

LIFE PROJECT MEDWOLF

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ACTION A4

Ex-ante evaluation of livestock depredations in the
province of Grosseto

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1. INTRODUCTION

The action A4 was aimed at quantifying the livestock damages caused by predators and characterizing the type of husbandry methods used in the Province of Grosseto. For this reason, official data on declared livestock depredations was analysed, and 150 interviews were carried out with livestock owners throughout the territory of the province.

The objective of the study was to provide an overview of:

- the conflict between wolves and local livestock activities;
- the husbandry methods used in the territory, to identify the level of vulnerability that characterizes the farms;
- the management strategies adopted by the Regional and Provincial administration, specifically with regards to the funding mechanisms made available to promote the use of damage prevention measures and the introduction of a new compensation system based on an insurance policy.

The results of this study provide the baseline for an evaluation of the functionality and efficacy of the future actions envisioned by the project. The analysis of the official damages provides a quantification of the extent and distribution of damages, both at the municipal and at the individual holding level. Furthermore, the interviews with livestock holders identify the contexts and factors that contribute to increase the risk of depredations, and thus suggest areas where husbandry methods might be improved. The interviews also enable us to evaluate the representativeness of the official damage records, providing information that will aid the programming of the project actions that envision the allocation of damage prevention measures among livestock owners at high risk of depredations (Actions C2 and C4).

To simplify the text of the report, we have annexed the following information

- legislation that regulates the compensation system for damages caused by predators to domestic livestock, and its changes through time (annex III);
- details of the insurance policy for the compensation of livestock damages caused by predators (annex III);
- the programs and funding mechanisms made available to encourage the adoption of damage prevention systems (annex IV);
- the legislation and funding mechanisms available for the disposal of carcasses (annex V).

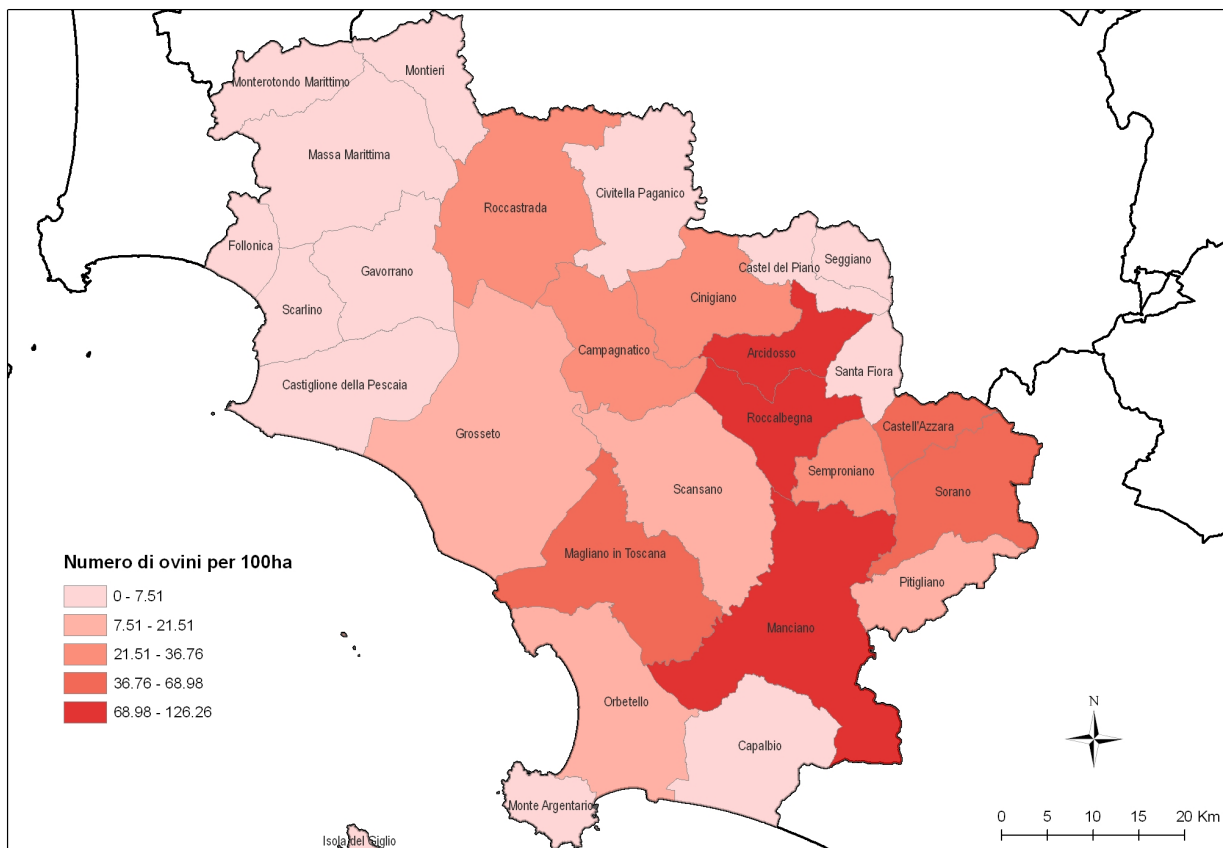
1.1 Study area

The study area covers the entire territory of the Province of Grosseto (440262 ha) and includes 28 municipalities. Livestock breeding is an important economic activity, as the Province holds 22.4% of all the livestock breeding farms of the Tuscany Region (n. of livestock breeding farms in the Tuscany Region = 9900) and 41% of all the sheep farms of the Tuscany region (n. of sheep breeding farms in the Tuscany Region = 2359) (ISTAT, 2010). In 2012 there were 1,811 livestock farms in the Province, 60% owned sheep; 42% cattle; 23% equines and 7% goats. Considering only sheep breeding, there are 1085 active farms in the Province, 53.1% are primarily dedicated to milk production, 46.7% to meat production and 0.1% to both (BDN, 2012). Sheep density at the municipal level is shown in fig. 1.

Over the past decade there has been a marked decrease in the number of livestock breeding farms present in the territory ($R^2=0,99$, F-statistic=1172 on 1 and 8 DF, $p=5,8e-10$), corresponding to about 28.63% fewer farms in 2013 compared to 2004, and 53.18 fewer farms on a yearly basis.

Accurate wolf population estimates for the Province are currently lacking. However, the presence of wolves, as well as that of feral dogs and wolf-dog hybrids, has been widely documented (Lovari and Sangiuliano, 2006; Manghi et al., 2012; Bocci, 2013).

Figure 1. Sheep density in the Province of Grosseto (Data source: BDN, 2012).



2. METHODS

2.1 Interviews with livestock holders

The interviews with livestock holders were carried out in order to gain a better understanding of the husbandry methods adopted by them and to identify the contexts and factors that contribute to increase the risk of depredations. A complete evaluation of conflict between predators and livestock activities must include the careful analysis of the husbandry methods adopted, with particular attention to the level of control exercised over grazing areas, the type of corrals or shelters used for nighttime enclosure, and the adoption of damage prevention systems. This type of research provides information on the level of vulnerability that characterizes the livestock breeding farms. Through the use of interviews it is also possible to verify the reliability of official statistics, the level of acceptance of the insurance system and other policies in place to mitigate damages and, finally, the livestock holder's willingness to participate in the project. All this information is functional to the correct implementation of the project as a whole, and of the actions C2 and C4 in particular.

2.1.1 Sampling

150 interviews were sampled as follows:

- a random sample of 134 sheep owners with more than 20 heads of sheep was selected from a total of 1094 sheep farms present in the Provincial territory, in proportion to their distribution at the municipal scale (Annex I);
- a sample of 16 sheep owners who had declared recurrent damages (>6) over the period 2007-2012 was identified using the official registries of Co.Di.Pr.A., the insurance company that covers damages caused by predators (Annex III). These represent 13.9% of the insured farms.

The choice of limiting the study to sheep farms was made on the basis of the analysis of official damages, which showed that more than 90% of depredations involved sheep. The 20 head limit was chosen as a minimum threshold above which livestock breeding can be considered a significant economic activity and investment in damage prevention may become cost effective. The threshold was agreed on by all the project partners, as a higher threshold would have precluded the obtainment of information from small-medium sized farms.

The importance of having a random sample of farms from the provincial territory was made clear from the very beginning of the project by the Provincial Administration and the livestock breeding associations. They claimed that basing the evaluation of conflict only on the livestock owners who subscribed an insurance policy would have resulted in a serious underestimation of conflict, since many livestock owners do not get insured. By collecting a random sample of livestock holders we were able to quantify the percentage of farms that suffer damages but do not declare them officially. On the other hand, sampling those sheep farms that declared recurrent damages to the insurance was also considered important for two reasons: because the guiding principle of damage prevention is to intervene where conflict is most pronounced and because those farms represent the official data on damages. Therefore, despite the lack of representativeness of this second group of farms, we have chosen to include them in the analysis.

It should be noted that once the sample was selected some changes were made during the data collection phase, as the data from the National Database was not always correct. For example there were farms that had closed their business, farms that owned less than 20 heads of sheep and farms that refused to participate in the study. In these cases, the farms were replaced by others that were randomly selected from the same municipality. We are confident that these changes did not significantly affect the study results.

2.1.2 Data collection

The questionnaire that was used in the interviews was divided into various sections (annex II):

- general information on the farm (number and species of livestock owned, surface area of the farm etc.);
- husbandry practices (open range grazing, open range grazing with night time or seasonal enclosure, year round enclosure);
- use of prevention systems (pasture and shelter fencing, livestock guarding dogs, shepherd vigilance);
- opinions regarding the insurance system;
- carcass disposal methods;
- willingness to participate in the project by implementing and monitoring the functionality of different prevention systems.

The questionnaire was agreed on by all the project partners and two meetings were held (18/12/2012 and 4/2/2013) to discuss the interview topics and data collection methods.

