respondents had been farming for 25 years (min.= 4; max.= 47). Actively farmed areas (at the time of the study or before retiring) ranged from 11 to 482 ha with a mean of approx. 170 ha. Of the 19 respondents, ten had either grassland (permanent and pasture) and/or fodder crops (including maize for silage). The types of crops which individuals farmed were: wheat (17), barley (15), rapeseed (14), grassland (10), maize (6), peas (4), faba beans (3), potatoes (2), and oats (1).

Eight respondents claimed that agricultural practices in their region had changed since they first started farming. Those which may have affected the changes in wild boar numbers were:

- Less ploughing of the soil
- Fixed fallow lands
- Grouping together of farms
- Land consolidation

# - Removal of hedges

The ways in which these changes might have influenced the trends in wild boar populations in the region included (a) less ploughing which may incite wild boar to damage fields because of the presence of worms closer to the surface, (b) a lot of plant debris left on the surface after harvest, and (c) less natural cover such as forests and hedges. Respondents also took the opportunity to cite other problems: the too high density of wild boar, the confinement of wild boar because of increased urbanisation, and the feeding of wild boar in forests and fields.

## 4.1.2. Hunting rights

Five respondents had reserved the hunting rights on their lands, with one individual having reserved the rights in the past but no longer having them because they owned less than 25 ha. Reported reasons for not reserving the hunting rights on lands were as follows:

- Did not own a single area of land large enough to reserve the hunting rights (Of these one individual was considering joining other farmers to rent a hunting lot).
- Did not hunt or were not hunters
- No time to hunt

# 4.1.3. Wildlife damage

There were reports by farmers of damages to all crops by wild boar but the two main crops cited as being particularly vulnerable were maize and pasture, with cereals being less affected, though of the cereals wheat was the crop most frequently affected.

Of the 18 farmers who had suffered damage, 12 reported that damage levels had increased since they started farming. No farmer reported that damage levels had decreased, with only 2 farmers claiming that damage levels had remained constant (but high) since they first started

farming. Two farmers stated that the level of damages was variable and highly variable from year to year.

Five respondents said they were not taking or had not taken mitigation measures to prevent damage to their crops by wild boar and 13 said they had. The types of mitigation measures cited by respondents were:

- 1. Shooting
- 2. Change of crops (e.g. bearded wheat instead of normal wheat)
- 3. Change of crop rotations
- 4. Coating of seeds with product (e.g. eau de cologne)
- 5. Electric fencing
- 6. Pea seeds coated in chilli
- 7. Firecrackers
- 8. Gas canons (gun-shot noises)
- 9. Repellents

Measures which were cited as effective in reducing the levels of wild boar damages were shooting, electric fencing, the use of a bearded wheat variety instead of normal wheat, and gas canons. Three farmers insisted that it was the role of hunters to put electric fences in place. Of those who said they did not or had not employed mitigation measures, 4 said that they would not consider taking any because (a) it would not help, (b) it is too expensive, (c) land would be subdivided in the future, (d) it was up to hunters to manage wild boar populations, and (e) that hunting remains a leisure activity while farming is a profession.

# 4.1.4. Role of wild boar in the environment

A number of answers were given for the question surrounding the role of wild boar in nature. Positive roles cited included (a) a regeneration role in the forests but not in the fields, (b) 'butchering' in the forests/scavenging of animal remains, and (c) the dispersal of seeds and burying of them by rooting in the soil. Four individuals gave vague answers about the role of wild boar, stating that they (a) play a role in the forest, (b) have their place, (c) are essential in the ecosystem, and (d) do more bad than good, though all four individuals stated that this was only the case when populations were not over abundant. Seven respondents felt that wild boar either played no role or they did not see the role that they played. Three individuals felt that wild boar had no positive role in the environment, describing them as destructors, claiming that their role was to cause considerable damages and that there was no need for wild boar. One individual felt that the role of wild boar in the environment was to satisfy hunters.

#### 4.1.5. Wild boar management

One interviewee stated that the problem of the wild boar damages to crops in Department of the Moselle was because of green movements and ecological movements who were not in favour of hunting. He claimed that hunters should be allowed to hunt more and that for example, every now and then "motorways should be closed off in order to hunt properly". He said to look around at the landscape and to take into consideration the difficulties associated with hunting in certain areas (e.g. semi-urban areas and gardens).

#### 4.1.6. Hunting licence

Five respondents possessed a hunting licence. Two respondents had not/never validated it though one felt that he may validate it the next season because of the level of wild boar damages to crops. One respondent cited that the he had started hunting in order to take charge of the deficiencies of professional hunters. Neither individual was happy with the way in which wild boar populations were managed. The management issues cited were a lack of wild boar hunting from hides or at night, and that hunters were only shooting young boar. Both respondents claimed to have seen an increase in the population of wild boar in the areas where they hunted, since 1999 and 1975.

#### 4.1.7. Farmer – Hunter dialogue

Thirteen respondents said that a dialogue existed between them and hunters on or around their lands. One individual mentioned that if the hunters were never present evidently there was no dialogue, though damages tended to be lower where dialogue did exist. Four respondents said that this dialogue helped manage wild boar damages to their crops, though only (a) with 'correct' owners of hunting rights who call to ask for news, (b) if hunters listen, allowing them to find out which crops will be planted where, and (c) where hunters react when called upon. Nine respondents said that dialogue did not help manage wild boar damages to crops because (a) they are difficult to manage, (b) it is hunters who are in control, (c) hunters do not understand, (d) hunters have their own agenda, (e) dialogue is merely a statement to which hunters do not appear to react to, and (f) hunters are breeding wild boar in the open-air. One individual felt that it all depended on the willingness of hunters whilst another respondent stated that the owner of the hunting rights on and around his land owned numerous other hunting lots elsewhere and therefore did not manage wild boar populations properly.

One individual cited the case of a hunting lot where elderly hunters rented out the hunting rights to younger hunters, stating that this had resulted in a substantial decrease in the level of wild boar damages in the surroundings. Another respondent, who had hunted in the past, had a 100 ha military terrain situated behind his farm where he felt that hunters were practically absent and drive hunts were rare despite there being a large number of wild boar present.

## 4.1.8. National Wild Boar Action Plan (PNMS)

Four respondents had heard about the PNMS either in the media or by word of mouth. None of the four individuals were confident that the PNMS would help enable a reduction in the level of damages caused to crops by wild boar in the Department.

# 4.2. SEMI-STRUCTURED INTERVIEWS WITH STAKEHOLDERS

## 4.2.1. Wildlife damage

According to the ONF ranger the issue of damages caused by wild boar (in forested areas, croplands, peri-urban areas, and on the roads) represents a real problem not only in the Department of the Moselle but also in France. He stated that the species is starting to inflict damages in outstanding natural areas, particularly wetlands. The ranger stated that hunters felt the urgency of the problem from a financial perspective (costs of compensating for damages) but they did not truly feel the urgency in the field. According to the ONF ranger wild boar are such an easy species to manage. He felt that the respect for game species plays an important role in feeling the urgency associated with damages, stating that hunting had become simply a case of "release hunting" (where animals are no longer truly wild) and that true hunting values were being lost. In his opinion it is imperative that hunters have an idea of the real damages and a respect for others. Whether or not the situation would improve and damages would decrease, the ONF ranger felt that the current management methods would have to change and that individuals would need to "stop joking around" as "we have been playing with fire for long enough".

The ONF ranger felt that we underestimate the impacts of wild boar in the forests, with the animals causing significant damages to small fauna (including reptiles, amphibians, and small rodents). The trend of roe deer moving from forests to fields to give birth may according to
the ONF ranger be linked to the high density of wild boar populations, and hunters do not care. The number one problem cited by the ONCFS ranger surrounding wild boar was public safety, with the repeated movements of individuals across particular roads and peri-urban areas.

## 4.2.2. Factors influencing wild boar damages

The ONF ranger cited five main causes for the elevated level of damages by wild boar in the Department: the management of wild boar, over-abundant populations, hunting pressures, the lack of respect for game species, and the reduction in parallel of the numbers of small game. According to the FDSEA vice-president the main reason for the high levels of crop damage was because hunting lots were too expensive, requiring hunters to spend more to obtain the right to hunt. In return for high prices he felt that hunters were practising more intensive supplementary feeding in order to guarantee that there would be enough wild boar.

## 4.2.3. Level of wild boar damages

The FDSEA vice-president felt that in general the levels of crop damages by wild boar in the Department of the Moselle were too high, though indicated that there were exceptions in certain areas where levels were acceptable. According to the ONF ranger, in the past there were only two "black spots" in the Department, where damages were relatively high yet these areas did not receive much attention as it was the Department as a whole that was providing compensation for the damages. According to the FDIDS estimator, certain areas may have relatively low levels of damages for a few years in a row and all of a sudden damages would increase substantially from one year to the next. On the other hand the FDIDS estimator said that there are areas where damage levels remain relatively elevated from one year to the next and the FDIDS is working with farmers in these regions to try and help reduce these levels.

According to the ONF ranger, individuals who do not manage wild boar populations responsibly are the ones who find themselves in areas where damages are high.

# 4.2.4. Farmer discontent

The FDIDS estimator claimed that the level of discontent manifested by farmers towards the damages caused to crops by wild boar varied greatly, though the level of discontent manifested by farmers was not necessarily related to the level of damages. According to the FDIDS estimator it is those farmers who are not used to damages who tend to manifest their discontent the most when damages do occur. The FDIDS estimator cited an example of a phone call he had received from a farmer one evening, concerning a few Ares of damages. That day the FDIDS estimator had been to visit a farmer who had suffered more than 20 ha of pasture damage. When the FDIDS estimator told the farmer on the phone that he had been to visit a farmer that day with over 20 ha of pasture damage, immediately the farmer was deeply concerned, asking what the other farmer was going to do for hay etc., to which the FDIDS estimator answered he didn't know.

## 4.2.5. Compensation for wild boar damages

The FDSEA vice-president felt that the level of compensation received by farmers for damages to their crops by wild boar was too low. According to him compensation did not take into account indirect losses. Admitting that it would not be possible, he suggested that farmers be compensated for example, with the amount of maize lost rather than with cash. The worst damages were said to be those caused to pastures, with indirect losses such as butyric acid finding its way into milk not being compensated for. However, according to the FDSEA vice-president even if compensation were to be sufficient, if the level of damages remained high

farmers would not be satisfied, simply because they do not want to see the fruits of their labour destroyed.

# 4.2.6. Agriculture and hunting in the Department of the Moselle

The ONCFS ranger felt that it had only been in the last 10 years that farmers had started to become hunters, because of wild boar damages. In his opinion, the agricultural world in the Department of the Moselle had been quite far removed from the world of hunting in the past. The ONCFS ranger talked about a movement within agriculture in the Department towards land consolidation, with the main aim being to create hunting reserves (requiring a minimum of >25 ha of continuous area of land, owned by single individual/group of individuals). The FDSEA vice-president, who had started hunting himself because of the level of wild boar damage levels had increased in the Department but felt that there were still not enough of them.

# 4.2.7. Hunter – Farmer dialogue

In general the FDSEA vice-president felt that relations between farmers and hunters in the Department of the Moselle were good, though not everywhere. He felt that good relations between farmers and hunters could help find a solution to the high levels of crop damage by wild boar but that it all depends on the willingness of the individuals to contribute towards the solution.

#### 4.2.8. Evolution of hunting in the Department of the Moselle

According to the ONCFS ranger hunting in the Department of the Moselle in general has become all about hunting wild boar, with a number of "commercial hunts" which seek large hunting bags because of the high prices being paid for the lots. According to the ranger even hunting lots which are considered small and often termed "petites chasses" (small hunts) feel an obligation to shoot large numbers of wild boar because of the high prices being paid for the hunting rights. Coupled with this, the ranger raised the issue of the collapse in the numbers of small game which has caused hunters to shift from small game shooting to large game, and wild boar in particular. The ONCFS ranger talked about an initiative planned by the FDC, which involved the reintroduction of pheasants on certain hunting lots along the edge of the Moselle River, the aim being to increase the numbers of small game in the area which in the past used to have high levels of small game.

# 4.2.9. Hunting lots

In general the ONF ranger felt that the price of hunting lots was too high, but stated that it was hunters who were causing this increase in prices, with hunters deciding on the price. The ranger claimed that money which hunters do not put into their hunting lots they will put into damages, and that few means exist to decrease the price of hunting lots. The FDIDS estimator talked about the idea of replacing minimum prices (reserve prices) for hunting lots with maximum prices (ceiling prices) in order to reduce them. According to the ONF ranger, there is however a problem with hunting lot rental contracts and the clauses for their revision. He stated that unfortunately no compensation exists for the "losses" which hunters suffer if they shoot more than they would otherwise have wanted to, instead certain hunting lots must be denounced, which may lead to administrative drive hunts.

The ONF ranger claimed that if hunting lots were rented out for less time, locals could perhaps "reclaim" their lands. The ranger mentioned that domanial hunting lots must be a minimum of 500 ha, which allows them to be managed more easily than smaller lots.

The ONCFS ranger cited a case he had encountered where farmers rented hunting lots to nonhunters and would ensure hunters were constantly present on the lands in hides, in order to shoot wild boar. He described this practice as "professional poaching". Another case cited by the ONCFS ranger involved a farmer who owned land on which he had reserved the rights to hunt. The farmer was a hunter but would make other hunters, willing to hunt wild boar on his land, pay for the privilege and would keep the dead animals afterwards to sell the meat. The individual would also receive compensation for the damages caused to his lands by wild boar.