The interviews were carried out by representatives of the 3 Agricultural Associations and by the Provincial Administration's staff. The data collection began in March and ended in June 2013.

2.1.3 Analysis of interviews

The interviews were analysed using descriptive measures by calculating the percentage of responses given by all the interviewed livestock holders and in some cases only by the holders from the random sample; the size of the sample on which percentages were calculated is highlighted in the results.

2.2 Analysis of previous data on depredations, damage compensation and spending for prevention measures (2007-2012)

The analysis of previous damages was based on information that was transferred by the Co.Di.Pr.A to the Province of Grosseto, relative to the damages declared to the insurance in the period 2007-2012. For the year 2012 we also analysed the damages reported by livestock holders to the National Health System (ASL), independently of whether they are insured or not. In case of death of livestock, holders are required by law to contact the local veterinary ASL so that it can perform a standard health inspection. During the course of another LIFE project (Life Ibriwolf LIFE10NAT/IT/000265), the ASL agreed to transfer this information to the Province of Grosseto, for those livestock deaths that result from depredation. It is important to note that damages declared to the insurance refer to the depredation events that are compensated under Regional legislation, which allows for the compensation of damages caused by wolves and, through an extension of the insurance policy, also the damages caused by dogs (annex III). Although both the ASL and the insurance company required on-site inspections of depredations by veterinarians, these were not carried out following standardized procedures and, also due to the objective challenges of distinguishing between damages caused by wolves, wolf-dog hybrids, and free-ranging dogs (Ciucci and Boitani 2005; see study area), they did not result in an accurate identification of which canid was involved. Therefore, our analysis of depredations includes an unknown proportion of damages caused by other large canids in addition to wolves.

The analysis of depredations was performed using the following variables:

- number and species of livestock preyed;
- type of damage incurred (dead livestock/livestock declared missing/abortions);
- number of farms affected by depredations;
- recurrence of depredations within farms;
- amount of compensation delivered;
- spatial and seasonal distribution of depredations;

Furthermore, two other aspects were considered in order to evaluate the current management strategy to mitigate depredation conflicts: the insurance system and the funding made available by the Region and Province to encourage the use of prevention measures.

The evaluation of the insurance system was carried out by analysing:

- the number of farms that subscribed an insurance policy;
- the number of farms that stayed insured from one year to the next.

To evaluate the funding mechanisms for prevention measures, we analysed:

- the type of measures that were funded;
- the amount spent.

Farms were used as the main unit for this analysis. On the basis of provisions made by the Health Ministry, these are distinguished by a code that identifies the location of the livestock breeding activity. The same farm can have more than one owner if they share the location of their breeding activity. A notable effort was expended to organize the data as it was often archived in registries that were incomplete and difficult to interpret. Most registries were not conceived to allow for the analysis and comparison of the information they contained and so a great deal of time was dedicated to data revision and cross checking.

The statistical analysis was based on the calculation of the yearly mean, standard deviation and overall distribution of the above mentioned variables as well as an analysis of their trends over time, carried out using linear regression. We performed Wilcoxon tests to compare the number of sheep owned by insured and uninsured farms, as well as farms that received funding for prevention measures and farms that didn't. We used the 1 sample Kolmogorov-Smirnov test to evaluate the departure of the spatial and seasonal distribution of damages from a uniform distribution and a correlation test to compare the spatial distributions of the mean number of depredation events declared to the insurance (between 2007 and 2012) and sheep density (in 2012). All spatial distributions were analysed at the municipal level. Finally, we used chi-square tests to assess the relationship between the occurrence of damage and insurance renewal.

3. RESULTS

3.1 Interviews with livestock owners

A total of 140 interviews were used in the analysis: 13 with livestock owners who had declared more than 6 damages during the period 2007-2012 and 127 with randomly sampled livestock holders (annex I).

We carried out 10 interviews short of what was expected, as we were not able to contact 3 livestock owners who had declared recurrent damages and, among the livestock owners of the random sample, we could not contact 3, and 3 more declined to participate in the study. Finally, we discarded 1 interview from the analysis as the livestock holder no longer owned sheep (Annex I).

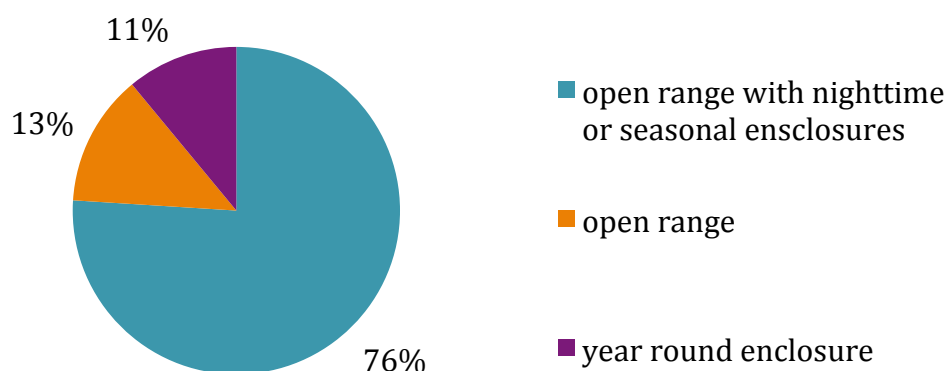
3.1.1 Average size of flock

On average the randomly sampled farms owned $255,14 \pm 260.16$ sheep (median= 165, 25th percentile=100, 75th percentile=300, range=20-1500). Most of those farms (71.65%) are prevalently dedicated to milk production.

3.2.1 Pasture management

Holders prevalently manage their livestock by allowing it to graze in open range pastures and by corralling it at nighttime or in the colder seasons (76%) (fig.2).

Figure 2. Type of pasture management practiced by interviewed livestock holders (n =140).

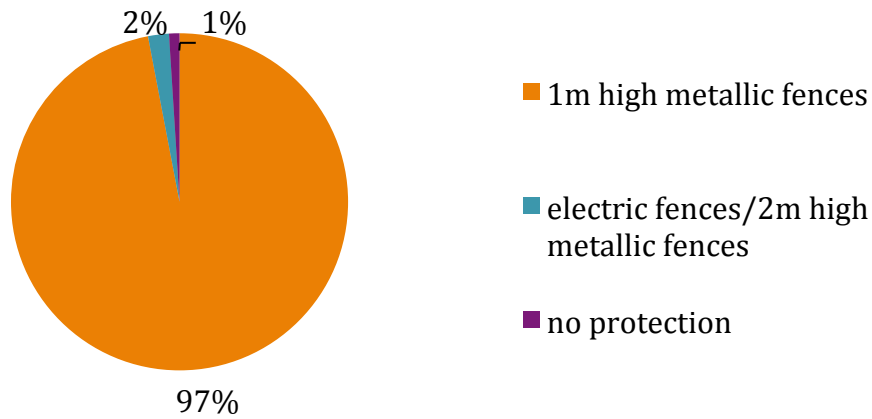


Of the interviewed holders, 76% divided their herd in 2 or more flocks in order to increase productivity, on the basis of the animals' needs and in consideration of the number of heads and the availability of pastures. 39% of the holders did not use nighttime enclosures during the summer season and the remaining holders did so only in response to the increased risk of depredation.

3.1.3 Livestock protection

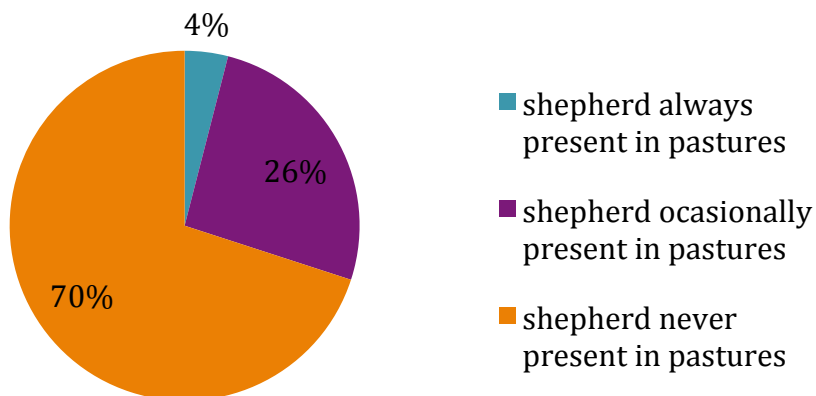
The interviewed holders were asked whether they undertook livestock surveillance and what type of protection they adopted for the pasture areas and the enclosures. In most cases (97%), pasture areas were enclosed by wide mesh metal fences that are about 1 m high that do not represent a significant barrier for predators (fig. 3).

Figure 3. Methods used by interviewed livestock owners to protect their pastures (n = 140).



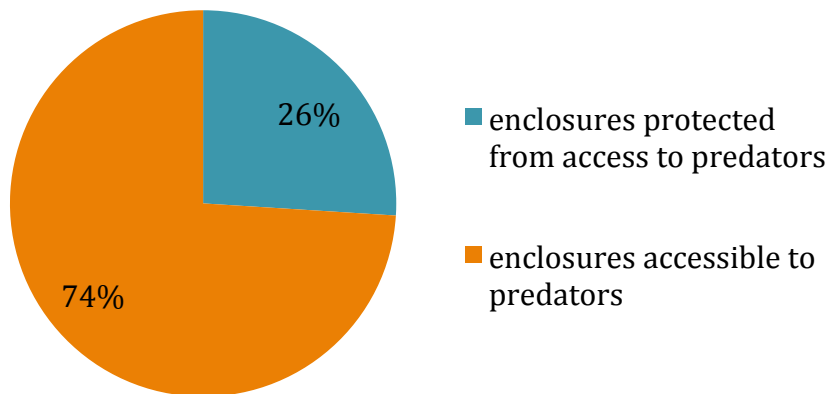
Most (69%) livestock owners do not monitor their flock during grazing hours and 26% claimed to occasionally guard their flock, depending on the season, the location of the pasture, and whether their other work duties permit it. Only 4% claimed to practice constant vigilance on their flock (fig. 4).

Figure 4. Presence of shepherd during grazing hours (n = 140).



The majority of night shelters (74%) consisted of a barn and its external area, which was enclosed by a 1.30m high fence. In 16% of cases the external area was enclosed by an electric fence or a 1,80-2,00m high metal fence, which however was not always buried underground or equipped with a top overhang. Finally, 8% of interviewed holders enclosed their livestock in a barn while the remaining 4% did not use any kind of protection. Overall, the shelters were protected from access to predators in only 26% of cases (fig. 5).

Figure 5. Characteristics of the livestock shelters used by interviewed livestock holders, in terms of their accessibility to predators (n = 140).

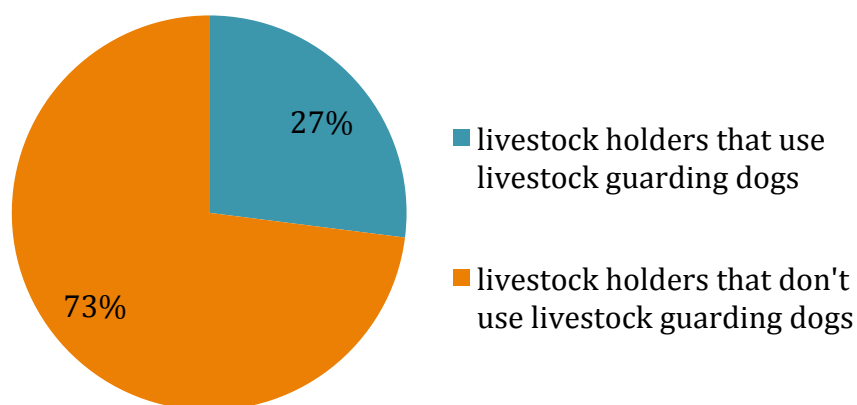


With regards to the proportion of livestock owners that uses predator safe livestock shelters, there were no significant differences between livestock owners who declared recurrent damages to the insurance and livestock owners who were sampled randomly ($\chi^2 = 0.594$, $df=1$, $p=0.441$).

3.1.4 Use of livestock guarding dogs

Livestock guarding dogs are scarcely utilized in the Province of Grosseto, as only 27% of the interviewed livestock owners used them (fig. 6). This type of prevention system is considered problematic by many holders, especially those who combine livestock activities with tourism, because the dogs are perceived to be aggressive towards strangers. Among the 38 holders that use livestock guarding dogs and excluding 6 holders that owned puppies, 58% claimed to be satisfied or very satisfied, 19% claimed to be relatively satisfied, and 23% claimed to be unsatisfied with the dogs. Out of the unsatisfied holders, 2 claimed the number of dogs was insufficient and 2 claimed that the dogs were afraid of predators.

Figure 6. Use of livestock guarding dogs by interviewed livestock owners (n = 140).

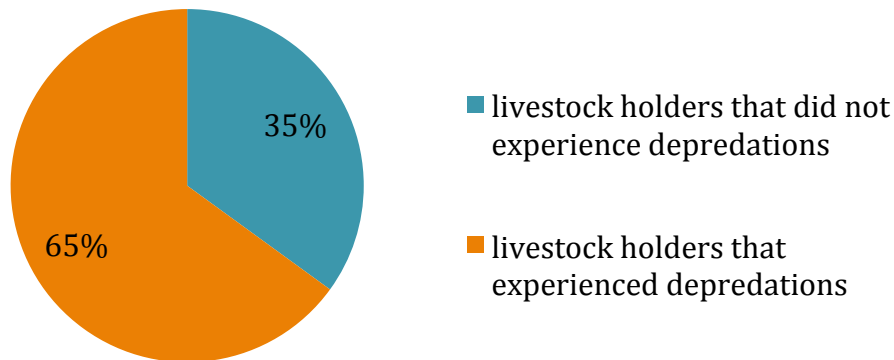


Compared to the livestock holders that were sampled randomly, those that declared recurrent damages to the insurance were significantly more likely to use livestock guarding dogs (61.54% of holders that declared recurrent damages used them, compared to only 23.62% of the holders from the random sample $\chi^2=6.652$, $df= 1$, $p=0.010$).

3.1.5 Experienced damages

Considering only the 127 farms from the random sample, 65% claim to have experienced at least one depredation between 2007 and 2012 (fig. 7).

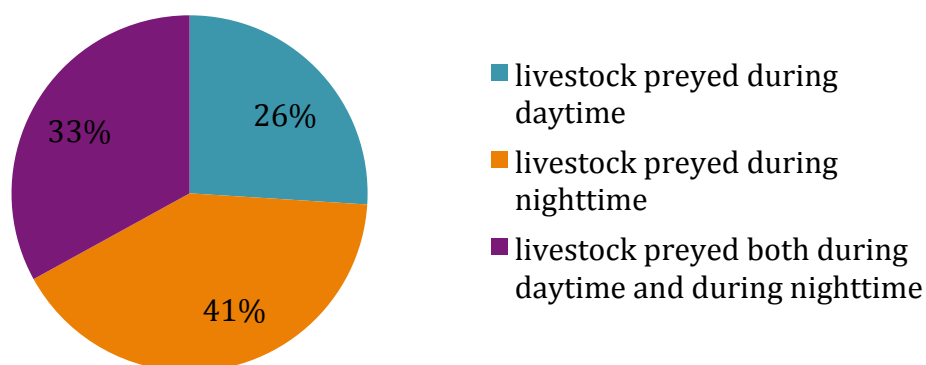
Figure 7. Livestock owners that declare to have suffered depredations between 2007 and 2012 (n =127).



The number of incurred depredation events was not analysed because during the interviews it became clear that holders were not able to recall the figure precisely, especially with regards to the earlier years.

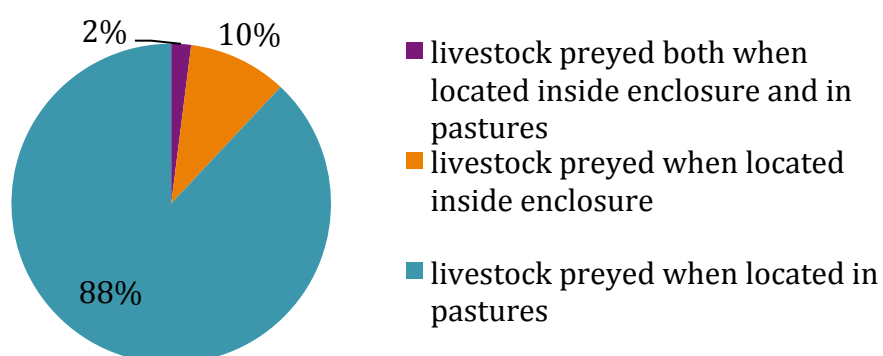
Considering only those holders that suffered damages (n=100, including the farms that declared recurrent damages to the insurance) 26% declare that depredations occur throughout the year; 35% identify 2 or 3 different seasons, and 29% specify one season in which depredations occur more frequently, usually the summer. Furthermore, 42% of holders claim that depredations occur more frequently during the night, 26% during the day and the remaining 36% claim that depredations occur irrespectively of the time of the day (fig. 8).

Figure 8. Time of day in which depredations occurred most often (n =100).



Finally, most interviewed holders (88%) claim that damages occur when livestock is grazing, 10% claim they occur in nighttime enclosures and 2% claim there is no difference (fig. 9).

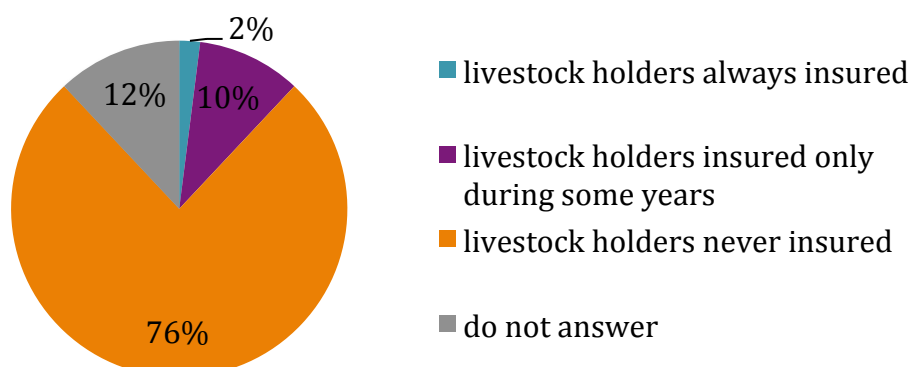
Figure 9. Prevalent location of livestock when depredations took place (n =100).



3.1.6 Insurance policy subscription

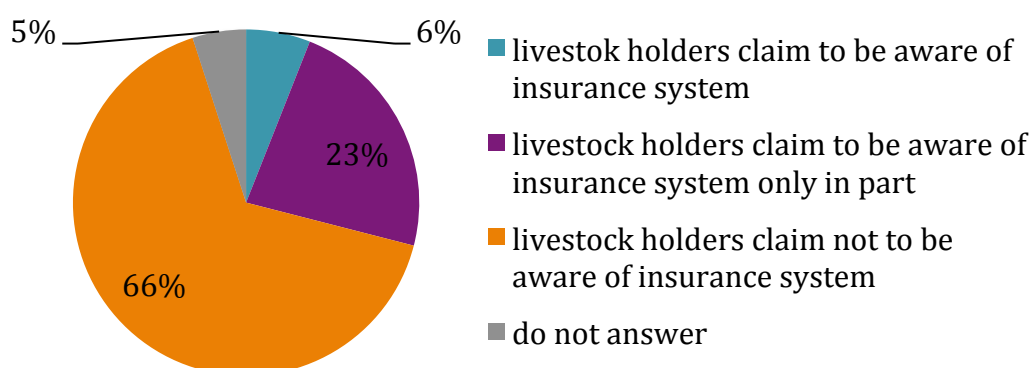
The percentage of livestock owners who get insured was calculated using only the random sample, in order to have an estimate of the number of farms who have access to compensation and the overall level of adherence to the regional policy aimed at mitigating conflict with predators. Of the interviewed holders, 76% never subscribed an insurance policy, 10% were insured for only some years, and 2% claimed to have been insured with continuity (fig. 10).