The ONCFS ranger raised the issue of whether or not small hunting lots with mainly fields and very little forest would be able to find takers, given the decrease in the numbers of small game. According to the ONCFS ranger the true passion of hunting was being lost, describing the current hunting system as "artificial hunting", with humans wanting to control and manage nature. The ranger mentioned that hunters had everything in their own hands and that in the worst case scenario the government could choose to take control of hunting matters away from hunters themselves. Although this was said as a joke it was meant to illustrate the importance of the correct management of wild boar populations by hunters.

# 4.2.10. Wild boar management

According to the ONF ranger the DDT possesses the means to resolve the problem yet actors must be careful not to associate themselves too closely with the world of hunting.

The ONF ranger felt that methods other than hunting were required to manage wild boar populations, in particular in peri-urban areas where one must think of the public, with the security of society playing an important role in determining the methods which can be used. The ranger felt that there were enough hunters in the Department of the Moselle to reduce wild boar numbers to an acceptable level. Though in theory he claimed it is very simple to do, he felt there was not enough willingness on behalf of hunters. The ONF ranger stated that to increase/maintain the numbers of current hunters would require a huge amount of effort on behalf of the hunting federations. In his opinion, hunting methods would have to change in order to attract younger people, with the promotion of methods such as bow hunting. According to the him, sustainable hunting must be the aim, which implies a relatively small number of wild boar and when things turn bad, the necessary steps must be taken (e.g. the culling of large numbers of them).

According to the ONF ranger restrictive orders given by hunting groups still exist for the shooting of wild boar despite such orders being banned. He claimed that the problem with them is not that in theory they are bad for the management of populations but that individuals may deviate from them. In essence certain animals are being spared and hunters may get a taste for this, allowing numbers to get out of hand. According to the ONF ranger, as soon as problems arise actions must be taken, not the weekend after nor the next organised drive hunt. He stated that wild boar shooting orders should focus on quantitative results rather than qualitative. However the ONF ranger also stated that areas where the highest numbers of wild boar are being shot are the areas where higher levels of roe deer damages are being observed.

The ONF ranger felt that the fecundity of female wild boar may be increasing as they face more dangers and higher hunting pressures, which may also force females to seek refuge in peri-urban areas.

As mayor of his commune the ONF ranger reported having received complaints on behalf of inhabitants concerning the acts of hunters. The ONF ranger mentioned about the trend of individuals, who had previously lived in urban areas, relocating to the countryside and not necessarily being familiar with certain rural happenings. In general it was the hunting methods which individuals were not pleased with. The ONF ranger raised the issue of the provocateur/exhibitionist practices of certain hunters, for example driving along the road with a trailer full of dead game visible to the general public or with animals on the bonnet of

vehicles. In his opinion such acts would not happen if it were local people who were the hunters. The relationship between hunters and other users of nature was said not to be good, though it could be better if hunters acted differently. One aspect about hunting that tended to displease local inhabitants was that many hunters acted as though they own hunting lots when in reality they are simply renting them.

The ONF ranger felt that mayors were not sufficiently informed about the powers they have in the field of hunting. Elected officials should for example be informed about what they can do with regards to not renting certain hunting lots, and the destruction of pest species.

The ONCFS ranger claimed that jealousies which exist between neighbouring hunting lots, in particular between for example large hunting lots containing 2,000 ha of forest and smaller communal and private hunting lots. Groups hunting on larger hunting lots are often not happy with the management practices of smaller neighbouring hunting lots who they feel will shoot any wild boar they see.

Surrounding the management of wild boar populations, the FDSEA vice-president felt that although there were a lot of talks about improving the situation, results were not following. He felt that as long as supplementary feeding of wild boar continued damage levels would not decrease. The FDSEA vice-president felt that there was not a strong enough pressure on behalf of hunters to limit wild boar populations and in particular that the orders given within hunting groups about which wild boar to shoot remained too restrictive. He felt that fines which are in place within certain hunting groups for failing to abide by such orders should be removed.

# 4.2.11. Management of roe deer (*Capreolus capreolus*)

Regarding roe deer population management, the ONCFS ranger felt that there had been a strong pressure placed on hunters when quotas for the numbers of deer which could be shot were first instituted and that this thinking of "do not shoot too many deer" was still anchored in the thoughts of many Mosellan hunters. The fact that not enough roe deer are shot each year has, according to the ONCFS ranger, significant impacts on the rest of the fauna.

## 4.2.12. Supplementary feeding

The ONF ranger began by stating that we must not forget that the talk is about protecting crops with high added values. The fact that peri-urban damages are not taken into account was seen by the interviewee as a big problem. There also remains a problem between large and small hunting lots in terms of competition and rivalry. The temptation was said to be great for small hunting lots to provide large quantities of feed as it may be difficult for them to keep a regular presence of wild boar on their lands. In his opinion the practice of supplementary feeding in a fixed location creates a monopoly for dominant females by preventing other groups of individuals from regularly feeding at such sites. This was said to artificially increase the potential of dominant females and create dangers with regards to diseases and their transmission. According to the ranger, the official position of the ONF was that there should be no supplementary feeding during the winter months. For this to enter into legislation would require all actors to agree, yet according to the ONF ranger, if it was to enter into legislation hunters would find other ways to compensate, for example by placing restrictions within hunting groups, on the animals which could be shot. The ONCFS ranger questioned whether or not hunters needed to practice supplementary feeding in order to hunt, feeling that if it were to stop, wild boar populations would become more dispersed and therefore all hunting lots would have more hunters. The ONF ranger stated that the solution would be to place further constraints on the practice of supplementary feeding in order to have wild animals again. He claimed that even if supplementary feeding might not have an effect on the number of births, it does act on the level of mortality, citing 1kg of maize a day as being enough to save a wild boar from starvation.

The compliance by hunters with the conditions defined in objective 22 of the SDGC differed according to the ONF ranger between domanial hunting lots and communal hunting lots. He felt that in general most hunters respected the conditions though there were still a few problems with certain communal lots. According to the ranger, when damage levels to crops are high in a certain sector, in general, strict controls of hunting practices including of supplementary feeding follow, after which individuals tend to obey the legislation. Both the ONF and ONCFS rangers stated that when hunters were found to have breached supplementary feeding regulations, the policy of both institutions was to give them advice on how to go about feeding in the correct manner, rather than punishing them for their first offence. Failure by hunters to follow this advice would subsequently result in punishments being imposed for further offences. In domanial forests, in general hunters were said to be required to go beyond the requirements of objective 22, with annual validations by the ONF of supplementary feeding methods, the banning of supplementary feeding on forestry roads, the banning of the use of phytosanitary products in forests, and a great willingness of individuals to protect wetland areas. The ONCFS ranger also felt that in general most hunters respected the requirements set out in objective 22 and that it was mainly occasional hunters that committed the most violations, as well as a few small hunting lots who sometimes feel "obliged" to commit infringements in order to shoot more wild boar.

According to the FDSEA vice-president the practice of supplementary feeding was not normal; especially given that wild boar is a pest species. Supplementary feeding as a dissuasion tool has over time according to him, lead to the practice of supplementary feeding by hunters to rear wild boar. He felt that most hunters did not respect the conditions defined in objective 22 of the SDGC and that an alternative dissuasion method would be to shoot wild boar, in particular more shooting of wild boar in fields to dissuade the animals from venturing onto croplands.

### 4.2.13. National Wild Boar Action Plan (PNMS)

The ONF ranger felt that the PNMS contained all the solutions necessary to reduce the levels of wild boar damages but that not all of the crucial measures had been adopted in the Department. Though various stakeholders in the Department were already getting together to discuss certain issues before the plan came into force, the ranger felt that the PNMS forced this happen. According to him, there remains a lack of individuals informed about the plan, with the plan remaining at the level of specialists. The ONF ranger felt that progress was still being hindered by the hunting lobby.

# 4.3. FDIDS GENERAL ASSEMBLY

## **4.3.1.** Factors influencing wild boar damages

Important points to take from the FDIDS general assembly were that during the 2009/2010 season, because of bad weather conditions maize harvests had been delayed by a few weeks compared to normal. It was also important to note that there had been an easing of the European Common Agricultural Policy that year which allowed farmers to plough their soils; there had been a year of low mast yields and increases in cereal prices of more than 60% compared to the previous year, with wheat prices having increased by 80%. The speaker stated that all of these factors play a role in determining the level of damages caused to crops by wild boar but that there was nothing which could be done about them.

# 4.3.2. Departmental Hunting Federations' views on supplementary feeding

The issue of supplementary feeding from fixed posts was raised by the FDC and the arguments put forward for allowing this practice to continue were the age of certain hunters and the distances between hunting lots and the locations where hunters resided. The FDC advocated that feeding should otherwise be performed by spreading feed across linear transects and be carried out all year round.

# 4.3.3. Role of legislation

The representative of the DDT who was present at the general assembly described the solutions to the problem of wild boar damages in the Department as being numerous and specific to each region. The individual highlighted the importance of the SDGC and the PNMS in resolving the issue of wild boar damages.

#### **CHAPTER FIVE – DISCUSSION**

In order to identify the elements, social and environmental in particular, which characterise the conflict between humans and wild boar in the department of the Moselle, this section will draw upon the results presented in Chapter Four and elements from Chapter Two, discussing the opinions of the various stakeholders and the implications they may have for the management of the conflict in terms of the costs for stakeholders (actual and perceived), responses from stakeholders, and the consequences for the individuals involved (direct and indirect). The goal of this discussion is to present an overview of the various factors which make-up the conflict in question, using Dickman's (2010) conceptual framework presented in section 2.1.4.

# 5.1. DICKMANS' (2010) CONCEPTUAL FRAMEWORK

# 5.1.1. Environmental risk factors

The complex mosaic of landscape elements (forests, fields, rural areas, urban areas, as well as private, communal, and domanial hunting lots) in the chosen study area and the three main farming practices in the region (crop, livestock, and mixed crop and livestock) form part of the environmental risk factors alluded to by Dickman (2010) and reflect the main elements of the landscape which appear to influence the conflict in question. From the semi-structured interviews and questionnaire responses however it is evident that individuals feel that it is both the landscape and its management by humans which play a role in determining the costs which society experiences from the impacts of wild boar.

# 5.1.1.1. Environmental characteristics

There are two main environmental elements which individuals cannot control: weather conditions and natural annual variations in the level of food naturally available to wild boar (non-crop and unprocessed). These two factors have the ability to influence the behaviour of wild boar, and in turn the level of damages they inflict. As mentioned at the general assembly of the FDIDS, weather conditions may for example delay harvests, providing a longer time period during which wild boar can feed on crops and take shelter, thus potentially increasing the overall level of damages. With less natural food available for wild boar, such as mast, this may force individuals to seek food elsewhere such as on croplands or in urban areas, with Groot Bruinderink et al. (1994) reporting a dietary preference by wild boar for mast when available over agricultural crops, as well as supplementary feeds such as maize and wheat. Conversely, higher levels of natural food may encourage individuals to remain in the forests rather than seek food elsewhere. There is however a trade-off for foresters, with the animals capable of causing significant damages within forests, when numbers are high. This has an influence on the composition of trees which foresters choose, aiming to provide wild boar with enough natural food without allowing the animals to cause significant damages with their behaviour. Other elements which cannot be controlled include climatic variations and crop prices. Climatic variations may for example, lead to milder or harsher winters, which may affect the relative survival rate of wild boar during the winter months compared to average winters. Variations in crop prices may distort the true magnitude of crop damages, with monetary values for crop damages potentially over or underestimating the net areas of crops damaged.

# 5.1.1.2. Behaviour and management of wild boar

It is evident from the responses given by the various stakeholders that wild boar numbers in certain regions of the Department appear to be too high and that overabundant wild boar populations are the source of much of the discontent manifested by the various stakeholders. Hunters have the ability to directly affect wild boar populations. This ability depends not only

on the forms of management practiced but on the availability of hunters. Increased hunting pressures on wild boar however may also have unwanted side effects on the management of other game species. According to the ONF ranger, it is in areas where hunters do not manage wild boar populations responsibly that high damage levels occur.

# 5.1.1.2.1. Supplementary feeding and hunting strategies

Hunters can directly affect wild boar populations via the hunting pressure they choose to practice and the animals they choose to shoot but also practices such as supplementary feeding which, whilst not necessarily affecting the fecundity of females may, according to the ONF ranger, enable individual wild boar to survive conditions they might otherwise have not survived, such as harsh winters and periods of low food availability.

The reality of the situation is, according to the ONF and ONCFS rangers, a farmer that hunted, and the vice president of the FDSEA, that shooting restrictions continue to be imposed by hunting groups with regards to wild boar despite this practice not being authorised, as do fines for not abiding by them. Although according to the ONF ranger such restrictions are not bad in theory, when wild boar numbers are low, it is the abuse of this management technique by certain hunters which can result in numbers reaching levels which are capable of inflicting high levels of damage. The same is true for the technique of supplementary feeding which according to farmers has, over time, been abused by certain hunters, with individuals providing feed for example, too close to fields and in too great quantities. As well as this, supplementary feeding, particularly in a fixed location may, according to the ONF ranger, create a monopoly of dominant females which prevent other groups of individuals from regularly feeding at such sites. As well as artificially increasing the dominance of certain individuals, the concentration of a number of wild boar in a given area, sharing the same food source may increase the potential for the development and transmission of diseases (Ruiz-Fons *et al.* 2006).