Figure 10. Insurance subscription by interviewed livestock holders between 2007 and 2012 (n = 127).



Among those who had never subscribed an insurance policy (n=97), 66% were not aware that the insurance system existed or were not informed of how it worked, 23% claimed to be partially informed of how it worked, and only 6% claimed to know how it worked (fig. 11).

Figure 11. Awareness of the insurance system by livestock owners (n = 97).



Respondents were also asked why they thought many holders did not get insured and how the system might be improved: 57 holders answered, and the main critique they made (mentioned by 61.40%) was the high cost of the insurance policies and the fact that once the damages are officially declared, holders are required to follow very costly procedures to dispose of the livestock carcasses. Furthermore, 31.59% of respondents criticized the inadequacy of the compensation that is delivered, mainly with regards to the fact that it does not include indirect damages such as loss of milk production and treatment of injured animals. Other respondents attributed the low level of subscriptions to the lack of awareness regarding the insurance policy (22,81%), the excessive bureaucracy required to declare the damages (12,28%), delayed compensation payments (3,51%), the fact that the entire holding is subject to health inspections when veterinarians are called to certify the damage (1,75%), the lack of clear insurance regulations (1,75%), and claims that compensation is not delivered at all (1,75%). Finally, some holders also considered the insurance inconvenient for farms that experience few damages (3.51%) while others claimed that holders do not get insured for a question of principle, because they deem it unfair to have to insure themselves against damages that they don't feel responsible for (7.02%)(see Annex III for an overview of the insurance regulations).

3.1.7 Carcass disposal

As mentioned above, the prospect of having to dispose of the carcasses of preyed livestock in a costly way may cause holders not to declare the damages they have incurred. When asked how they dispose of livestock carcasses, 31% said they relied on a specialized company, 20% had obtained a permit to have a livestock cemetery within their property, 13% used livestock cemeteries of neighbours or one made available by a local dairy, 9% said they buried the carcasses (without permit) and 18% did not answer. These percentages were calculated including all the interviewed holders (n=140).

It is interesting to note that out of those who pay specialized companies to dispose of carcasses, only 47% benefited of regional funding available to cover those costs (annex V presents the relative legislation). Some respondents claimed that the reason why many holders do not access this funding is because they are not aware it exists.

3.1.8 Adherence to regional/ provincial programs for damage prevention

Of the interviewed holders, 23% (n=40) benefited of regional funding to implement damage prevention measures (Annex IV); in particular, 56% benefited of a husbandry scheme where holders were compensated for guarding their livestock overnight during the summer season, 22% received acoustic alarm systems, 19% received funding to construct metallic fences (buried underground and equipped with overhang), and 1 holding had installed a video surveillance system. With regards to those 14 holders that had participated in the livestock guarding scheme and expressed an opinion about it, 50% claimed to be very satisfied, 14% relatively satisfied, and 36% were unsatisfied or very unsatisfied. Those who expressed a negative opinion considered the program a form of subsidy to livestock holders rather than a valid approach to damage prevention.

3.1.9 Willingness to participate in the project

Towards the end the interview, holders were asked whether they were interested in receiving damage prevention measures, free of cost, to contribute to an experimental evaluation of their efficacy: 68% were willing, 5% were willing only under certain conditions, and 15% were unwilling (fig. 12). Most respondents were interested in receiving electric fences (61.1%) and fixed metallic fences (45.3%), the remainder were interested in receiving livestock guarding dogs (24.2%) and acoustic deterrents (22.1%).

Figure 12. Willingness of interviewed livestock owners to implement prevention measures (n = 140)



3.2. Previous data on depredations, damage compensation and spending for prevention measures (2007-2012)

Based on the insurance registry, an average of 18.2 ± 4.5 livestock breeding farms declared damages every year, 56.3 ± 27.5 depredation events were reported, and $28,395 \pm 11,359$ € were paid in compensation. A mean of 60 ± 8 farms were insured on a yearly basis, representing 3.3% of all livestock breeding farms, and 5.5% of all the sheep farms, present in the Province in 2012 (table 1).

Table 1. Livestock depredations declared to the insurance between 2007 and 2012 (data source: Co.Di.Pr.A).

	Insured livestock holders	Insured farms	Farms that declared damages	Depredation events	Number of preyed livestock ^I	Compensation paid
2007	61	59	13	16	92	6650.00
2008	79	74	16	47	387	27925.30
2009	64	61	16	56	427	35061.60
2010	55	50	17	54	395	28034.33
2011	60	57	25	64	466	37034.82
2012	66	61	22	101	536	35664.85
TOTALE (2007-2012)	128 ^{II}	115 ^{II}	55 ^{II}	338	2303	170370.90

^I includes dead animals, animals declared missing and abortions.

^{II} refers to the total number of holders or farms throughout the period 2007-2012.

The large majority of livestock preyed every year were sheep (mean= $97.5 \pm 3.1\%$), followed by goats (mean= $1.61 \pm 3.04\%$), cattle (mean= $0.70 \pm 0.37\%$) and equines (mean= $0.17 \pm 0.22\%$). For this reason the remaining analysis will focus on sheep depredations.

On average, 374.3 ± 152.0 sheep were preyed every year (range=91-552) and 6.9 ± 6.2 sheep were preyed in every predation event (fig. 13). Moreover, on a yearly basis, $62.57 \pm 9.57\%$ of the preyed sheep were killed, $34.99 \pm 9.19\%$ were declared as missing; and $2.52 \pm 3.18\%$ suffered abortions. A mean of 4.5 ± 4.8 sheep were killed in each predatory attack declared to the insurance (in which sheep were killed) and mass slaughter depredations, which involved ≥ 20 sheep, accounted for 11.1% of sheep losses and only 1.9% of sheep depredations (fig. 14).

Figure 13. Number of heads of sheep affected in every depredation event from 2007 to 2012 (data source: Co.Di.Pr.A).

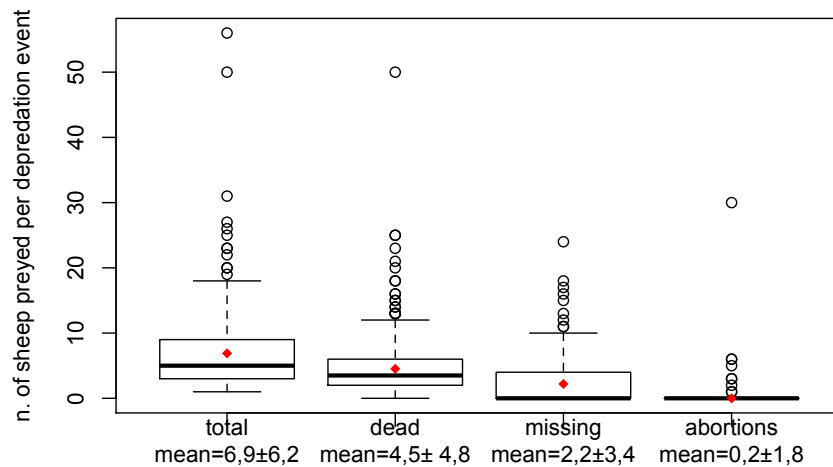
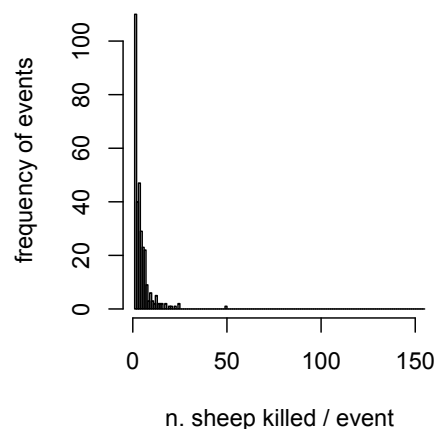


Figure 14. Frequency distribution of the number of sheep killed in every depredation event (data source: Co.Di.Pr.A 2007-2012)ⁱ

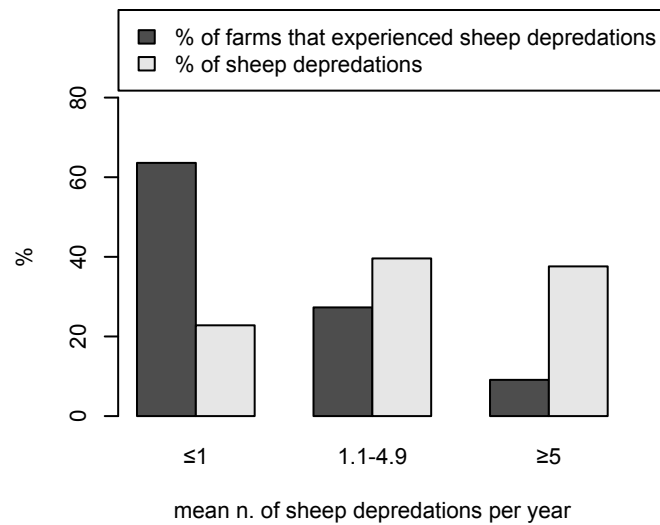


ⁱ Considering only the depredations in which sheep were killed.

Insured livestock owners who experienced sheep depredations at least once between 2007-2012, lost an average of $4.91 \pm 5.96\%$ sheep from their herd on a yearly basis (range= 0.30-29.09%)¹. Moreover, each insured holding (that experienced at least 1 depredation) suffered on average 1.9 ± 2.9 attacks per year (range= 0.2-16.0), and 9.1% experienced a mean of ≥ 5 predatory attacks in any single year; these cumulatively corresponded to 37% of all claimed depredations (Fig. 15). Accordingly, the majority of insured holdings (63.6%) experienced ≤ 1 predatory attacks per year (Fig. 15).