The ONF and ONCFS rangers claimed that at present, the majority of hunters are abiding by the regulations in place surrounding supplementary feeding. According to the ONCFS ranger, the few hunting lots where hunters do not abide by supplementary feeding regulations tend be those which are either small in area or one's where hunters only hunt occasionally. In both situations hunters tend to feel obliged to feed in order to shoot wild boar. It is therefore the attitudes of hunters towards supplementary feeding which must change.

# 5.1.1.2.2. Hunter characteristics

According to the ONF ranger there are enough hunters in the Department of the Moselle to reduce wild boar numbers to an acceptable level. However, with the arguments put forward by the FDC for allowing supplementary feeding to be practiced at fixed posts being the age of certain hunters and the distances between their homes and hunting lots, it is evident that the demographics of hunters and their geographical locations do not always seem optimal to respond to the challenges which society is faced with in the HWC in question. Many hunters are elderly individuals and indeed this may pose problems for the management of wild boar, such as the recommended provision of supplementary feed in a line over a few hundred meters rather than at fixed posts. One farmer cited an example of a hunting lot where the level of wild boar damages in the surroundings had decreased drastically since elderly hunters had begun to rent the lot to younger hunters. This example highlights the importance of inciting younger individuals to start hunting. According to the ONF ranger however, in order to do this, hunting methods must be made more attractive, with the focus being on sustainable hunting, with methods such as bow hunting being encouraged.

The department of the Moselle is recognised throughout France for its 'hunting tourism', having the largest business establishment in France in the field of hunting (FDCM 2007), which attracts hunters from outside the department, but even hunters within the department often travel great distances to hunt, illustrated by one farmer who stated that the owner of the hunting rights on/next to his land did not live in the area and also had other hunting lots elsewhere to manage. Greater distances between the homes of hunters and their hunting lots often make it more difficult for hunters to respond to wild boar damages when they occur and to observe the behaviour of wild boar populations on their lots.

## 5.1.1.2.3. Compensation system

As mentioned by the ONF ranger there is no form of what could be termed 'compensation' given to hunters for shooting animals which they would not otherwise have shot. As a number of stakeholders mentioned, the cost of hunting lots in general at present is relatively high compared to in the past. These high prices are being maintained by hunters, who are willing to pay them. These higher prices tend to reflect the number of wild boar present on each lot. The issue therefore is about getting certain hunters to accept that they should shoot more wild boar than they wish to, in order to satisfy both the demands of numerous farmers and certain sectors of society, including those who have suffered wild boar related damages.

The current compensation scheme in operation by the FDIDS is better suited to lower levels of damages, with the ONF ranger mentioning that in the past there were only two areas in the Department where wild boar damage levels to crops were high but that because it was hunters in the Department as a whole who were compensating for them, few complaints were made about these levels. When the level of compensation starts to increase and the amount paid by each individual can truly be felt as is the case at present, the following question arises: who should pay for what? The fact that hunters are paying for damages, whether or not there are any on or around their hunting lots may signal to certain hunters that they are entitled to allow, either intentionally or unintentionally, wild boar populations to increase. Without the correct price signal (costs of impacts on or around individual hunting lots) being sent to individual hunting lot owners it is difficult for hunters to visualise the true financial impacts associated with their management of wild boar populations.

# 5.1.1.2.4. Coexistence between hunters and other users of nature

With hunting being an open air activity, it is inevitable for hunters to come into contact with other users of nature such as cyclists, hikers, joggers, and quad drivers. The ONF ranger, as mayor of his commune, felt that this coexistence between hunters and other users of nature may lead to the manifestation of discontent on behalf of the non-hunters. Reasons cited for this discontent were the concerns of individuals surrounding certain hunting methods employed and the provocateur/exhibitionist behaviour of certain hunters. Respect is therefore required on behalf of both hunters and non-hunters, in order to share the environment peacefully without it resulting in conflict.

## 5.1.1.2.5. Hunting reserve management

A number of areas in the department of the Moselle are not part of hunting lots but contain areas which wild boar can inhabit. Hunting therefore may or may not take place in such areas. De Klemm (1996) claimed that, where little or no hunting takes place this allows wild boar to seek refuge because of the relative calm compared to areas which are regularly hunted. One of the farmers, who had hunted in the past, cited an area of 100 ha of land belonging to the military, situated behind his house, where the presence of hunters was rare, with drive hunts only being organised occasionally. According to him wild boar numbers were high on the land. This highlights the importance of maintaining a stable hunting pressure, both in areas which are regularly hunted and those which are rarely hunted/not hunted at all, in order to avoid wild boar populations building up over time and going unnoticed.

## 5.1.1.3. Land use and management

# 5.1.1.3.1. Urban Sprawl

The issue of urban sprawl was raised by a farmer, with the phenomenon said to influence wild boar populations, reducing their natural habitats and confining them to increasingly fragmented natural habitats. Coupled with this, the number one problem cited by the ONCFS ranger surrounding wild boar was public safety, with the repeated movements of individuals across roads and peri-urban areas. With wild boar capable of adapting to different habitats (Santos *et al.* 2004) and numerous food sources (Rosvold and Andersen 2008), individuals may inflict damages in both urban and rural areas. It is clear that the expansion of urban areas, coupled with the loss of natural habitats, increased wild boar numbers, and increased hunting pressures influence wild boar movements, their encounters with humans, and in turn the types and levels of damages they cause. Urban sprawl may also influence the socio-cultural landscape as suggested by Patterson *et al.* (2003), with encounters between wildlife and urbanised societies becoming less frequent. This was alluded to by the ONF ranger, stating that individuals who previously lived in urban areas and had relocated to the countryside were not necessarily familiar with certain rural happenings.

# 5.1.1.3.2. Farming

The management choices made by farmers, unless they are also hunters or own the right to hunt on their lands, can only displace the damages caused by wild boar. The choice of crops and location of crops are not only chosen based on the level of damages which wild boar may be expected to cause but depend on a number of other factors including the market price of crops, budgets, land suitability, farmer requirements (e.g. fodder for livestock), and the types of crop rotations practiced. The types and locations of crops, without employing any mitigation strategies, may however influence which areas are damaged by wild boar, with maize and pasture being cited by farmers as particularly susceptible to damages. These results are similar to those presented by Schley *et al.* (2008) who found that when maize is present, it is generally the crop that suffers the most damages by wild boar. Whether fodder and/or nonfodder crops are grown by farmers may influence the levels of actual and perceived costs associated with damages, with the FDSEA vice-president claiming that the worst damages were those caused to pasture. Schley *et al.* (2008) also found that where damage to grassland occurs, it is often the most problematic. With approximately 119,500 ha of permanent grassland in the Department of the Moselle out of a total of 319,399 ha of land being used by agriculture in 2009 (SSP 2009), the damages to grasslands are therefore of great concern for farmers in the Department.

The techniques used to plant and harvest crops, as well as the management of soils may also influence damage levels, with farmers citing unploughed soils as being more susceptible to damages than ploughed soils. As stated in the responses by farmers, the time they spend, either working on their lands or surveying them may indirectly affect wild boar populations. Farmers have the ability to observe the animals, monitor the damages they cause, and report them to hunters. Farmers are also in a prime position to predict where wild boar might present themselves. Whether or not these reports lead to action on behalf of hunters does not solely depend on the farmers themselves but rather on the availability of hunters and their willingness and ability to shoot wild boar.

#### 5.1.1.3.3. Small game management

Both the ONF and ONCFS rangers stated that part of the increase in wild boar numbers may be explained by the decrease in the numbers of small game species. Farmers also cited changes in farming practices, which may have influenced the evolution of small game numbers, such as land consolidation and the removal of hedges. These practices reduce the level of cover for a number of small game species and therefore essential elements of their habitats. Coupled with land use changes, the hunting pressures practiced by hunters may also influence small game numbers. With fewer numbers of small game to hunt, a number of hunters have, according to both rangers, switched from hunting small game to hunting large game, such as wild boar.

## 5.1.1.3.4. Hunting rights

With three types of hunting lots in the department of the Moselle: domanial, communal, and private; the ways in which each can be managed vary, as do their general characteristics such as size and period of time for which they are rented. These characteristics may influence the management practices of the hunting right owners.

# 5.1.1.3.4.1. Types of hunting lots

According to the ONF ranger, if hunting lots were to be rented out for less time (less than 9 or 12 years) more locals would perhaps be able to, what he called "reclaim" their lands. Less commitment is required when renting hunting rights for shorter periods of time which may suite certain individuals more. In his opinion, local ownership of hunting rights would mean that wild boar populations would be managed more responsibly, with locals more likely to understand and show respect for the neighbouring inhabitants.

The landscape characteristics vary between domanial (forest), communal (forest and/or field), and private (field and/or forest) hunting lots. These characteristics govern how the lots can be managed, with the possibility for hunters to place hides in fields in the case of communal and private lots. This may help with the mitigation of crop damages if hunters are present in them at the correct times, with the vice-president of the FDSEA citing the shooting of wild boar in fields as an effective method for dissuading wild boar from venturing onto croplands, and a hunting farmer citing that hunters should spend more time hunting from hides, particularly at night. Hunting may also become a business as illustrated by the examples cited by the ONCFS ranger, including those involving farmers (section 4.2.9) and those termed "commercial hunts", where the owners of hunting rights may benefit financially from the ownership of them. This is one of the contentious issues observed by Graham *et al.* (2005) in conflicts between humans and wildlife, with DCAs often being esteemed and protected in some way because of their economic value.

## 5.1.1.3.4.2. Size of hunting lots

The size of hunting lots may influence the way in which they are managed, with the ONF ranger citing that domanial hunting lots must be a minimum of 500 ha. Large areas increase the likelihood of maintaining wild boar, which by their nature can be relatively nomadic, potentially covering large distances in search of favourable habitats (West *et al.* 2009). In general, wild boar populations in larger hunting lots can be managed more easily than smaller lots. In contrast, the minimum area for private hunting lots is 25 ha, which may make it more difficult for owners of hunting rights in such areas to manage wild boar populations effectively. The ONCFS ranger questioned whether or not small hunting lots with mainly fields and very little forest would be able to find takers, given the decrease in the numbers of small game and the difficulties associated with maintaining wild boar populations on them.

## 5.1.1.4. Human behaviour: Asset protection and management

# 5.1.1.4.1. Farmer damage mitigation techniques

Changes in farming practices, intended to reduce the levels of wild boar damages to crops, such as the erection of electric fences, changes in crop types, and changes in the location of crops tend not to affect wild boar numbers but instead encourage wild boar to seek food elsewhere, either in urban areas, in forests, or on neighbouring farmlands. The employment of such mitigation measures depends on the willingness and optimism of farmers as indicated by responses to the questionnaire, with some farmers feeling that they would not help and that it is up to hunters to manage wild boar populations, not them. When and where such mitigation techniques are employed, coupled with their effectiveness may influence the patterns of damages to crops.

# 5.1.1.4.2. Pro-active management

Concerning the management of crop damages, the direct and indirect powers of hunters and farmers need to be combined in order to effectively organise mitigation strategies. According to the ONF ranger, in theory, reducing wild boar numbers to an acceptable level is simple, yet it requires a willingness on behalf of hunters to partake in this reduction. Cases were cited during the responses given by farmers where for example, a local hunter would go out and sit in a hide in order to shoot wild boar when he was told by farmers that they were causing damages to their crops, whilst another farmer felt that damage levels were lower in areas where a dialogue existed between him and hunters compared to where no dialogue existed. This pro-active management of wild boar populations can help as an asset management tool according to the FDSEA vice-president, provided that individuals are willing to contribute

towards the solution. This implies that both hunters and farmers must listen to each other and trust one and other with regards to crop damages and the management of wild boar.

#### 5.1.2. Social risk factors

Social risk factors can play an important role in influencing stakeholder attitudes (Dickman 2010) as can deeper socio-political considerations such as tradition, private property rights, and government control (Patterson *et al.* 2003). The power relationship in particular between the various stakeholders, as well as the level of trust towards one and other may determine the views which an individual has surrounding a given conflict. The level of vulnerability may also shape a person's stance on the conflict in question, however ultimately it is the beliefs and values of an individual which influence their opinions.

## 5.1.2.1. Inequality and power

As suggested by the ONF ranger and mayor of his commune, as well as a number of farmers, many hunters tend to act as though they own the hunting lots they are renting, though evidently they do not. The implications associated with this perceived ownership by certain hunters are that various wild boar populations are not necessarily managed with the concerns of local members of society in mind. Some farmers felt that they were powerless, having no control over how hunting groups managed wild boar populations, feeling that hunters have their own agenda. The power, according to many farmers, is in the hands of hunters and what could be termed the 'hunting lobby', as alluded to by the ONF ranger. According to him, although in theory the authorities have the ability to influence the way in which wild boar are managed, the degree to which they exert this power depends on the extent to which they choose to associate themselves with the 'hunting lobby'.

Despite mayors having a lot of power in terms of organising the destruction of pest species and the possibility of not renting certain hunting lots, according to the ONF ranger, mayors are not necessarily informed about these powers. The simple question therefore of power must not be mentioned alone, individuals must be aware of the powers they possess and know how to use them.

### 5.1.2.2. Distrust and animosity

In the study area it was evident that distrust existed, manifested by a number of farmers towards hunters. This was highlighted by the fact that many farmers felt that dialogue between them and hunters would not help reduce damage levels. Only with understanding hunters was dialogue said to play a role in helping mitigate damage levels. This perceived inaction of a number of hunters does little to strengthen the argument in the department that hunting is the answer to managing wild boar populations and further increases the distrust on behalf of farmers towards hunters. This distrust was obvious in comments made by one farmer who wished "to take charge of the deficiencies of professional hunters". This implies that the farmer felt hunters were incapable of managing wild boar populations responsibly.

Distrust and animosity were also apparent between hunters themselves. This was shown to be the case particularly between larger and smaller hunting groups, where competition and rivalry may arise between two groups concerning the management of wild boar populations which they have in common on their lands.

The issue of a lack respect on behalf of hunters towards each other, farmers, and game species, raised by the ONF ranger, ONCFS ranger, and farmers, illustrates that more efforts must be made to increase the awareness of hunters and improve their attitudes towards the act

of hunting and all that it implies. The acts of hunters clearly impact not only the livelihoods of farmers but also the perceptions and security of society as a whole.

The distrust manifested by farmers towards hunters may transcend from individuals through to the administrative level, with Anthony *et al.* (2010) identifying that the management of conflict situations may impact upon the legitimacy of institutions. This was apparent in the lack of trust demonstrated by farmers with regards to the PNMS developed by the Ministry for Ecology, Energy, Sustainable Development, and the Sea, aimed at providing solutions to tackle the human-wild boar conflict nationally. Whether or not this distrust was expressed by farmers because they felt that hunters would fail to apply the recommended solutions or because the authorities would fail to transcribe these recommendations into legislation is not known. The ONF ranger however felt that there remained a lack of individuals informed about the plan, with the plan remaining within the sphere of specialists and progress being hindered by the hunting lobby with regards to its implementation. This highlights the importance of gaining the trust of stakeholders and involving them in discussions surrounding the resolution of conflicts.

# 5.1.2.3. Vulnerability and wealth

Although wealth may play a role in influencing the types of mitigation strategies which farmers employ and in turn the vulnerability of crops, wealth is not the only factor which influences this choice. Other factors such as perceived effectiveness, willingness, and beliefs were also shown to play a role. Despite Decker and Brown (1982) finding that the tolerance of individuals towards damages by wildlife may vary based on their respective situations, such as vulnerability and wealth, not enough data was collected in this study to be able to discuss the influences of these factors on the reactions by farmers to wild boar crop damages.

The issue of wealth arises with regards to the act of hunting. Unless individuals own enough land to reserve hunting rights on them (25 ha minimum), with increasing costs associated with renting hunting lots, this means that it may be prohibitively expensive for certain individuals to practice hunting. This barrier may increase the vulnerability of individuals who want to hunt in order to try and reduce the levels of wild boar damages, but cannot afford to.

# 5.1.2.4. Beliefs and Values

According to the ONF ranger it is the methods of hunting which need to change and the values of hunting which need to be better adapted to the context of hunting today. At present wild boar hunting in the department of the Moselle is no longer about subsistence but rather a combination of pest control, leisure, and business. A number of farmers stated that hunters had become breeders of wild boar. Although this may not be an entirely accurate account of the situation, there are elements of truth to the statement. Irrespective of the arguments for or against the practice of supplementary feeding, the fact that it is permitted year round and there has been abuse of the technique in the past, conveys a message towards the general public that there are hunters who, to a certain extent, are rearing wild boar to satisfy their hunting needs. This belief may become engrained in the thoughts of members of society, most notably those of farmers.

The beliefs and values of for example green movements may, according to one farmer, interfere with the management of wild boar populations by hunters. It is important however to understand the true beliefs and values which are being advocated, with for example nature protection movements, whilst not always being in favour of hunting in general, may support the practice for DCA regulation purposes (Scherrer 2002). The number of different beliefs and values was highlighted by the variety of responses given by farmers surrounding the role of wild boar in the environment. These ranged from no role at all to highly beneficial in the

forest, when numbers are reasonable. These distinct beliefs and values may influence an individual's perceptions in conflicts with wildlife and may in turn influence the perceived costs associated with DCAs.

#### **5.1.3.** Costs (actual and perceived)

Costs can be measured both as actual financial costs and as perceived costs associated with a form of loss. In the case of those associated with the conflict between humans and wild boar, the image of stakeholders may suffer from their actions, as well as the overall health of a particular ecosystem, and of individual species. Which costs are accounted for in the management of the conflict, plays a major role in determining what responses will follow. Although the current compensation scheme in place for wild boar damages to crops compensates for the direct cost of crop damages, part of the cost of protecting crops, and some of the restoration costs; a number of other costs are not compensated for.

# 5.1.3.1. Loss of future game

With game species often profiting from advantageous management approaches due to their hunting, economic, and social interest (De Klemm 1996); the ONF ranger raised the issue of "losses" which hunters suffer by shooting wild boar which they would not normally shoot unless they were encouraged to. This 'loss' represents a perceived cost for hunters.

# 5.1.3.2. Financial

Costs which can be measured financially include material damages, such as those caused to vehicles and machinery, damages to crops, and the cost of implementing damage mitigation strategies. Financial costs also include those associated with hunting such as the cost of renting hunting rights.

#### 5.1.3.3. Expected returns

There is a cost associated with the loss of crops, damaged by wild boar, which farmers would otherwise have used as fodder. This cost cannot simply be measured financially based on how much it would cost to replace what would have been harvested but must also take into account the effort costs associated with retrieving fodder from elsewhere.

## 5.1.3.4. Image

One of the perceived costs associated with the human-wild boar conflict may be the image which is portrayed of the actors. If a few hunters for example are seen to be managing wild boar irresponsibly, this may negatively impact the views of society with regards to hunters in general and the values they represent. Failure by the authorities to react to the development of the conflict may also harm society's image of certain institutions (Anthony *et al.* 2010). In the case of the conflict between wild boar and humans in the department of the Moselle, it is not only the image of hunters and institutions which may suffer but any stakeholder whose actions may be viewed negatively by other members of society. An example is the image of green movements which may suffer within the sphere of hunters and farmers, with individuals feeling that such movements are preventing necessary management actions from being carried out.

## 5.1.3.5. Ecosystem

As indicated by the ONF ranger, the health of natural ecosystems such as wetland habitats may suffer from the presence of large numbers of wild boar in a given area. It is clear that wild boar require moist areas within their habitats, such as wetlands (Fernández-Llario 2005). The costs associated with the loss of ecosystem services provided by such habitats are difficult to understand and quantify both financially and in terms of the area which they affect. Such costs are often given little attention in the press (Goulding and Roper 2002) and often overlooked by hunters in the Department of the Moselle, according to the ONF ranger.

## 5.1.3.6. Species

With the focus being on reducing the wild boar populations in the department, the increased hunting pressures on wild boar may have unwanted effects on the animals themselves but also on roe deer populations in particular. These effects can be perceived as a cost to hunters and the well-being of society, wildlife, and the environment. The ONF ranger felt that the fecundity of female wild boar may in fact increase when they are faced with increasing hunting pressures, as part of the species' biological defences. This represents a cost to hunters who are charged with reducing wild boar numbers, to society, to the environment, and to other species. In the Department of the Moselle, roe deer populations have, over time, benefitted from advantageous management strategies, as discussed by the ONCFS ranger, with many hunters feeling that they should limit the number of individuals they shoot in order to sustain higher numbers the following year. This may have effects on both the health of roe deer populations and on the damages they cause.

The other perceived costs associated with the current wild boar numbers include, according to the ONF ranger, the impacts they may have on small fauna (such as reptiles, amphibians, and small rodents), also mentioned by Schley *et al.* (2008), and the births of deer fawns. It is therefore important for hunters to realise that the costs associated with their management of wild boar populations are not limited to those which are compensated for (crop damages), but that other impacts, which are difficult to quantify financially, must be taken into account.

#### 5.1.3.7. Amenity

Perceived costs include the loss of amenity by members of society whose activities interfere with the act of hunting, such as hikers, cyclists, and walkers. With hunting being advocated as the main means for controlling wild boar numbers in the department, these costs must be accounted for when evaluating the success of the method and considering alternatives.

# 5.1.3.8. Health

It is difficult to measure health costs (both physical and mental) yet they form part of the perceived costs associated with the conflict. Physical health costs include those associated with the efforts undertaken to repair wild boar damages, collisions with the species, and their pursuit. Mental health costs may include the stress felt by stakeholders in conflict situations and the sentiment of failure in managing damages. Where wild boar cause damages to crops, according to the FDSEA vice-president, it is hard for farmers to accept seeing the fruits of their labour destroyed. This lack of satisfaction manifested by farmers represents a cost. Other health costs associated with high numbers of wild boar may be those associated with disease, with the issue of disease transmission from wild boar being raised by the ONF ranger, a problem which the Department has had to face, with the appearance of CSF in domestic pigs and wild boar in 2002 (DGAL 2002; MAAPRAT 2007).

#### 5.1.4. Responses

Responses to the costs experienced by stakeholders in the conflict between wild boar and humans in the department may take numerous forms including verbal, educational, managerial, legislative, and financial. Responses are not always proportionate to the level of costs suffered, but depend also on the multitude of environmental and social risk factors discussed, with individuals potentially exaggerating the costs they experience due to DCAs (Dickman 2010).

#### 5.1.4.1. Verbal

From the results of the questionnaires and semi-structured interviews it is evident that a number of stakeholders were shown to manifest their discontent verbally, including complaints the ONF ranger had received as mayor of his commune, from local inhabitants surrounding the actions of hunters. The FDIDS estimator also experienced verbal discontent, manifested by a farmer over the phone.

The vice-president of the FDSEA felt that the response of the hunting community towards the high levels of crop damages in the Department was merely talk and that not enough action was being taken. The ONF ranger talked about how the PNMS had forced the key actors involved in the human-wild boar conflict to gather around the same table and discuss the options available to them. However, verbal responses alone do not suffice in resolving conflicts; they must lead to actions and be carefully addressed to the appropriate stakeholders. Verbal responses must be constructive and aimed at lessening rather than heightening the conflict in question.

## 5.1.4.2. Educational

Education was a tool said to be employed by a number of stakeholders in an attempt to reduce actual and perceived costs felt by those involved in the conflict. Both the ONF and ONCFS rangers said that where possible, they would try to educate hunters on how to improve their supplementary feeding practices. The FDIDS estimator also claimed that the fund was working with individual farmers in an attempt to help tackle the issue of crop damages.

#### 5.1.4.3. Managerial

Ideally there should be no need for responses, however according to the ONF ranger, as soon as problems arise management actions must be taken, not the weekend after nor the next organised drive hunt. One managerial response may be for individuals to take control of matters themselves, with many farmers in conflict situations often feeling that they do not have sufficient control to influence matters (Manfredo and Dayer 2004). Farmers choosing to reserve the rights to hunt on their land, joining hunting groups on or around their land, or simply getting a hunting licence or validating their existing one in order to hunt are increasing the control they have over matters. The FDSEA vice-president felt that although an increasing number of farmers are beginning to take up hunting in response to the increasing levels of crop damages in the Department, not enough are doing so. One important movement may be that of land consolidation, mentioned by the ONCFS ranger, with the aim being for farmers to group lands together in order to form a minimum of 25 ha of continuous land, owned by a single individual/group. This entitles land owners to reserve the hunting rights on their land.

No compensation exists for the "losses" which hunters suffer by shooting more wild boar than they would otherwise have shot, instead certain hunting lots must be denounced, which may lead to administrative drive hunts. The threat of administration hunts in itself may lead to an increased culling of wild boar by hunting groups in order to avoid having the control taken away from them for the space of one drive hunt.

If further supplementary feeding restrictions were to be imposed, such as the abandonment of feeding during winter months, according to the ONF ranger this might result in hunters finding other ways to compensate, for example by placing restrictions within hunting groups, on the animals which could be shot. When making changes to the current system the potential consequences and responses from the various actors must be carefully considered.

The initiatives which the FDC plans to implement, such as the reintroduction of pheasants on a number of hunting lots along the edge of the Moselle River are essential in allowing small game numbers to increase. Their success will depend not only on the efforts of hunters, but also on those of farmers who will need to manage their land in such a way that it allows small game numbers to remain healthy.

In response to the current urban sprawl and the appearance of wild boar in urban areas, the ONF ranger clearly stated that methods other than hunting may be required in such situations; these include for example trapping or tranquilising. In the Department of the Moselle it is the responsibility of the lieutenant de louveterie to decide what methods to employ in such circumstances.

#### 5.1.4.4. Legislative

The two key legislative responses to the costs associated with the human-wild boar conflict, either directly or indirectly, are the PNMS and the SDGC respectively. The DDT highlighted the importance of both of these documents during the general assembly of the FDIDS and according to the ONF ranger the PNMS contains all the tools necessary to deal with the conflict in question. With the PNMS containing a total of 13 individual actions plans (MEEDDM 2009), it aims to provide the Departmental authorities with advice on how to identify costs, diagnose them, and improve the effectiveness of the management strategies aimed at reducing wild boar numbers (supplementary feeding practices, effectiveness of culling, vulnerability of wild boar, regulation of numbers in hunting reserves and protected areas, culls in peri-urban and/or industrial areas, and the organisation of meetings). Unlike the PNMS which forms a set of guidelines, the SDGC contains a set of measures which hunters must abide by, not only in their management of wild boar populations but of game species in general. Important measures contained within the SDGC, relating to the management of wild

boar include those associated with supplementary feeding practices. The ONF ranger, ONCFS ranger, and FDSEA vice-president talked about the compliance by hunters with these regulations, with each of them feeling that the current legislative response was not enough and that stricter regulations were required.