¹ n=39 using data from the years 2010-2012, but the livestock holders who experience damage between 2007-2012 were actually 54.

Figure 15. Recurrence of depredation events within insured farms (data source: Co.Di.Pr.A 2007-2012)



Livestock damages are not uniformly distributed throughout the Province at the municipality level (K-S test $D = 0.69$, $p\text{-value} = 1.81e-11$) (fig. 16): 72.51% of attacks occurred in 4 municipalities (Manciano, Roccalbegna, Arcidosso and Sorano, which make up 17.38 % of the provincial territory) and 33.71% occurred in only one municipality (Manciano, which makes up 8.45% of the provincial territory) (table 2). The observed dispersion of conflict is correlated with sheep density at the municipality level (correlation=0.43; $t=2.36$, $df=25$, $p=0.026$) (table 2). Instead, damages occur rather uniformly throughout the year, with no significant difference between the seasons (K-S test $D = 0,30$, $p = 0.771$).

Figure 16. Spatial distribution of depredations on livestock at the municipal level during the period 2007-2012 (data source Co.Di.Pr.A).

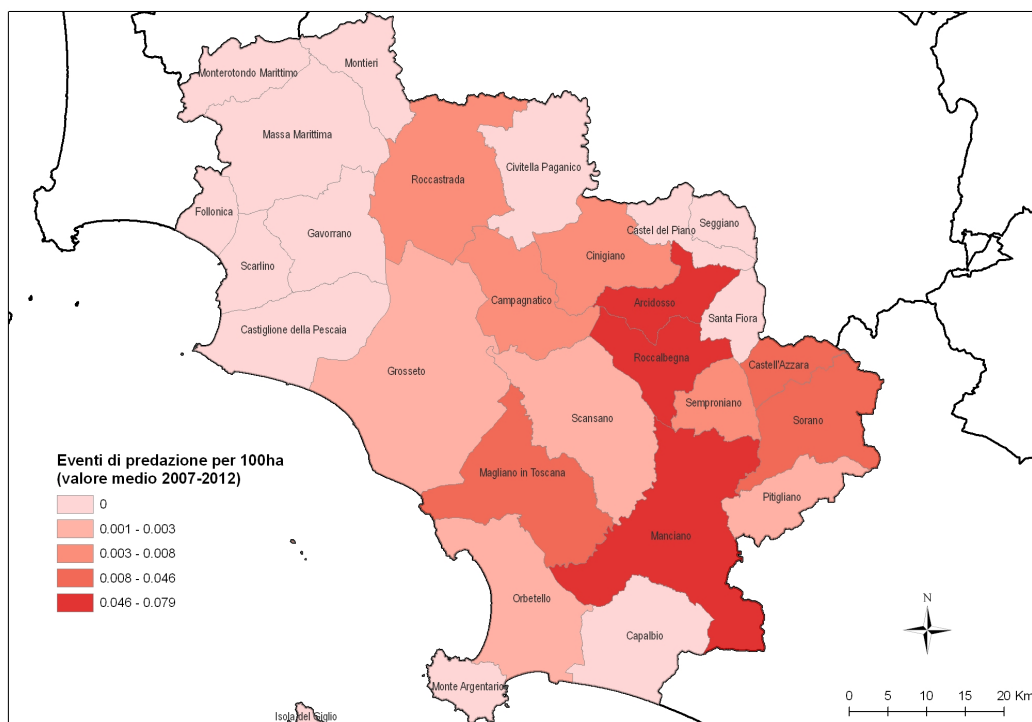


Table 2. Spatial distribution of sheep depredations declared to the insurance between 2007 and 2012 (n=326; data source: Co.Di.Pr.A)

Comune	number of heads of sheep/100 ha	number of sheep depredation events 2007-20012	Percentage of sheep depredation events 2007-20012
Manciano	97,18	110	33,74
Roccalbegna	68,98	53	16,26
Arcidosso	50,32	44	13,50
Sorano	86,73	34	10,43
Magliano In Toscana	65,95	28	8,59
Castell'Azzara	21,51	18	5,52
Roccastrada	36,76	14	4,29
Campagnatico	112,45	6	1,84
Cinigiano	20,91	4	1,23
Grosseto	28,31	4	1,23
Scansano	110,51	4	1,23
Orbetello	22,04	3	0,92
Pitigliano	66,45	2	0,61
Semproniano	66,90	2	0,61
Capalbio	126,26	0	0,00
Castel Del Piano	21,16	0	0,00
Castiglione della Pescaia	2,71	0	0,00
Civitella Paganico	23,85	0	0,00
Follonica	0,13	0	0,00
Gavorrano	12,81	0	0,00
Massa Marittima	7,51	0	0,00
Monte Argentario	0,40	0	0,00
Monterotondo Marittimo	24,05	0	0,00
Montieri	3,30	0	0,00
Santa Fiora	25,27	0	0,00
Scarlino	9,89	0	0,00
Seggiano	9,57	0	0,00

3.2.1 Subscription to the insurance scheme

An accurate interpretation of declared damages must take into account the number and characteristics of the insured farms.

Between 2007 and 2012, 115 farms (corresponding to 128 livestock holders) insured their herds for at least one year. On a yearly basis the majority of farms insured sheep ($93.44 \pm 0.52\%$), the remaining insured bovines ($9.59 \pm 0.71\%$), goats ($3.06 \pm 1.23\%$), equines ($2.39 \pm 0.98\%$), red deer, roe deer and muflon ($1.14 \pm 0.99\%$). The farms that were insured in 2012 owned an average of 397.92 ± 377.12 sheep (median=332.0, 25th percentile=182.5, 75th percentile=477.5, range=53-2489), and those that weren't owned an average of 179.52 ± 260.56 sheep (median=100.0, 25th percentile=26.0, 75th percentile=231.5, range=1-2900). Compared to uninsured sheep owners, insured ones owned significantly more sheep (Wilcoxon test: $W=-11262.5$, $p<0.001$).

Farms remained insured for a mean of 3.15 ± 1.77 years (table 3). On average, $76.02 \pm 7.82\%$ of farms remained insured, $24.55 \pm 14.42\%$ abandoned the insurance and $23.99 \pm 7.83\%$ were newly insured, from one year to the next. Out of the 115 farms that were insured for at least 1 year in the period 2007-2012, only 35.96% remained insured with continuity from the year they were insured until 2012, 45.61% abandoned the insurance, 5.26% got insured for the first time in 2012 and the remaining 13.16% abandoned the insurance for one or more years and then got insured again until 2012. Those farms that experienced damage were more likely to remain insured than those that did not ($\chi^2=19.51$, $df=1$, $p\text{-value}<0.001$; $\Phi=0.48$). Nonetheless, 10 farms abandoned the insurance even though they had reported damages (not counting those who closed their business).

Table 3. Duration of insurance contracts in the period 2007-2012 (data source: Co.Di.Pr.A.).

Duration of the insurance policy	Insured farms	Percentage of insured farms
1 year	25	21,74
2 year	28	24,35
3 year	17	14,78
4 year	13	11,30
5 year	14	12,17
6 year	18	15,65

3.2.2 Damage prevention funding

Over the same period of time, 163 farms (corresponding to 174 livestock holders) received funding for prevention measures (see Annex IV for information on the types of prevention funding), and € 1 091 984,15 of funding were spent in total. Of the farms that received funding, 64.42% ($n=105$) used it to build or restore stables, fences, surveillance/alarm systems and to acquire acoustic deterrents and livestock guarding dogs, whereas 44.79% ($n=73$) received funding from the livestock guarding scheme, which lasted through one or two summer seasons.

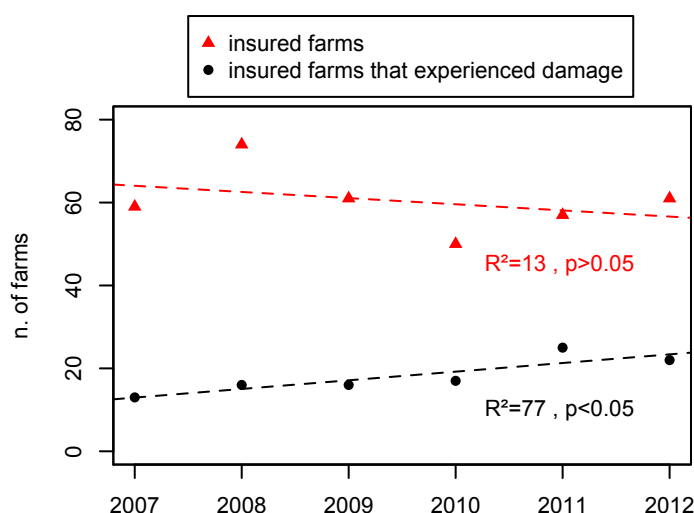
If we analyse only the interventions financed by the PRAF funding scheme (Annex IV) we can see that most of them (68.06%, $n=49$) involved the construction of predator proof metallic fences, and the remaining involved the construction and repair of shelters (13.89% $n=10$), the installation of electric fences (9.72% $n=7$) and surveillance/alarm systems (5.56% $n=4$) and finally the acquisition of livestock guarding dogs (4.11% $n=3$).

Once again, farms that received funding owned significantly more sheep (mean=339.26±288.80, median=283.5, 25th percentile=176.5, 75th percentile=419.0, range=8-2489) than those that didn't (mean=168.72±261.68, median=90, 25th percentile=23.0, 75th percentile=200, range=1-2900; Wilcoxon test: W=27628.5, p<0.001). Analysing the effectiveness of preventive measures proved difficult due to the small number of insured farms and the lack of data regarding the date in which the measures were implemented. Out of the 163 farms that received funding for prevention measures in the period 2007-2012, 33.13% (n=54) were insured for at least one year, and 21.47% (n=35) had declared at least one depredation to the insurance, during that time.