## 5.1.4.5. Financial

One response suggested by the FDIDS estimator to the current costs associated with the renting of hunting lots may be to impose a maximum price rather than a minimum price for which lots can be rented, in order to prevent prices from being inflated, with this inflation often being linked to an increase in the number of wild boar on each lot. However, such a response may, according to the ONF ranger, simply result in money being invested by hunters in wild boar damages instead. It appears logical that if hunters are willing to pay a certain amount at present, a decrease in the cost of hunting lots may not have the desired effect of decoupling wild boar numbers from hunting lot prices but rather encourage hunters to find other ways of allowing wild boar numbers to remain relatively high whilst still paying the same price.

The FDIDS compensation scheme is a response on behalf of hunters to the direct financial costs suffered by farmers from wild boar damages to crops, though according to the FDSEA vice-president the level of this response is not high enough, stating that the level of compensation was too low. It is evident that this financial compensation does not and indeed cannot realistically cover all of the actual and perceived costs suffered by farmers, given the difficulties for example of obtaining large quantities of hay to give to farmers in response to their loss of fodder harvest.

#### 5.1.5. Consequences (direct and indirect)

The consequences of these responses up until now have been both positive and negative in terms of their potential for contributing to the resolution of the human-wild boar conflict. The consequences cited are both real and theoretical, based on the responses enumerated previously.

# 5.1.5.1. Wild boar numbers

The consequences associated with administrative hunts are that they encourage hunters to realise that they must manage wild boar populations responsibly, and where they occur, they tend to lead to drastic reductions in wild boar numbers.

According to the ONCFS ranger if supplementary feeding were to stop, wild boar populations would become more dispersed and therefore all hunting lots would have more hunters and the price of meat would drop, allowing it to be sold more easily or possibly to be shared between individual hunters. The actual consequences however associated with the potential cessation of supplementary feeding are difficult to predict and would require trials to be carried out in order to test the potential effects.

# 5.1.5.2. Management

Education has the ability to help improve management practices by the various stakeholders and reduce the levels of damages caused by wild boar and hence, in theory, the level of conflict, including the level of discontent manifested by different actors.

An increase in the number of farmers who hunt and an increase in the numbers who reserve the right to hunt on their lands may result in more hunters beginning to realise the consequences of their actions on crop damage levels, either through discussions with farmers or through hunters themselves being farmers. Whether this may lead to an increased wild boar hunting pressure depends on the willingness of hunters. If the total costs associated with hunting however become too high for certain hunters, they may cease to hunt altogether.

# 5.1.5.3. Non-target species

Administrative hunts, which tend to take place when the drive hunt season is finished, as well as having consequences on wild boar numbers may also impact non-target species such as deer, increasing the stress levels felt by such species and potentially resulting in the capture of non-target animals by hunting dogs. The focus on increasing the hunting pressure on wild boar may also impact roe deer, potentially leading to increased damages caused by the species as well as diseases if numbers are allowed to increase substantially. On the other hand, if wild boar populations continue to remain high this may have negative consequences for small fauna such as amphibians, rodents, and reptiles.

# 5.1.5.4. Disease

If wild boar numbers continue to increase or remain high and supplementary feeding continues to be practiced at fixed posts, the concentration of animals in small areas may increase the risks of disease, as mentioned by the ONF ranger and Ruiz-Fons *et al.* (2006).

#### 5.1.5.5. Small game

If initiatives aimed at increasing the numbers of small game are successful, this may reduce the pressures felt by certain hunters, to maintain high wild boar numbers. In the long term, the successful reintroduction of small game species may draw large game hunters, including wild boar hunters, away from such practices, towards small game hunting. If such initiatives are successful, hunting lots with no/few wild boar, but sufficient areas of fields, may find it easier to identify takers than if there was no/very little small game present.
#### **CHAPTER SIX – CONCLUSIONS AND RECOMMENDATIONS**

#### 6.1. CONCLUSIONS

The results from the research carried out in this study illustrate the complex nature of the conflict between wild boar and humans in the Department of the Moselle. Wild boar are responsible for a number of damages caused in the Department including to croplands, non-crop lands, vehicles, fauna, and ecosystems. Although wild boar damage levels appear to be acceptable in certain regions of the Department, there are areas which can be termed 'hotspots' where members of society, farmers in particular, appear to be unhappy with the damage levels. Farmers are particularly concerned about damages to pasture because of the costs associated with repairs and the loss of fodder.

The conflict is characterised by a number of factors over which humans have no control, including weather, climate, mast yields, and variations in crop prices. It is clear that the expansion of urban areas, coupled with the loss of natural habitats, increased wild boar numbers, changes in farming practices, increased hunting pressures, and climatic variations influence wild boar movements and in turn the types and levels of damages they cause.

Hunting has the ability to directly affect wild boar numbers, depending on for example pressures, effectiveness, shooting restrictions, supplementary feeding practices, age and health of hunters, and their availability. Hunters however appear to be compensating for only a fraction of the costs associated with wild boar damages. The costs which hunters are paying for reflect only the direct damages to crops, part of the mitigation costs, and a fraction of the costs of repairing damages. The price paid by hunters in the Department is not directly related to the damages on and/or around their hunting lots but rather the compensation system demands that each wild boar hunter contributes a fixed amount and that each hunting lot

owner contributes a fixed amount based on the price and characteristics of his/her lot. Without a price signal representative of the actual costs of damages on and/or around each hunting lot being sent to hunters it is difficult for them to visualise the true financial costs associated with their management of wild boar. Hunting lots where wild boar populations cause significant damages face the threat of administrative drive hunts. Such hunts however, whilst potentially encouraging hunters to manage wild boar responsibly may also have significant impacts on other fauna. Hunters therefore must understand that the costs which they compensate for are not the only ones associated with their management of wild boar populations, but that other impacts, including those which are difficult to measure financially, must be accounted for.

Shooting restrictions surrounding wild boar still appear to be imposed within certain hunting groups despite the practice not being authorised, as do fines for not abiding by them. Though not all areas of the department of the Moselle are affected by high wild boar damage levels, where damages are high the primary cause tends to be elevated wild boar numbers, with shooting restrictions appearing as one of the practices allowing numbers to increase.

Whether or not supplementary feeding affects the fecundity of female wild boar, it does seem capable of affecting their survival during environmentally harsh periods, the potential for disease transmission, and the dominance of certain females. It is the abuse of this technique by hunters which appears to have partly contributed to the rise in wild boar numbers in the Department. The majority of hunters seem to abide by the regulations in place surrounding the practice however where hunters do not comply with legislation such as on small hunting lots or where hunters only hunt occasionally, hunters tend to feel obliged to feed in order to shoot wild boar. The attitudes of hunters towards supplementary feeding must change, hunters must accept that wild boar are wild animals and that the chance of shooting them should not depend on the animals being fed by them but rather on the amount of effort which they put

into pursuing them. However, it is not simply enough to hunt on hunting lots but a stable hunting pressure must also be maintained in areas which would otherwise not be hunted and are capable of hosting wild boar populations, in order to avoid wild numbers increasing and going unnoticed.

Farmers have the ability to influence the behaviour of wild boar based on the types of crops they plant, planting locations, and the methods they use to mitigate crop damages. Decisions made by farmers surrounding the management of their lands can only displace damages caused by the species unless individuals hunt on or around their lands. Farmers however are ideally placed to provide feedback to hunters surrounding the behaviour of wild boar on their land and in turn predict when and where the animals are most likely to appear. Though a dialogue exists between numerous farmers and hunters in the Department, whether or not this can help mitigate wild boar damages depends on the willingness of the two actors to contribute towards a solution. Dialogue must lead to action, without which farmer discontent will continue to remain strong, with farmers feeling that there is too much talk and not enough being done about wild boar numbers.

Despite the levels of wild boar damages in areas of the Department inciting individuals to manifest their discontent, deeper socio-political factors also influence the levels of conflict. The perceived inaction of hunters in response to the appearance of wild boar damages, the way in which hunting is conducted, their behaviour, and the apparent lack respect on behalf of hunters towards members of society all affect the level of conflict in the Department.

Modern hunting in the Department of the Moselle is associated with pest control, leisure, and business. With the price of hunting lots having increased in conjunction with the increase in wild boar numbers, today the aim of many hunters in the Department appears to be, to get the most value for money. The costs of hunting lots and numbers of wild boar suggest that numerous hunters measure this value in terms of the number of wild boar which are available to shoot. Certain owners of hunting rights have also found ways of benefiting financially from the renting of hunting lots. Not all owners of hunting rights however possess the same means with which to manage wild boar populations and indeed the damages they cause to crops. The percentage of forest and fields on each lot, the size of lots, and their location all govern the ways in which they can be managed.

The hunting lobby in the Department of the Moselle clearly has the majority of the power in the relationship between the various stakeholders concerned by the conflict. With hunting being advocated as the sole widely applicable method for controlling wild boar numbers in the Department, apart from in special circumstances where the species causes problems in urban areas; it is hunters who have the ability to reduce wild boar numbers. Other stakeholders are at the mercy of the decisions made by hunters, with farmers alone only able to displace the damages which the species inflicts. Certain hunters in the Department appear to be confusing this power with ownership, meaning that wild boar populations are not necessarily being managed with the concerns of local landowners in mind.

Although legislation has been adapted within the Department in an attempt to resolve elements of the conflict between humans and wild boar, it appears that the ideas contained within this legislation have encountered difficulties transcending from the legislative sphere through to the individuals in the field. The degree to which institutions associate themselves with the hunting lobby has the ability to influence the amount of power legislation has in affecting wild boar management.

The conclusion is not that wild boar must be eradicated from the Department of the Moselle but that numbers should be reduced to levels which allow hunters to manage the animals sustainably and to respond to damages when and where they arise or to prevent them from happening. The same is true for any species which is capable of causing significant damages, particularly species which are highly adaptive and resilient and can in theory recover relatively quickly from intensive culls if enough individuals remain. For this to happen, the aim of hunting should be to gain satisfaction from the act of hunting in itself rather than the wild boar bag at the end of the season.

#### 6.2. **RECOMMENDATIONS**

All efforts should be made by hunters to increase both the natural mortality of wild boar and that associated with hunting. Ideally, given the level of wild boar populations in the department, though this is already the case at present, there should be no restrictions placed by hunting groups on the classes of wild boar which are to be shot (young, sub-adult, adult, male, female, weight, etc.) and enforcement of this should be strengthened. The argument that wild boar are a highly adaptive and resilient species should not be used by hunters to argue why the culling of large numbers is difficult to achieve but rather that populations can theoretically recover quickly from such culls.

Given that supplementary feeding may affect the survival of wild boar during harsh environmental conditions, supplementary feeding should not be provided during the winter months and should only be authorised during periods where crops are susceptible to damages by wild boar. To test the effects of such a practice would require field trials to be carried out in order to examine how and where it is best to provide feed. A close dialogue between farmers and hunters is also required in order for essential information to be shared, allowing hunters to react as soon as, or before damages occur.

The hunting federation must focus on promoting more sustainable wild boar hunting practices which involve lower, more manageable wild boar numbers. Methods such as bow hunting should be promoted and encouraged over gun hunting, with the general public tending to be more accepting of such practices. Efforts should also be made to encourage hunters to hunt closer to the areas where they live, with the hope that the availability of hunters will increase as will their knowledge of wild boar behaviours on their lots, and in turn the numbers of wild boar shot. One means of doing this could be to encourage farmers to hunt on and/or around their lands. In theory, local ownership may lead to more responsible management of wild boar populations, as they would be the one's feeling the costs associated with wild boar damages.

The only way to encourage hunters to accept that they should shoot more wild boar, other than imposing fines or administrative hunts appears to be educate them about the true effects of their management practices and to accept that the aim of wild boar hunting should not be to have as many wild boar on one's land to shoot but rather to take pleasure from the effort and perseverance required in the search, pursuit, or the awaiting of wild animals and to manage populations responsibly.

In response to the current urban sprawl and the appearance of wild boar in urban areas, improvements are required in the planning of villages, towns, and cities, and their future expansion towards areas in which wild boar and other animals, likely to enter into conflict with humans (e.g. deer), are present. Plans should be drawn up to limit the amount of area converted by humans, with such areas being confined to those already less favourable for wildlife and fauna. Where necessary, individuals should be made aware of the risks which they face when moving to these areas, such as coming into contact either directly or indirectly with wild boar.

The time lapse between costs and the responses to them must be as short as possible in order to avoid upsetting the various actors concerned. Every effort must be made to shorten the feedback loop between wild boar damages and subsequent management actions which are taken to either prevent damages from reoccurring or to limit wild boar numbers in order to reduce the frequency and intensity of the associated costs.

The beliefs and values of particular movements (e.g. green and ecological) must be accounted for when designing management strategies. Efforts must be made to respond to their concerns and attempt to improve the acceptance by such movements of the techniques which are used to manage wild boar populations. This will inevitably lead to trade-offs having to be made by both parties, those managing wild boar populations and those objecting to certain management practices. The goal however must remain the control of wild boar numbers in order to limit the level of damages caused by the animals. All means possible should be considered by the authorities, taking into account the concerns of all parties, allowing alternatives to the current status quo to be implemented, without losing sight of the overall objective of responsible management of wild boar numbers. If hunters themselves feel that hunting alone cannot reduce wild boar populations, other methods of population control should be considered such as trapping, snares, toxicants, vaccination, and contraception, with their potential impacts being examined under trial conditions.

All efforts should be made to reintroduce or increase the numbers of small game species in the Department in order to provide hunters with a substitute for large game, in the hope that this will result in fewer wild boar hunters and that hunters in general will feel less of a need to maintain elevated wild boar numbers to satisfy their hunting needs.

Further research is required to determine the willingness to pay of hunters for wild boar damages, however damages should be extended beyond the costs covered under the current compensation scheme and attempt to include the entirety of wild boar related damage costs.

With regards to the costs associated with the impacts upon different species and ecosystems it is important for hunters to achieve the correct balance between wild boar hunting and the hunting of roe deer. Hunters should not focus solely on shooting wild boar but should also aim to meet the roe deer quotas they are set and should take into account the numerous sideeffects which their actions may have on the environment.

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## PERSONAL COMMUNICATIONS

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- Dauendorffer, Anne. Member of the Fonds Départemental d'Indemnisation des dégâts de Sangliers (FDIDS). Email communication, 11 March 2011.
- Henry, Yannick. Technician in charge of the wild boar file at the Departmental Federation of Farmers (FDSEA). Email communication, 14 February 2011.

# APPENDICES

# Appendix 1. Images of rooting damages caused by wild boar



Fig. A. Wild boar damage caused to permanent pasture (brown patches)



Fig. B. Wild boar damage caused to newly sown field of wheat (darker brown areas)



Fig. C. Wild boar damage to land along the edge of a road

# Appendix 2. Number of hunting licence validations per season in the Department of the Moselle

validated

hunting

Number of

Table

A.

licences/season in the Department of the Moselle				
Hunting Season	Number of Hunting Licence Validations			
2000/2001	8496			
2001/2002	8597			
2002/2003	8427			
2003/2004	8543			
2004/2005	8736			
2005/2006	8971			
2006/2007	8993			
2007/2008	9134			
2008/2009	9231			
2009/2010	8848			

**Number of Hunting Licence** Validations 9400 Number of Validations 9200 9000 8800 8600 8400 Number of Validations 8200 8000 2009/2010 2008/2009 2000/2001 2007/2008 2001/2002 2002/2003 2004/2005 2005/2006 2003/2004 2006/2007 **Hunting Season** 

Fig. D. Number of validated hunting licences/season in the Department of the Moselle

#### Appendix 3. Level of compensation awarded to farmers by the FDIDS per hunting

season

Hunting Season	Level of Compensation (EUR)
2000/2001	4,518,631
2001/2002	5,153,965
2002/2003	1,184,639
2003/2004	1,138,639
2004/2005	1,144,209
2005/2006	816,303
2006/2007	765,727
2007/2008	896,524
2008/2009	1,000,013
2009/2010	800,787

Table B. Level of compensation awarded to farmers by the FDIDS per hunting season



Fig. E. Level of compensation awarded to farmers by the FDIDS per hunting season





#### **Appendix 5. Farmers' questionnaire – French version**





#### **MESPOM 2009/2011**

# Questionnaire sur les points de vue des agriculteurs concernant les dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle

Mon nom est Mark RYAN, je suis étudiant. Je fais un Masters en Science de l'Environnement, Politique et Gestion à l'Université d'Europe Centrale, Budapest, Hongrie. A présent je travaille sur ma thèse qui porte sur les conflits entre les êtres humains et la faune sauvage, en particulier le conflit entre le sanglier et l'agriculture, un problème qui existe aussi bien en France que dans de nombreux pays à travers l'Europe. L'objectif de ce questionnaire est de me permettre de connaître les points de vue des agriculteurs sur le thème des dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle, y compris leur opinion sur la gestion du problème au niveau départemental et au niveau national. Le but par la suite est, à travers cette recherche, de comprendre les motifs du conflit, la façon dont elle est actuellement gérée et comment la gestion de ce problème peut être améliorée dans le futur.

Les informations que vous fournissez dans ce questionnaire resteront anonymes. Vos réponses dans le présent questionnaire ne seront transmises à aucune partie tierce et resteront entre les mains du chercheur. Je vous demande votre permission de me laisser utiliser les réponses que vous donnez dans ce questionnaire, dans ma thèse, sans que je ne révèle l'identité de l'auteur des réponses.

Si vous avez des questions concernant la recherche que j'entreprends, n'hésitez pas à me contacter par téléphone ou par e-mail (**vous pouvez garder cette 1**<sup>ère</sup> **page pour vous**):

Téléphone (Luxembourg): +352 691 816668

Téléphone (Hongrie): +36 702 435055

E-Mail: mark.ryan@mespom.eu

# Questionnaire sur les points de vue des agriculteurs concernant les dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle

En signant la présente, je donne la permission au chercheur d'utiliser mes réponses à ce questionnaire dans le contexte de la recherche définie dans l'introduction et je comprends que mes réponses resteront anonymes et ne seront données à aucune partie tierce.

Nom :	: Prénom :
Signat	ture : Date :
Numé	ro de téléphone:
Adres	se e-mail:
1.	Quel est votre sexe?
	Masculin 🗆 Féminin 🗆
2.	Quel âge avez-vous ?
3.	En quelle année avez-vous commencé le métier d'agriculteur ?
4.	Quel est la superficie (ha) de Surface Agricole Utile (SAU) que vous cultivez à l'heure actuelle ?
5.	Quelles sont les principales cultures que vous cultivez (par exemple maïs, blé
	(hiver/printemps), pâture, colza (hiver/printemps) etc.) ?
6.	Quelles sont les communes sur lesquelles vous cultivez des terres à l'heure actuelle ?
7.	Est-ce que vous avez réservé le droit de chasse sur vos terres ?
	OUI 🗆 NON 🗆
	a. Pourquoi?
8.	Avez-vous déjà subi des dégâts occasionnés à vos cultures par des sangliers ?
	$OUI \square$ NON $\square$
	SI NON, Veuillez passer à la Question 12.

- 9. Quelles sont les cultures qui ont subi ces dégâts ?
- Pensez-vous que le niveau absolu des dégâts occasionnés aux cultures par les sangliers sur les terres que vous cultivez a augmenté/ diminué / est resté constant depuis que vous êtes agriculteur ? (En ne tenant pas compte des changements des prix des céréales)
- 11. Quel est plus ou moins le plus haut niveau de dégâts occasionnés à vos cultures par des sangliers (en euros/francs) et en quelle l'année ces dégâts se sont-ils produits ?
- 12. Est-ce que vous prenez/ avez déjà pris des mesures pour essayer de limiter les dégâts que les sangliers peuvent occasionner à vos cultures ? (par exemple les clôtures électriques, tir à balle, canon à gaz, changement de cultures etc.)
  - $OUI \square$  NON  $\square$ 
    - a. SI OUI
      - i. Quelles mesures prenez-vous/ avez-vous déjà pris et ont-elles étés efficaces ?
    - b. SI NON
      - i. Est-ce que vous considéreriez prendre de telles mesures ?

OUI 🗆	NON	
-------	-----	--

1. SI NON

- a. Pourquoi?
- 13. Est-ce que votre seul revenu vient de l'agriculture ?

 $OUI \square$  NON  $\square$ 

## SI OUI, Veuillez passer à la Question 14.

- a. SI NON
  - i. Quels sont les autres métiers que vous exercez ?

14. Y a-t-il eu des changements visibles dans les pratiques agricoles dans la région depuis que vous êtes agriculteur ? (par exemple un changement dans les types de culture)

 $OUI \square$  NON  $\square$ 

## SI NON, Veuillez passer à la Question 15.

a. SI OUI

- i. Quels sont ces changements ?
- ii. De quelle façon ces changements auraient-ils pu contribuer à l'évolution de la population de sangliers dans votre région depuis que vous êtes agriculteur ?

15. Selon vous, quel rôle les sangliers jouent-ils dans la nature ?

16. Pensez-vous qu'il y ait des formes d'agrainage en forêt pour les sangliers qui peuvent aider à limiter le niveau des dégâts que les sangliers occasionnent aux cultures ?

 $OUI \square$  NON  $\square$ 

- a. SI OUI
  - i. Que sont-ils?

b. SI NON

i. Est-ce que selon vous, l'agrainage en forêt pour les sangliers devraitêtre interdit ?

 $OUI \square$  NON  $\square$ 

17. Avez-vous entendu parler des essais sur semis de maïs à base de piment qui enrobe la semence et qui est censé réduire le niveau des dégâts que les sangliers occasionnent au maïs ?

 $OUI \square$  NON  $\square$ 

## SI NON, Veuillez passer à la Question 18.

a. SI OUI

- i. Est-ce que vous pensez que si les essais sont un succès, cela pourrait permettre de réduira le niveau total des dégâts occasionnés aux cultures par les sangliers sur les terres que vous cultivez ?
- 18. Est-ce que vous possédez un permis de chasser ?

OUI 🗆	l NON	
	11011	_

SI NON, Veuillez passer à la Question 19.

a. SI OUI

- i. Depuis combien de temps avez-vous votre permis de chasse ?
- ii. Qu'est-ce qui vous a incité à commencer à chasser ?
- iii. Combien de fois est-ce que vous allez à la chasse en moyenne ? (par semaine, par mois ou par an)
- iv. Quelles sont les espèces que vous chassez ? (par exemple sanglier, chevreuil, renard, lièvre, canard etc.)
- v. Est-ce que vous chassez sur vos terres ou ailleurs ?

Sur mes terres  $\Box$  Ailleurs  $\Box$ 

- 1. SI AILLEURS
  - â. Êtes-vous content(e) de la façon dont les populations de sangliers sont gérées là où vous chassez ?
- vi. En tant que chasseur, avez-vous vu une augmentation de la population de sangliers dans les endroits où vous avez chassé, depuis que vous êtes chasseur ?

 $OUI \square$  NON  $\square$ 

19. Est-ce qu'il existe un dialogue entre vous et les groupes de chasseurs qui chassent sur et/ou aux alentours de vos terres ?

 $OUI \square$  NON  $\square$ 

SI NON, Veuillez passer à la Question 20.

- a. SI OUI
  - i. Est-ce que ce dialogue permet de gérer les dégâts que les sangliers occasionnent aux cultures, sur les terres que vous cultivez ?

 $OUI \square$  NON  $\square$ 

- ii. Pourquoi ?
- 20. Avez-vous déjà entendu parler du Plan national de maîtrise du sanglier développé par le Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer ?

 $OUI \square NON \square$ 

a. SI OUI

- i. Où est-ce que vous en avez entendu parler ?
- ii. Êtes-vous confiant que ce plan permettra de faire baisser le niveau des dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle ?
  - $OUI \square$  NON  $\square$

Je tiens à vous remercier beaucoup pour votre temps et patience. Vos réponses resteront anonymes et seront utilisées pour tenter d'atteindre les objectifs de cette recherche qui sont définis dans l'introduction de ce questionnaire qui vous est distribué.

Mark Ryan

Luxembourg, 11 mars, 2011

#### **Appendix 6. Farmers' questionnaire – English version**





#### **MESPOM 2009/2011**

# Questionnaire on the views of farmers concerning agriculture and wild boar damage in the Department of the Moselle

My name is Mark Ryan. I am a Masters student studying Environmental Science, Policy and Management (MESPOM) at the Central European University, Budapest, Hungary. I am currently working on my thesis, the topic of which is human-wildlife conflicts, in particular the conflict between wild boar and agriculture, a common issue both in France and across Europe. The aim of this questionnaire is to provide an understanding of the views of farmers surrounding the issue in the Department of the Moselle, including the way in which they feel the issue is managed at the Departmental and National level. The subsequent goal of this research is to contribute to the understanding of why this conflict exists, how well it is currently being managed and how management can be improved in the future.

The information which you provide in this questionnaire will remain anonymous. The answers which you give in this questionnaire will not be revealed to any third party and will remain in the hands of the researcher. I request permission to use the answers given to the questionnaire in my thesis, without ever revealing the identity of the author of the answers.

Should you have any reservations or questions surrounding the research do not hesitate to contact me by telephone or by e-mail (**you can keep this 1**<sup>st</sup> **page for yourself**):

Telephone (Luxembourg): +352 691 816668

Telephone (Hungary): +36 702 435055

E-mail: mark.ryan@mespom.eu

# Questionnaire on the views of farmers concerning agriculture and wild boar damage in the Department of the Moselle

By signing this, I allow my answers to be used in the context of the current research defined in the introduction and understand that the answers which I give will remain anonymous and will not be given to any third party.

Surname:		Name:
Signature:		Date:
Telephone number: _		
E-mail address:		
1. What sex are	you?	
Male	Female	
2.What age are	you?	
3.What year did	l you first start farming?	
4.What is the a	rea (ha) of useful agricultur	al land that you actively farm at present?
5.What are the	main crops which you farm	1?
6.What are the	communes on which you fa	rm land at present?
7.Have you rese	erved the right to hunt on ye	our lands
$_{\rm YES}$	NO $\Box$	
a. Why?		
8.Have you eve	r suffered damage by wild	boar to your crops?
$_{\rm YES}$	NO $\Box$	
IF NO, pl	lease skip to Question 12.	