3.2.3 Trends over time

The number of farms that declared damages increased significantly over the period 2007-2012 ($R^2=0.77$, $F=13.41$, $p=0.022$), whereas the number of farms that subscribed to the insurance remained stable, without significant variations over time ($R^2=0.13$, $F=0.58$, $p=0.491$) (fig.17).

Figure 17. Temporal trend in the number of insured livestock farms and those that declared damages to the insurance (data source: Co.Di.Pr.A).



The number of declared depredation events increased significantly over the years, with a linear increase of about 14 additional events every year ($R^2=0.85$, $F=22.78$, $p=0.009$; range=16-64) (fig. 18). The same trend was detected with regards to the number of livestock preyed, which increased by about 69 animals every year ($R^2=0.72$, $F=10.16$, $p=0.033$; range=92-536) (fig. 19). On the contrary, we did not detect a significant increase in the amount spent for compensation ($R^2=0.61$, $F=6.14$, $p=0.068$)², whereas spending to encourage the use of damage prevention measures increased significantly ($R^2=0.94$, $F=65.69$, $p=0.001$), from 7878€ in 2007 to 374334€ in 2012 (fig. 19).

² This may be due to the fact that from 2010 onwards, holders that experienced recurrent damages received a less compensation (Annex III).

Figure 18. Temporal trend in the number of depredation events declared to the insurance company (data source: Co.Di.Pr.A).

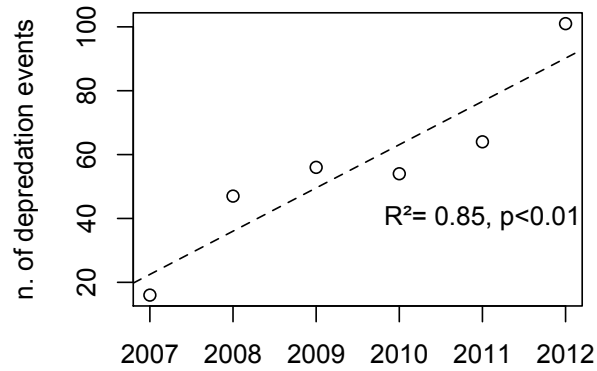
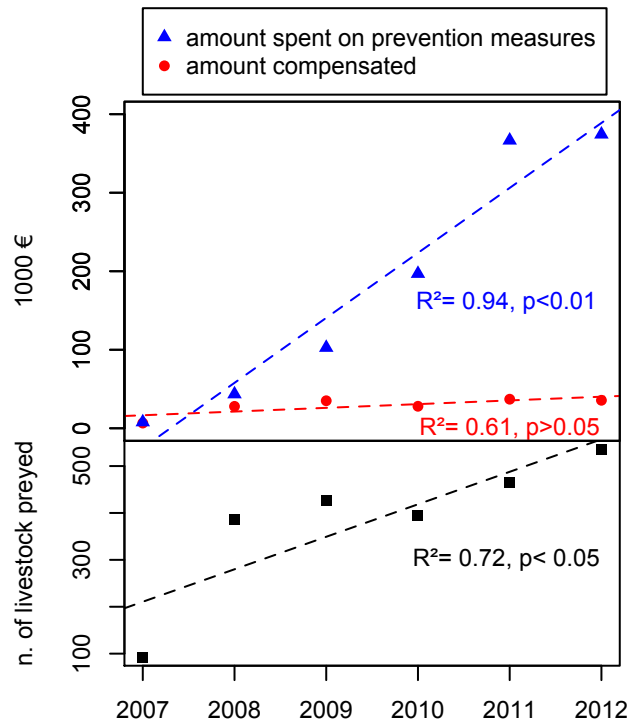


Figure 19. Temporal trend in the funds spent on damage prevention, the funds spent on compensation, and the number of preyed livestock declared to the insurance (data source: Provincial registry on compensation spending and Co.Di.Pr.A)



3.2.4 Comparison between insurance data, ASL data and the results of the interviews carried out with livestock holders

For the year 2012 it is possible to compare the depredations declared to the insurance, those declared to the ASL and those reported by the holders that were interviewed. It should be noted however that only some aspects could be compared, since the ASL reports often did not include the number of livestock preyed, and the number of depredation events recalled by the interviewed holders was not reliable.

In 2012, 64 holders filed 124 depredation reports to the ASL, compared to the 27 holders that declared 101 depredation events to the insurance. It is important to note that, out of the holders that declared damages to the ASL, only 28.13% (n=18) were insured in 2012. Furthermore, with regards to the interviewed holders, 50% (n=63) declared to have suffered damages in 2012, and out of those, 16% (n=10) reported damages to the ASL and 6% (n=4) declared damages to the insurance (even though 11% were insured that year, n=7). This shows that the official damage registries offer a very limited perspective on the phenomenon.

4. CONCLUSIONS

4.1 Executive summary

The Action A4 allows us to make general considerations about three interconnected aspects:

- the quantification of conflict;
- the local husbandry practices;
- the management strategy adopted at the provincial level to mitigate conflict.

The main results of the study are the following:

- Over the period 2007-2012 the mean number of farms that subscribed to the insurance represent only 3% of the livestock farms that were present in the territory in 2012;
- Depredations mostly involved sheep (97% of preyed livestock on a yearly basis);
- Depredation events occurred throughout the year and in no prevalent season;
- Damages are not distributed uniformly across the provincial territory, and are mostly concentrated in the municipalities of the south eastern portion of the territory;
- 9.1% of insured farms suffer frequent depredations (a mean of ≥ 5 events on a yearly basis), and these represent 37% of all claimed depredations;
- The depredation events declared to the insurance and the number of preyed livestock increased over time, whereas the number of farms that subscribed to the insurance and the amount of compensation delivered did not change;
- Spending to encourage the use of prevention measures, and the number of interventions carried out, increased significantly over time, but it is currently not possible to monitor their efficacy in reducing damages;
- The farms that report damages to the ASL are significantly more numerous than those who are insured;
- 65% of the randomly sampled livestock holders claim to have suffered damages, and this percentage is considerably higher than the percentage of those who were insured or those who declared damages to the ASL;
- Livestock are mainly managed in open range pastures with occasional enclosure or supervision by herders;
- 74% of the interviewed holders use livestock enclosures or shelters that are not protected from predators;
- Only 26% of holders use livestock guarding dogs;
- The majority of holders believe that the insurance scheme is not a functional tool to mitigate conflict between predators and the livestock breeding sector. Even though 80% of the cost of the insurance policy is funded by the regional government, the critiques raised by the livestock holders focus on the unfavourable economic aspects of the insurance, such as the fact that it entails additional costs for the holders and it does not compensate induced damages. Other studies have also shown that damage compensation by the state is viewed as a basic entitlement and holders deem it unfair to have to insure themselves against a problem that they do not feel responsible for (Marino et al., 2012). It is also important to highlight that there is a general lack of information regarding the actual terms stipulated by the insurance: among those who had never been insured (n=97) only 6% claimed to know how that insurance system works.

In light of these results, it is evident that the analysis based on the official statistics renders an extremely partial perspective on the actual level of conflict. The percentage of insured farms in the territory is negligible, and the data on the depredations reported to the ASL and those claimed by the interviewed holders indicates that the number of farms that experience damage is considerably higher. There is therefore a significant level of “hidden damage” given by those farms that do not report depredations. It is important to specify that the estimate, which places the proportion of holders who experience damages at 65% of those present in the territory, is based on unverified claims made by interviewed holders, and therefore it may be an overestimation of the actual phenomenon. Nonetheless, this study serves to demonstrate that in the Province of Grosseto, depredations have involved a considerable proportion of farms.

Moreover, the types of husbandry methods adopted in the territory appear to be incompatible with the presence of wolves. The situation is however hopeful, as many holders demonstrated interest in participating in the project to experiment the implementation of damage prevention systems.

4.2 Management implications

This study makes the following contributions toward the correct implementation of the project:

- In order to bring the conflict between predators and livestock activities to a level that is socially, economically and biologically acceptable, it is necessary to work with all the farms that suffer damages, including those that do not report them, and this is especially important for the implementation of damage prevention measures;
- It is important that holders be involved in the choice of which prevention methods are implemented, so that they can be compatible with the holder's husbandry practices;
- It is necessary to establish a shared rationale according to which prevention methods are implemented, with regards to where and how the interventions are developed, and why it's important to monitor their efficacy;
- It is fundamental to initiate a monitoring program of the damage prevention mechanisms and the compensation policy;
- The data on damages needs to be collected in a precise manner and should include the conditions in which the depredations took place, with particular attention to the husbandry practices/livestock management adopted. Currently, the only information available is the number and species of livestock preyed, while information on the environmental and management context are completely lacking. A detailed and accurate quantification of the phenomenon is fundamental to its effective management;
- It is important to establish a single data bank that combines all the information necessary to evaluate depredations, starting from the details of the depredation events and the circumstances in which they took place and moving on to the type of prevention systems adopted and the funding received to implement them. The current available registries were devised in a completely independent fashion and therefore do not allow for the phenomenon to be analysed in its full complexity. The data archiving system is structured in such a way that it does not enable a rapid analysis of the information nor does it reduce the chances of data entry errors, as we have verified in

the analysis. The MedWolf project is currently devising a database that will attempt to surpass all of these issues.

In conclusion, we believe that this study constitutes an important step towards the quantification and characterization of the damages caused by predators to the livestock sector, and it lays the foundations for a correct implementation of the future activities envisioned by the project.

The analysis of the damages presented in this report will be replicated in the future years. Furthermore, it is currently being extended to include data relative to the years preceding the introduction of the insurance system to compensate the damages caused by predators.