**CEU eTD Collection** 

- 9. What are the crops which have been damaged by wild boar?
- 10. Do you feel that **absolute** crop damage levels have increased/decreased/remained constant during your time as a farmer? (not taking into account the changes in the price of cereals)
- 11. What approximately, is the highest level of damage (in euros/francs) which you have ever suffered and what year was it in?
- 12. Do you/have you in any way attempt(ed) to mitigate wild boar damage to your crops? (e.g. electric fences, shooting, gas canons, change of crops etc.)

 $_{\rm YES} \square \qquad {\rm NO} \square$ 

b. IF YES

i. What methods do you/have you use(d) and are/were they effective?

c. IF NO

i. Would you ever consider using any mitigation method?

$_{\rm YES}$	NO $\Box$
1. IF N	10

a. Why not?

13. Is your sole income from farming?

YES  $\square$  NO  $\square$ 

## IF YES, please skip to question 14.

a. IF NO

- i. What other job(s) do you have?
- 14. Have there been any noticeable changes in farming practices in the region since you first started farming? (e.g. changes in types of crops planted)

 $YES \square NO \square$ 

#### IF NO, please skip to question 15.

a. IF YES

i. What are these changes?

ii. How do you feel these changes may have contributed to the change in the population of wild boar in your region since you first started farming?

15. What role do you feel wild boar play in the environment?

16. Do you think that methods of supplementary feeding of wild boar in the forest exist which can help limit the levels of damages they cause to crops?

 $YES \square NO \square$ 

- a. IF YES
  - i. What are they?

b. IF NO

i. According to you, should supplementary feeding of wild boar in the forests be prohibited?

 $YES \square NO \square$ 

17. Have you heard about the testing of a new technique of coating maize with chilli to reduce damage levels by wild boar to maize?

YES  $\square$  NO  $\square$ 

## IF NO, please skip to question 18.

a. IF YES

i. Do you think it will be effective or not in reducing the total level of damage which wild boar cause to your crops?

18. Do j	you j	possess	a ł	nuntir	ng l	licence?	,
----------	-------	---------	-----	--------	------	----------	---

 $_{\rm YES} \square \qquad {\rm NO} \square$ 

#### IF NO, please skip to question 19.

- i. IF YES
  - i. How long have you had a hunting licence?
  - ii. What gave you the incentive to start hunting?
  - iii. How often do you hunt on average (per week, per month or per year)
  - iv. What are the main game species which you hunt? (E.g. wild boar, roe deer, fox, hare, duck etc.)

v. Do you hunt on your land or elsewhere?

On my land  $\Box$  elsewhere  $\Box$ 

- 1. IF ELSEWHERE
  - a. Are you satisfied with the way in which wild boar populations are managed where you hunt?
- vi. As a hunter, have you seen a rise in the wild boar population in the areas where you hunt since you first started hunting?

YES LI NOL	
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19. Is there a dialogue between you and the groups of hunters who hunt on or around your lands?

YES  $\Box$  NO  $\Box$ 

IF NO, please skip to question 20.

a. IF YES
i. Does the dialogue help to manage wild boar damages to crops on the lands which you farm?

$_{\rm YES}$	NO $\Box$
1L5	

- ii. Why?
- 20. Have you heard about the National Plan for the Control of Wild Boar developed by the Department of Ecology, Energy, Sustainable Development, and the Sea?
  - YES  $\square$  NO  $\square$

a. IF YES

- i. Where did you hear about it?
- ii. Are you confident that this plan will help reduce the level of crop damages by wild boar in the Department of the Moselle?
  - YES  $\Box$  NO  $\Box$

I would like to thank you very much for your time and patience. Your answers will remain anonymous and will be used to attempt to achieve the goals of this research, stated in the introduction.

Mark Ryan

Luxembourg, 11 March, 2011





#### **MESPOM 2009/2011**

# Questionnaire sur les points de vue des agriculteurs concernant les dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle

Mon nom est Mark RYAN, je suis étudiant. Je fais un Masters en Science de l'Environnement, Politique et Gestion à l'Université d'Europe Centrale, Budapest, Hongrie. A présent je travaille sur ma thèse qui porte sur les conflits entre les êtres humains et la faune sauvage, en particulier le conflit entre le sanglier et l'agriculture, un problème qui existe aussi bien en France que dans de nombreux pays à travers l'Europe. L'objectif de ce questionnaire est de me permettre de connaître les points de vue des agriculteurs sur le thème des dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle, y compris leur opinion sur la gestion du problème au niveau départemental et au niveau national. Le but par la suite est, à travers cette recherche, de comprendre les motifs du conflit, la façon dont elle est actuellement gérée et comment la gestion de ce problème peut être améliorée dans le futur.

Les informations que vous fournissez dans ce questionnaire resteront anonymes. Vos réponses dans le présent questionnaire ne seront transmises à aucune partie tierce et resteront entre les mains du chercheur. Je vous demande votre permission de me laisser utiliser les réponses que vous donnez dans ce questionnaire, dans ma thèse, sans que je ne révèle l'identité de l'auteur des réponses.

Si vous avez des préoccupations ou questions concernant la recherche que j'entreprends, n'hésitez pas à me contacter par téléphone ou par e-mail:

Téléphone (Luxembourg): +352 691 816668

Téléphone (Hongrie): +36 702 435055

E-mail: mark.ryan@mespom.eu

# Questionnaire sur les points de vue des agriculteurs concernant les dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle

En signant la présente, je donne la permission au chercheur d'utiliser mes réponses à ce questionnaire dans le contexte de la recherche définie dans l'introduction et je comprends que mes réponses resteront anonymes et ne seront données à aucune partie tierce.

 Signature : \_\_\_\_\_
 Date : \_\_\_\_\_

Numéro de téléphone: \_\_\_\_\_

Adresse e-mail:\_\_\_\_\_

1. Est-ce que selon vous, le niveau des dégâts occasionnés aux cultures par le sanglier dans le département de la Moselle est en général trop élevé ?

 $OUI \square$  NON  $\square$ 

- a. SI OUI
  - i. Est-ce que c'est trop élevé partout ou y a-t-il des endroits où le niveau est acceptable ?
  - ii. Selon vous, depuis combien de temps ces dégâts sont-ils trop élevés ?
  - iii. Quels sont selon vous, les causes principales de ce niveau élevé des dégâts ?
  - iv. Est-ce que selon vous, la gestion des populations de sangliers s'est améliorée depuis que le niveau élevé de dégâts est apparu ?

 $OUI \square$  NON  $\square$ 

- 2. Est-ce que vous pensez que la situation s'améliorera/ s'empirera et que les dégâts baisseront/ augmenteront ou resteront les mêmes dans les prochaines années (cinq à dix ans)?
- 3. Quelle est votre opinion sur les essais sur semis de maïs à base de piment qui enrobe la semence et qui est censé dissuader les sangliers de commettre des dégâts aux cultures de maïs ?
- 4. Est-ce qu'en général les relations entre agriculteurs et chasseurs sont bonnes dans le département de la Moselle ?

 $OUI \square$  NON  $\square$ 

a. Est-ce que de bonnes relations entre agriculteurs et chasseurs peuvent aider à trouver une solution et à faire baisser le niveau des dégâts occasionnés aux cultures par le sanglier ?



- Quel est votre point de vue sur l'agrainage de dissuasion pratiqué par les chasseurs ? (Qui respecte l'Objectif 22: Pratiques de l'agrainage, dans le Schéma Départemental de Gestion Cynégétique dans le Département de la Moselle)
  - Pensez-vous que la plupart des chasseurs respectent les conditions définies dans l'Objectif 22 ?

6. Pensez-vous qu'il y ait une méthode qui pourrait remplacer cette méthode (agrainage) ?

 $OUI \square$  NON  $\square$ 

- a. SI OUI
  - i. Quel serait cette méthode ?
- 7. Y a-t-il une pression assez forte de la part des chasseurs pour diminuer le nombre de sangliers ?
  - $OUI \square$  NON  $\square$
- 8. Avez-vous vu une augmentation du nombre d'agriculteurs qui chassent le sanglier depuis que les dégâts du sanglier deviennent de plus en plus élevés ?

oui 🗆 🛛	NON	
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a. Est-ce que vous-même vous êtes chasseur ?

OUI 🗆 🛛 N	ON
-----------	----

- i. SI OUI
  - 1. Qu'est-ce qui vous a incité à commencer à chasser?
- 9. Dans le temps, en France, il y avait ce que l'on appelait un «droit d'affût» prévu par le Code rural et qui organisait un droit de légitime défense contre le sanglier au profit des agriculteurs lorsque leurs cultures, encore sur pied, étaient menacées par le sanglier.
  - a. Pensez-vous qu'il y ait recours à un système similaire aujourd'hui ?

OUI 🗆	NON $\Box$
-------	------------

b. Pensez-vous qu'un système similaire fonctionnerait aujourd'hui ?

OUI 🗆	NON $\Box$
-------	------------

i. Pourquoi ?

- 10. Est-ce que le niveau d'indemnisation offert aux agriculteurs par le FDIDS pour les dégâts occasionnés aux cultures par le sanglier est acceptable ?
  - $OUI \square$  NON  $\square$ 
    - a. SI NON
      - i. Pourquoi ce niveau n'est-il pas acceptable ?
      - ii. Imaginons que l'indemnisation soit à un niveau acceptable pour les agriculteurs.
        - 1. Est-ce que les agriculteurs seraient satisfaits ?

OUI 🗆	NON $\Box$
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Je tiens à vous remercier beaucoup pour votre temps et patience. Vos réponses resteront anonymes et seront utilisées pour tenter d'atteindre les objectifs de cette recherche qui sont définis dans l'introduction de ce questionnaire qui vous est distribué.

Mark Ryan

Luxembourg, 1 mars, 2011





#### MESPOM 2009/2011

### Questionnaire on the views of farmers concerning agriculture and wild boar damage in the Department of the Moselle

My name is Mark Ryan. I am a master's student studying Environmental Science, Policy and Management (MESPOM) at the Central European University, Budapest, Hungary. I am currently working on my thesis, the topic of which is human-wildlife conflicts, in particular the conflict between wild boar and agriculture, a common issue both in France and across Europe. The aim of this questionnaire is provide an understanding of the views of farmers surrounding the issue in the Department of the Moselle, including the way in which they feel the issue is managed at the Departmental and National level. The subsequent goal of this research is to contribute to the understanding of why this conflict exists, how well it is currently being managed and how management can be improved in the future.

The information which you provide in this questionnaire will remain anonymous. The answers which you give in this questionnaire will not be revealed to any third party and will remain in the hands of the researcher. I request permission to use the answers given to the questionnaire in my thesis, without ever revealing the identity of the author of the answers.

Should you have any reservations or questions surrounding the research do not hesitate to contact me by telephone or by e-mail:

Telephone (Luxembourg): +352 691 816668

Telephone (Hungary): +36 702 435055

E-mail: mark.ryan@mespom.eu

# Questionnaire on the views of farmers concerning agriculture and wild boar damage in the Department of the Moselle

By signing this, I allow my answers to be used in the context of the current research defined in the introduction and understand that the answers which I give will remain anonymous and will not be given to any third party.

Signature:	Date:
Telephone number:	
E-mail address:	

1. In your opinion, do you think the level of damages caused to crops by wild boar in the Department of the Moselle in general, is too high?

YES  $\square$  NO  $\square$ 

- a. IF YES
  - i. Is it too high everywhere or are there areas where the level of damages is acceptable?
  - ii. In your opinion, for how long have these levels of damages been too high?
  - iii. What are according to you, the main causes for this high level of damages?
  - iv. In your opinion, has the management of wild boar populations improved since the high level of damages to crops first appeared?

 $_{\rm YES} \square \qquad {\rm NO} \square$ 

- 2. Do you think that the situation will improve/get worse, and that damages caused by wild boar to crops will decrease/increase/remain the same in the next few years (five to ten years)?
- 3. What is your opinion on the trials being conducted on maize seeds coated in chilli which is intended to reduce the amount of damages wild boar cause to maize crops?
- 4. In general, are relations between farmers and hunters good in the Department of the Moselle?

 $YES \square$ NO  $\Box$ 

- a. Can a good relationship between farmers and hunters help find a solution and enable a reduction in the levels of damages caused by wild boar to crops?
  - $YES \square NO \square$
- 5. What is your opinion on the practice of supplementary feeding of wild boar by hunters? (Which meets objective 22 (SDGC 2007) surrounding supplementary feeding practices in the Department of the Moselle)?
  - a. Do you think that most hunters respect the conditions defined in objective 22?
    - YES  $\square$  NO  $\square$
- 6. Do you think that alternative methods exist which could replace the practice of supplementary feeding of wild boar?



a. IF YES

- i. What would these methods be?
- 7. Is there a strong enough pressure on behalf of hunters to reduce the numbers of wild boar?

$_{\rm YES}$	NO 🗆
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8. Have you seen an increase in the number of farmers that hunt wild boar since the level of damages caused to crops by the species has increased?

$_{\rm YES}$	NO $\Box$
--------------	-----------

a. Are you a hunter?