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Annex I

Distribution of interviews at the municipal level

COMUNE	Number of farms	Number of planned interviews	Number of carried out interviews
ARCIDOSO	41	5 (+4*)	3 (+3)
CAMPAGNATICO	61	8	10
CAPALBIO	38	6	4
CASTEL DEL PIANO	15	1	3
CASTELL'AZZARA	10	1 (+1)	1 (+1)
CASTIGLIONE DELLA PESCAIA	10	0	0
CINIGIANO	43	4	4
CIVITELLA PAGANICO	24	3	1
FOLLONICA	1	0	0
GAVORRANO	24	2	1
GROSSETO	79	9	8
MAGLIANO IN TOSCANA	85	12 (+1)	11 (+1)
MANCIANO	147	21 (+5**)	21 (+4)
MASSA MARITTIMA	34	3	2
MONTE ARGENTARIO	1	0	0
MONTEROTONDO MARITTIMO	11	1	1
MONTIERI	14	1	1
ORBETELLO	26	3	3
PITIGLIANO	41	5	4
ROCCALBEGNA	57	8 (+2)	7 (+2)
ROCCASTRADA	39	4 (+1**)	3
SANTA FIORA	15	2	2
SCANSANO	132	18	18
SCARLINO	12	1	1
SEGGIANO	8	1	1
SEMPRONIANO	38	5	5
SORANO	88	10 (+2)	12 (+2)
TOTALE	1094***	134 (+16)	127 (+13)

Distribution of interviews at the municipal level. The numbers in parenthesis refer to the sample of farms that experienced recurrent damages in the period 2007-2012

*Out of the 4 farms in Arcidosso that experienced recurrent damages one had shut down and the business had been transferred to a holder that was already included in the random sample

**We were unable to contact one of the selected holders

***of which 1085 breed only sheep and 9 breed both sheep and goats. The BDN (2012) data for the latter is aggregated, which is why in the introduction we speak of 1085 sheep farms.

Annex II

**The questionnaire used for the interviews with
livestock holders**



PROGETTO MEDWOLF LIFE11/NAT/IT/069

Azione A4

INDAGINE PRELIMINARE SUI DANNI AGLI ALLEVAMENTI CAUSATI DA PREDATORI IN PROVINCIA DI GROSSETO

Area Sviluppo Rurale della Provincia di Grosseto

Area Conservazione della Natura della Provincia di Grosseto

1. LOCALIZZAZIONE AZIENDA:

A) Comune: _____

B) Località: _____

C) Coordinate: UTM_X: _____ UTM_Y: _____

D) Specificare il punto di riferimento delle coordinate:

2. SUPERFICIE DELL'AZIENDA, ESTENSIONE E CARATTERISTICHE DELL' AREA DI PASCOLO:

A) Superficie dell'azienda: _____ (HA)

B) Estensione dell'area di pascolo (in relazione alla superficie aziendale):

☐ fino al 25 %

☐ 26-50%

☐ 51-75%

☐ >75%

C) L'ambiente prevalente delle aree di pascolo è:

☐ pascoli aperti
boschi

☐ pascoli interspersi ad arbusteti

☐ pascoli interspersi a

3. COMPOSIZIONE E STRUTTURA DELL' AZIENDA:

	OVINI	CAPRINI	BOVINI	EQUINI	SUINI	ALTRO
N° CAPI						
ATTITUDINE *						
RAZZA						

*L = latte C= carne M= mista

A) L'attività di allevamento:

è l'unica fonte di reddito ☐ sì ☐ no
 corrisponde all'attività lavorativa principale ☐ sì ☐ no
 è a sola conduzione familiare ☐ sì ☐ no, specificare:

B) L'azienda è attiva sul territorio dall'anno: _____

4. GESTIONE DEL BESTIAME DOMESTICO:

A) Brado

☐ con ricovero per gli animali ☐ senza ricovero per gli animali

B) Semibrado

Specificare:

☐ con ricovero per gli animali ☐ senza ricovero per gli animali

C) Stabulazione

☐ *annuale* ☐ *stagionale*

5. CARATTERISTICHE DELLA CONDUZIONE DEGLI ANIMALI AL PASCOLO :

A) Quando al pascolo, il gregge è suddiviso in :

☐ 2 gruppi ☐ 3 gruppi ☐ ≥4 gruppi ☐ il gregge *non* è suddiviso

B) Solitamente, i parti avvengono:

☐ in reti metalliche *di contenimento*

☐ in reti metalliche *di protezione* (interrate e con antigatti), specificare estensione ed altezza:

☐ in reti *elettrificate*, specificare tipologia, estensione ed altezza:

☐ in *stalla*

☐ all'aperto, *non custoditi* da particolari strutture

C) Il bestiame pascola:

☐ solo di giorno

☐ anche di notte nei periodi favorevoli, specificare:

6. SISTEMI DI PROTEZIONE DEL BESTIAME:

A) L'area di pascolo del bestiame è protetta da:

☐ in reti metalliche *di contenimento*

☐ in reti metalliche *di protezione* (interrate e con antigatti), specificare estensione ed altezza:

☐ in reti *elettrificate*, specificare tipologia, estensione ed altezza:

☐ *nessuna forma di contenimento*

B) Le aree di ricovero notturno (o diurno, quando il pascolo è notturno), sono protette da:

☐ *reti metalliche di contenimento*

☐ reti metalliche *di protezione* (interrate e con antigatti), specificare estensione ed altezza:

☐ reti *elettrificate*, specificare tipologia, estensione ed altezza:

☐ *nessuna forma di contenimento*

C) Il bestiame non viene ricoverato all'interno di un recinto, perché:

☐ costi dei ricoveri eccessivi

☐ il bestiame deve rimanere libero

☐ altro, specificare:

D) L'uso dei ricoveri è continuativo durante l'anno o varia *stagionalmente*?

☐ uso *continuativo*

☐ uso *stagionale*, specificare: _____

E) Quando il bestiame è al pascolo, è prevista la presenza di un custode?

☐ *si*, per l'intera giornata di pascolo

☐ solo *saltuariamente*, specificare:

☐ *no*

F) Oltre alle strutture di cui sopra vengono utilizzati altri sistemi di protezione e/o prevenzione?

☐ *si* ☐ dissuasori acustici ☐ dissuasori visivi ☐ dissuasori olfattivi ☐ *fladry*

☐ *no*

7. PRESENZA CANI DA LAVORO:

A) Sono presenti in azienda cani da *conduzione*?

☐ *si*,

☐ *no*, perché:

B) Sono presenti in azienda cani da *guardiania*?

☐ *si*,

☐ *no*, perché:

C) Giudizio sull'uso dei cani da *guardiania*:

☐ molto soddisfatto ☐ soddisfatto ☐ abbastanza soddisfatto ☐ poco
soddisfatto ☐ per niente soddisfatto

Motivazione della risposta:

Cani da CONDUZIONE:

N° CANI	1			2			3			4			5		
DIMENSIONI *	G		M	G		M	G		M	G		M	G		M
SESSO**	M	S	F	M	S	F	M	S	F	M	S	F	M	S	F
ETA' (ANNI)															

* M = medio ≤ 30 KG G = grande = ≥ 30 KG **Sesso: F = femmina M = maschio S = sterilizzato

Cani da GUARDIANIA:

N° CANI	1			2			3			4			5		
DIMENSIONI *	G		M	G		M	G		M	G		M	G		M
SESSO**	M	S	F	M	S	F	M	S	F	M	S	F	M	S	F
ETA' (ANNI)															

* M =medio ≤ 30 KG G =grande = ≥ 30 KG **Sesso: F = femmina M = maschio S = sterilizzato

Comportamento dei cani da GUARDIANIA:

I CANI DA GUARDIANI A :	Sono stati educati/ addestrati al loro ruolo?	Restano sempre con il gregge?	Hanno fatto attacchi ad altri allevamenti?	Hanno fatto attacchi alla fauna selvatica?	Hanno fatto attacchi a persone terze?
SI					
NO					

8. INDENNIZZO DEI DANNI E GESTIONE DELLE CARCASSE:

A) In riferimento agli ultimi 6 anni (2007-2012), l'allevatore ha stipulato contratti assicurativi per l'indennizzo dei danni causati da predatori?

☐ sì, sempre

☐ solo *alcuni anni*, perché:

☐ no, perché:

B) Qual è la modalità di smaltimento delle carcasse?

☐ cimitero aziendale *proprio* ☐ cimitero aziendale *di terzi* ☐ ditta autorizzata ☐ interrimento

C) Usufruisce dei finanziamenti regionali per lo smaltimento delle carcasse?

☐ sì, ☐ no perché:

9. DANNI PREGRESSI:

Anno	N. eventi di predazione	Specie	N. capi persi	Danni indotti (S/N)
2012				
2011				
2010				
2009				
2008				
2007				

A) In che stagione sono avvenuti principalmente gli attacchi al bestiame domestico?

☐ Estate ☐ Autunno ☐ Inverno ☐ Primavera ☐ In tutte le stagioni

B) In che momento della giornata si sono verificati principalmente gli attacchi al bestiame domestico?

☐ Giorno ☐ Notte ☐ Non c'è differenza

C) La maggior parte dei danni si è verificata quando il bestiame si trovava:

☐ Al pascolo ☐ All'interno dei ricoveri

10. OPINIONE NEI CONFRONTI DEL SISTEMA DI INDENNIZZO:

A) L'allevatore pensa di conoscere nel dettaglio quanto previsto, in materia d'indennizzo dei danni da predatori, dai contratti assicurativi vigenti?

☐ sì ☐ solo in parte ☐ no

B) Quali modifiche secondo lei si potrebbero apportare alle condizioni di assicurazione per rendere tali programmi più funzionali?

(in esteso):

C) Secondo lei qual è il motivo per cui molti allevatori su scala provinciale non usufruiscono del programma assicurativo per gli indennizzi da predatori?