- i. IF YES
  - 1. What gave you the incentive to take up hunting?
- 9. In the past, in France, there was what was called a «droit d'affût» under the Rural Code, which gave farmers the legitimate right to defend their crops by shooting wild boar, when their crops were still standing and were being threatened by the animal.
  - a. Do you feel that a similar system would be required today?

YES $\square$ NO
------------------

b. Do you think that a similar system would work today?

$_{\rm YES}$	NO $\Box$
--------------	-----------

i. Why?

10. Is the level of compensation offered to farmers by the FDIDS for damages caused to crops by wild boar acceptable?

a. IF NO

- i. Why is this level not acceptable?
- ii. Imagine if the level of compensation were acceptable.
  - 1. Would farmers be satisfied?



I would like to thank you very much for your time and patience. Your answers will remain anonymous and will be used to attempt to achieve the goals of this research, stated in the introduction.

Mark Ryan

Luxembourg, 1 March, 2011

#### **Appendix 9. ONF questionnaire – French version**





#### **MESPOM 2009/2011**

# <u>Questionnaire sur les points de vue de l'Office National des Forêts concernant les dégâts</u> <u>occasionnés par le sanglier en forêt dans le département de la Moselle</u>

Mon nom est Mark RYAN, je suis étudiant. Je fais un Masters en Science de l'Environnement, Politique et Gestion à l'Université d'Europe Centrale, Budapest, Hongrie. A présent je travaille sur ma thèse qui porte sur les conflits entre les êtres humains et la faune sauvage, en particulier le conflit entre le sanglier et les êtres humains, un problème qui existe aussi bien en France que dans de nombreux pays à travers l'Europe. L'objectif de ce questionnaire est de me permettre de connaître les points de vue de toutes les parties concernées sur le thème des dégâts occasionnés par le sanglier dans le département de la Moselle, y compris leur opinion sur la gestion du problème au niveau départemental et au niveau national. Le but par la suite est, à travers cette recherche, de comprendre les motifs du conflit, la façon dont elle est actuellement gérée et comment la gestion de ce problème peut être améliorée dans le futur.

Les informations que vous fournissez dans ce questionnaire resteront anonymes. Vos réponses dans le présent questionnaire ne seront transmises à aucune partie tierce et resteront entre les mains du chercheur. Je vous demande votre permission de me laisser utiliser les réponses que vous donnez dans ce questionnaire, dans ma thèse, sans que je ne révèle l'identité de l'auteur des réponses. Si vous avez des préoccupations ou questions concernant la recherche que j'entreprends, n'hésitez pas à me contacter par téléphone ou par e-mail:

Téléphone (Luxembourg): +352 691 816668

Téléphone (Hongrie): +36 702 435055

E-mail: mark.ryan@mespom.eu

# Questionnaire sur les points de vue de l'Office National des Forêts concernant les dégâts occasionnés par le sanglier dans le département de la Moselle

En signant la présente, je donne la permission au chercheur d'utiliser mes réponses à ce questionnaire dans le contexte de la recherche définie dans l'introduction et je comprends que mes réponses resteront anonymes et ne seront données à aucune partie tierce.

Signature	Date		
Lieu :		-	
Numéro de téléphone:		-	
Adresse e-mail:			

 Est-ce que selon vous, le phénomène des dégâts occasionnés par le sanglier (aux cultures, en forêt, en milieu périurbain, sur les routes) est réellement un problème dans le département de la Moselle ?

 $OUI \square$  NON  $\square$ 

a. SI OUI

- i. Est-ce que selon vous, la plupart des chasseurs individuels sentent l'urgence de ce problème ?
  - $OUI \square$  NON  $\square$
- ii. Est-ce qu'il y a plus d'endroits où le niveau des dégâts est trop élevé ou en général est-ce que le niveau est acceptable ?
- iii. Selon vous, depuis combien de temps ces dégâts sont-ils trop élevés ?
- iv. Quels sont selon vous, les causes principales de ce niveau élevé des dégâts ?

v. Est-ce que selon vous, la gestion des populations de sangliers s'est améliorée depuis que le niveau élevé de dégâts est apparu ?



- 2. Est-ce que vous pensez que la situation s'améliorera/ s'empirera et que les dégâts baisseront/ augmenteront ou resteront les mêmes dans les prochaines années (cinq à dix ans)?
- 3. Est-ce qu'en général les dialogues entre l'Office National des Forêts (ONF) et les chasseurs sont bons dans le département de la Moselle ?



- NON  $\Box$
- a. Est-ce que de bons dialogues entre l'ONF et les chasseurs peuvent aider à trouver une solution et à faire baisser le niveau des dégâts occasionnés par le sanglier en forêt ?
  - OUINON  $\Box$
- 4. Quel est votre point de vue sur l'agrainage de dissuasion pratiquée par les chasseurs ? (Qui respecte l'Objectif 22: Pratiques de l'agrainage, dans le Schéma Départemental de Gestion Cynégétique dans le Département de la Moselle)
  - a. Pensez-vous que la plupart des groupes de chasse dans le département de la Moselle respectent les conditions définies dans l'Objectif 22 ?



5. Y a-t-il une pression assez forte de la part des chasseurs pour faire diminuer le nombre de sangliers dans le département de la Moselle ?

 $OUI \square$ NON  $\Box$  6. Est-ce que selon vous, il y a besoin d'avoir recours à des méthodes de suppression des populations de sangliers dans le département de la Moselle autres que la chasse ?

 $OUI \square$  NON  $\square$ 

a. SI OUI

- i. Quelles seraient ces méthodes ?
- 7. Pensez-vous qu'il y a assez de chasseurs en Moselle pour faire baisser la population de sanglier dans le département de la Moselle jusqu'à un niveau acceptable ou maintenir la population à un niveau acceptable ?



- 8. Est-ce que vous pensez que dans le futur il y aura plus de chasseurs ou moins de chasseurs et quelles seront selon vous, les conséquences sur les populations de sangliers dans le département de la Moselle ?
- 9. En tant que Maire de votre commune, est-ce que vous recevez des plaintes de la part des habitants de votre commune concernant les actes des chasseurs ?

OUI 🗌 🛛 NON	[
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a. SI OUI

i. Est-ce que vous en recevez beaucoup?

ош 🗆	NON	
-	1,01,	

ii. Quelles sont ces plaintes ?

- 10. Est-ce que selon vous, les relations entre les chasseurs et les autres utilisateurs de la nature dans votre commune sont bonnes ?
  - $OUI \square$  NON  $\square$
- 11. D'après vos expériences y a-t-il encore des restrictions de tirs imposés pour le sanglier par certains groupes de chasse ?
  - $OUI \square$  NON  $\square$ 
    - a. Pensez-vous que ceci soit nécessaire dans certains secteurs ? (Par exemple où il existe très peu de sangliers)
- 12. Est-ce que les lots de chasses sont en général trop chers ?

OUI 🗆	NON $\Box$
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- a. SI OUI
  - i. Est-ce que ceci peut contribuer au maintien de fortes populations de sangliers sur certains lots de chasses ?
    - $OUI \square$  NON  $\square$
  - ii. Est-ce que le système de louer les lots de chasses aux enchères contribue à ce phénomène ?



- 1. SI OUI
  - a. Est-ce qu'il existe des moyens pour faire baisser le prix des lots de chasse ?



#### i. SI OUI

1. Que sont-ils ?

- 13. Quelle est l'importance du revenu issue de la location des lots de chasse pour les communes petites/moyennes/grandes ?
- 14. Avez-vous déjà entendu parler du Plan National de Maîtrise du Sanglier développé par le Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer ?

 $OUI \square$  NON  $\square$ 

a. SI OUI

 Est-ce que selon vous, ce plan permettra de faire baisser le niveau des dégâts occasionnés par le sanglier dans le département de la Moselle dans les années à venir ?



Je tiens à vous remercier beaucoup pour votre temps et patience. Vos réponses resteront anonymes et seront utilisées pour tenter d'atteindre les objectifs de cette recherche qui sont définis dans l'introduction de ce questionnaire qui vous est distribué.

Mark Ryan

Luxembourg, 8 mars, 2011

#### Appendix 10. ONF questionnaire – English version





#### **MESPOM 2009/2011**

### Questionnaire on the views of the National Forestry Office concerning wild boar damage to forests in the Department of the Moselle

My name is Mark Ryan. I am a master's student studying Environmental Science, Policy and Management (MESPOM) at the Central European University, Budapest, Hungary. I am currently working on my thesis, the topic of which is human-wildlife conflicts, in particular the conflict between wild boar and agriculture, a common issue both in France and across Europe.

The aim of this questionnaire is provide an understanding of the views of all the relevant stakeholders surrounding the issue of damages caused by wild boar in the Department of the Moselle, including the way in which they feel the issue is managed at the Departmental and National level. The subsequent goal of this research is to contribute to the understanding of why this conflict exists, how well it is currently being managed and how management can be improved in the future.

The information which you provide in this questionnaire will remain anonymous. The answers which you give in this questionnaire will not be revealed to any third party and will remain in the hands of the researcher. I request permission to use the answers given to the questionnaire in my thesis, without ever revealing the identity of the author of the answers.

Should you have any reservations or questions surrounding the research do not hesitate to contact me by telephone or by e-mail (**you can keep this 1**<sup>st</sup> **page for yourself**):

Telephone (Luxembourg): +352 691 816668

Telephone (Hungary): +36 702 435055

E-mail: mark.ryan@mespom.eu

# <u>Questionnaire on the views of the National Forestry Office concerning wild boar damage</u> <u>to forests in the Department of the Moselle</u>

By signing this, I allow my answers to be used in the context of the current research defined in the introduction and understand that the answers which I give will remain anonymous and will not be given to any third party.

Signature:	Date:
Place:	
Telephone number:	
E-mail address:	

 According to you, is the issue of damages caused by wild boar (e.g. to crops, in forests, in semi-urban areas, on the roads) really a problem in the Department of the Moselle?

 $YES \square NO \square$ 

a. IF YES

i. In your opinion, do most hunters feel the urgency of this problem?

YES 🗆 🛛 NO 🛛	
--------------	--

- ii. Are there areas in the Department where the level of damages is too high or are levels generally acceptable?
- iii. According to you, how long have these damages been too high?
- iv. What are according to you, the main causes for this high level of damages?

v. In your opinion, has the management of wild boar populations improved since the high level of damages first appeared in the Department?



- 2. Do you feel that the situation will improve/worsen and that the levels of damages will decrease/increase or stay the same in the next few years (five to ten years)?
- 3. In general, are dialogues between the National Forestry Office (ONF) and hunters good in the Department of the Moselle?



a. Can good dialogue between the ONF and hunters help to find solutions which can reduce the level of damages which wild boar cause in the forest?



- 4. What is your point of view surrounding the supplementary feeding of wild boar by hunters (which meets objective 22 (SDGC 2007) surrounding supplementary feeding practices in the Department of the Moselle)?
  - a. Do you think that the majority of hunting groups in the Department of the Moselle respect the conditions under objective 22 (SDGC 2007)?

YES I NO	ЭЦ
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5. Is there a strong enough pressure on behalf of hunters to reduce the numbers of wild boar in the Department of the Moselle?

 $YES \square$ NO  $\Box$ 

- 6. In your opinion, are other methods for the control of wild boar populations required in the Department of the Moselle other than hunting?
  - YES  $\Box$  NO  $\Box$ 
    - a. IF YES
      - i. What would such methods be?
- 7. Do you think that there are enough hunters in the Department of the Moselle to enable a reduction in the wild boar population to a level which is acceptable or to maintain wild boar populations at an acceptable level?



- 8. Do you think that in the future there will be more or less hunters in the Department of the Moselle and what will be in your opinion the consequences for wild boar populations in the Department?
- 9. As the mayor of your commune, do you regularly receive complaints from the inhabitants of your commune regarding hunting?

YES $\Box$	NO	
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- a. IF YES
  - i. Do you receive a lot?
    - YES  $\square$  NO  $\square$
  - ii. What types of complaints do you receive?

- 10. In your view, are relations between hunters and other users of the environment good in your commune?
  - YES  $\square$  NO  $\square$
- 11. In your experience, have you come across hunting groups which still impose restrictions surrounding the shooting of wild boar?
  - $_{\rm YES} \square \qquad {}_{\rm NO} \square$ 
    - a. Do you feel that such restrictions are necessary in certain areas (for example, where few wild boar exist)?
- 12. Do you feel that the cost of hunting lots is in general too high?

$YES \square$	NO 🗆
---------------	------

- a. IF YES
  - i. Can this contribute to the maintenance of high wild boar populations on certain hunting lots?

YES	NO	
	<b>1</b> , <b>0</b>	

ii. Does the system of auctioning hunting lots contribute to this phenomenon?



- 1. IF YES
  - a. Do other methods exist to help push the price of hunting lots down?



#### i. IF YES

1. What are they?

- 13. What is the importance of the revenue generated from the renting of hunting lots for small/medium/large communes?
- 14. Have you heard about the National Plan for the Control of Wild Boar developed by the Department of Ecology, Energy, Sustainable Development and the Sea?

YES $\Box$	NO 🗌
------------	------

a. IF YES

i. In your opinion, will this plan enable a reduction in the level of damages caused by wild boar in the Department of the Moselle in the coming years?



I would like to thank you very much for your time and patience. Your answers will remain anonymous and will be used to attempt to achieve the goals of this research, stated in the introduction.

Mark Ryan

Luxembourg, 8 March, 2011