(in esteso):

11. OPINIONE/DISPONIBILITA' PER L'UTILIZZO DI SISTEMI DI PREVENZIONE:

A) In passato ha beneficiato di finanziamenti per interventi di prevenzione da attacchi da predatori? (Recinzioni, Guardiania notturna, Dissuasori ecc...)

☐ sì, quali:

☐ no, perché:

B) Nell'eventualità che ne abbia beneficiato, quale è il suo giudizio complessivo:

☐ molto soddisfatto ☐ soddisfatto ☐ abbastanza soddisfatto ☐ poco soddisfatto ☐ per niente soddisfatto

Motivazione della risposta:

C) Sarebbe interessato a ricevere in affidamento strumenti di prevenzione per contribuire ad una valutazione sperimentale della loro funzionalità?

I. sì. Quali:

☐ cani da guardiania ☐ recinzioni elettrificate ☐ recinzioni fisse
(antigatto ed interrate) ☐ dissuasori acustici (o di altro tipo)

II. no, non ne ho bisogno

III. forse, ma a queste condizioni, specificare:

Grazie per la sua collaborazione. Se ha altri commenti sul questionario li indichi di seguito:

Compilatore del questionario: nome e cognome: _____

Data e ora dell'intervista: _____

L'intervistato è / non è il titolare dell'azienda

Annex III

**Summary of the legislation that regulates the
compensation system for damages caused by predators
and its changes over time**

Laws preceding the current one

L.R. 71/1982 “Regional funding for the replacement of livestock that has been damaged by predators or meteorological events”

- Envisioned the compensation of up to 80% of the value of preyed livestock in case of wolf predation and 60% in case of dog predation.

L.R. 72/1994 “Damages to livestock caused by predators or meteorological events”

- Made compensation conditional upon the implementation of prevention measures and eliminated the distinction between wolves and other canids, compensating 100% of the value of the preyed livestock.

The types of damages compensated were:

- direct damages (dead or injured livestock);
- induced damages (abortions and loss of milk production).

Damages had to be declared to the veterinary ASL within 24 hours, and the vet was required to certify the damage with 7 days, by compiling the relevant documentation and enclosing a compensation request.

The amount of compensation delivered was determined by the Municipality, based on the livestock price list predisposed by the Regional Government. The evaluation of other damages was also determined by the Municipality on the basis of the average price of the various products that were damaged (provided by the chamber of Commerce of the Province).

Within 45 days of the damage report, the municipality was required to dispatch a compensation request to the regional government. The latter was then required to pay 80% of the compensation with 30 days of receiving the municipal dispatch. The remaining 20% was paid following inspections made by the Municipality, to verify the actual replacement of livestock.

To implement prevention measures, the law stipulated funding for up to 50% of the spending considered admissible, and not exceeding 50 million lire.

The law envisions the creation of a document, which identified the municipalities with stable wolf presence. Within two years of the creation of the document, compensation was delivered only to those who had implemented, or were in the process of implementing, adequate measures to protect their livestock.

Current law

L.R. 26/2005 and successive modifications (L.R. 65/2005) “Protection of farms subject to predations ”

Regulation 8/5/2006 n. 15/R and successive modification (d.p.g.r. 11/03/2009 n. 8/R.)

The current regulation envisions substantial changes compared to the past.

The objective of the law is to:

- Protect bovine, equine, sheep and goat farms from attacks by predators specified in the annex IV of the directive 92/43/CEE (wolves, eagles and wild cats).

For this purpose, the law envisions funding interventions for the following preventions measures:

- barns or animal shelters;
- metallic and electric fences;
- alarms and video surveillance systems;
- purchase and training of livestock guarding dogs.

Funding is granted for up to 40% of the cost of the measure and 50% in mountainous areas or areas under adverse conditions (directive 75/268/CEE). The maximum spending admitted is € 26000,00 for every intervention.

Funding for insurance policies:

Funding is available only to the farms that have implemented at least one of the prevention measure listed in the regulation (d.p.g.r. 8/5/2006 n.15/R).

The damages recognized are:

- Direct damages (death, culling and presumed death i.e. when the carcass is not found within 20 days from its disappearance;
- Induced damages (abortion).

The value of the dead animals corresponds to the prices fixed by ISMEA or the CIIAA. In case of abortion, compensation is delivered in the form of 30% of the value of the adult animal.

Funding for the insurance policies covers 80% of the cost of the policy, which stipulates the compensation of damages that exceed 20% of the normal productivity in the mountainous areas or areas under adverse conditions, and 20% in other areas. Funding is reduced to 50% for policies made on the entire value of the production. The value of normal production refers to the single units of risk.

The CO.DI.PRA. Toscano is a non-profit agricultural consortium aimed at protecting agricultural farms. It is recognized by the Ministry and the Tuscany Region and operates on the entire Tuscan territory by coordinating the agricultural sector through the collective subscription of insurance contracts.

The farms that can access funding must own bovines, equines sheep or goats, must be registered as agricultural entrepreneurs (article 8, L.R. 45/2007), and must carry out their activities in a municipality where the presence of protected predators has been ascertained (in the Province of Grosseto this means anywhere except the Isola del Giglio, d.p.g.r. 11/03/2009 n. 8/R.).

The impact of the law subject to monitoring:

In the first semester of every year the regional government dispatches to the relevant commission a report on the previous year, with information of the number of requests to obtain funding for prevention measures, and a quantification of the funding delivered for every type of prevention measure implemented. The commission promotes an evaluation of the impact of the law through a quantification of the damages caused by predators, a comparison between damages caused before and after the implementation of prevention systems, and the collection of opinions and evaluations of the involved subjects, namely the agricultural associations, regarding the implemented interventions.

Furthermore the Co.Di.Pr.A. is required to dispatch an annual report on the number of subscribed insurance contracts, the location of the insured farms, the type of damage declared and compensated and the amount of compensation delivered.

Additional information contained in the 2013 insurance contract

The livestock holder is required to insure all the animals of the same species and type of production in his/her possession, that are kept in enclosure or allowed to graze in open ranges. Farms that incur damages are required to contact a veterinary and within 5 days they must provide the insurance with information on veterinary care administered, a veterinary certificate containing the date of the damage, the number of livestock heads involved the cause of death; and a certification of any abortions.

Compensation delivered:

- 70% of the value of the livestock heads in case of death or culling of sheep, goats and bovines;
- 50% of the value of the livestock heads in case of death or culling of equines;
- 30% of the value of the livestock in case of presumed death;
- 30% for abortions (compensated if they occur between the 120th and the 240th day since conception, in the case of bovines; between the 60th and the 120th day since conception, in the case of sheep and goats; between the 120th and the 300th day since conception, in the case of equines).

The above mentioned conditions apply to newly insured holders or holders that in the previous years maintained a ratio of damages / insurance premiums of <70%. In the case of a greater ratio of damages / insurance premiums, the amount compensated is reduced and the insurance premium increased.

Compensation is paid within 30 days of three established deadlines(30/04/2013; 31/10/2013; 31/12/2013).

Annex IV

Summary of the programs and funding mechanisms made available by the Tuscany Region and the Province of Grosseto to encourage the adoption of damage prevention systems

Prevention measures

The data analysis focussed on the prevention measures that were implemented in the Provincial territory through the various funding mechanisms available. In particular we analysed:

- The measures funded by the previous regional law (L.R. 26/2005) which was successively called the P.A.R. (Piano Agricolo Regionale 2008-2010) and P.R.A.F. (Piano Regionale Agricolo Forestale 2012-2015) relative to the period 2007-2012.

The interventions subject to funding are:

- stables and animals shelters;
- metallic or electric fences;
- alarm and video surveillance systems;
- purchase and training of livestock guarding dogs.

Funding is granted for up to 40% of the cost of the measure and 50% in mountainous areas or areas under adverse conditions (directive 75/268/CEE). The maximum spending admitted is € 26000,00 for every intervention.

To access the funding, holders must enter a call for applications and they are ranked on the basis of the following criteria: location of the farms (mountainous areas or areas under adverse conditions/other areas); number and species of livestock owned; whether they experienced damages from the year 2006; type of agricultural entrepreneur; whether they applied for funding the previous year and were denied it.

- The interventions carried out within the livestock guarding scheme (in the summers of 2010 and 2012) relative to the nighttime vigilance of livestock by a shepherd (from 8pm to the following morning). €3750 were delivered to each holding, representing 80% of the estimated cost of carrying out shepherding activities. Shepherding could be carried out either by the holder, a family member or an employee, and it had to be documented with the relevant paperwork. The shepherd was required to report the presence of predators in proximity of the flock to the provincial police. To access the funding holders had to enter a call for applications and were ranked on the basis of criteria similar to those mentioned above.
- The interventions carried out in the “experimental project for the defence of livestock from predator attacks” envisioned in the 6.3.7 measure of the P.A.R. These involved the delivery of acoustic deterrents to the farms that had not received funding for the livestock guarding scheme. 81 acoustic deterrents were delivered, for a total spending of about €50000,00.

Annex V

Summary on the Regional legislation and funding mechanisms available for the disposal of carcasses

The D.M. 29/09/2000 required livestock holders to dispose of the carcasses of sheep, goats, bovines and equines through incineration by authorized companies.

The Tuscany Region, through the L.R. 26/2004 ("Interventions in favour of farms for the removal and destruction of dead animals") and the successive modification introduced by the L.R. 10/2006, delivers funding for the disposal of carcasses.

For the collection and transportation of livestock carcasses to the incineration centre, the law stipulates a compensation of

- € 300,00 per bovine or equine head;
- € 65,00 per sheep or goat head.

To cover the costs of the incineration of livestock, the law stipulates a maximum compensation of:

- € 50,00 per bovine or equine head;
- € 7,00 per sheep or goat head

Compensation cannot exceed 75% of the spending made and documented by the livestock holders.