



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Discussion Paper 2007:2

Performance payments for carnivore conservation in Sweden

Astrid Zabel

*Environmental Policy and Economics,
Institute for Environmental Decisions, ETH Zurich
astrid.zabel@env.ethz.ch*

Karin Holm-Müller

*Department of Resource and Environmental Economics
karin.holm-mueller@ilr.uni-bonn.de*

The series "Agricultural and Resource Economics, Discussion Paper" contains preliminary manuscripts which are not (yet) published in professional journals, but have been subjected to an internal review. Comments and criticisms are welcome and should be sent to the author(s) directly. All citations need to be cleared with the corresponding author or the editor.

Editor: Thomas Heckelei
Institute for Agricultural Policy, Market Research
and Economic Sociology, University of Bonn
Nußallee 21
53115 Bonn, Germany

Phone: +49-228-732332
Fax: +49-228-734693
E-mail: heckelei@agp.uni-bonn.de

Performance payments for carnivore conservation in Sweden

Astrid Zabel, Karin Holm-Müller

Abstract

Solving carnivore-livestock conflicts is essential if goals to preserve biodiversity conservation are taken seriously and livelihoods especially of poor livestock owners are to be safeguarded. This paper presents an innovative performance payment approach for carnivore conservation, that has been successfully implemented in Sweden. Performance payments are made to reindeer herding Sami villages for certified carnivore offspring on the villages' territories. First results support the assumption that this approach has the potential to solve many problems inherent to conventional compensation schemes. A well designed common pool regime is deemed necessary to direct the incentives set by the internal distribution of the performance payments toward collective action in carnivore conservation.

Keywords: Performance payments, Carnivore conservation, Sweden, Collective action.

JEL-classification: Q2, Q57

1 Introduction

Many carnivores require vast territories, and as human population increases, more and more pristine natural areas are being developed and converted into agricultural land. Unsurprisingly, carnivores that live at the fringe between wild and agricultural land occasionally prey on livestock. Predation of livestock can result in severe economic losses (THIRGOOD ET AL. 2005; WOODROFFE ET AL. 2005; MISHRA 1997). Herders, whose livelihoods depend on livestock, oftentimes seek to kill the damage causing animal to prevent further damage. Conservationists on the other hand engage in measures to protect endangered carnivores since they are appreciated as an important component of biodiversity. Viable solutions to make coexistence of wildlife and livestock acceptable to both, conservationists and livestock owners, are already much-needed and are likely to be increasingly sought-after as human sprawl increases.

Schemes that provide ex-post compensation to livestock owners for losses to predation have been installed in many places around the world but they have not proven to be widely successful. Most of the schemes' deficiencies can be ascribed to one or several of the following problems: moral hazard (COZZA ET AL. 1996;

SWENSON & ANDRÉN 2005), high transaction costs (SABERWAL ET AL. 1994; BLANCO 2003), long time lags (FOURLI 1999; MADHUSUDAN 2003), and problems of trust and transparency (MONTAG 2002; WESTERN & WAITHAKA 2005). Mainly due to these problems, practitioners and analysts have denounced ex-post compensation schemes as being inadequate, fraudulent and cumbersome (NAUGHTON-TREVES ET AL. 2003).

2 Performance payments in Sweden

In search of new solutions to alleviate carnivore-livestock conflicts, a performance payment scheme was developed and implemented in Sweden. Performance payments are monetary or in-kind payments made by a paying agency to individuals or groups, conditional on specific conservation outcomes (ALBERS & FERRARO 2006). Performance payments are made on a strict *quid pro quo* basis depending on the level of conservation outcome. Their focus is completely on the outcome, the actions that led to the conservation outcome are not relevant. This conditionality concept gives the paying agency the possibility to pay exactly and solely for the conservation goal it strives for.

In 1996, the Swedish government implemented this new performance payment strategy as policy measure to attain and maintain stable populations of wolverines (*Gulo gulo*), lynx (*Lynx lynx*), and wolves (*Canis lupus*) within the country. Wolverines, which are listed as vulnerable on the IUCN red list of endangered species (MUSTELID SPECIALIST GROUP 1996), and lynx roam the wilderness areas in the northern parts of Sweden. They share the premises with semi-domesticated reindeer (*Rangifer tarandus tarandus*) that are herded by the indigenous Sami people. Especially during the winter months, both carnivore species prey on reindeer (PERSSON 2005; DANELL ET AL. 2006).

The performance payments are made by the Swedish state to Sami villages contingent on the number of carnivore reproductions that are certified on the villages' reindeer grazing grounds. The payments are made irrespective of actual predation incidents. Incentives to apply optimal levels of livestock protection are not distorted and consequently the scheme does not give rise to moral hazard. Furthermore, there are no problems with time lags since payments are made for carnivore offspring, i.e. while the animals are too young to cause damage. The height of the payment is determined according to the monetary damage that the offspring are expected to cause throughout their lifetime. The transaction costs connected to counting and verifying the number of carnivore reproductions may, however, be substantial.

In Sweden, once the money is paid, the Sami villages have the authority to decide on the use and internal distribution of the money (REGERINGENS PROP. 2000/01:57). Theoretically, a village needs to solve two problems: (i) determine the number of carnivores that will optimize its overall welfare (dependent on the

amount of payment per reproduction) and (ii) make sure that no village member has incentives to deviate from this level.

If payments are set high enough to assure full conservation, the internal distribution scheme needs to create a situation in which each individual's utility is higher if carnivores are conserved compared to a situation in which carnivores are killed. Otherwise, incentives to reduce the number of damage causing carnivores may arise. Less potential parent animals in one year naturally reduces the likelihood to obtain offspring and performance payments for these offspring in the next year. Illegal poaching of carnivores is an issue in Sweden. In a longtime study of more than 200 radio-marked wolverines, 60% of adult mortality was ascribed to illegal poaching (this included sure and likely cases of illegal poaching) (PERSSON 2007). Research carried out between 1996 and 2002 on 245 radio-collared lynx in Sweden and Norway revealed that 46% of adult mortality was attributable to sure and probable illegal poaching (ANDRÉN ET AL. 2006). Great caution must be taken not to superficially and indiscriminately accuse all reindeer herders of illegal poaching. Concerning attitudes toward carnivores, reindeer herders are a heterogeneous group. Although most may not have any connection whatsoever to poaching activities, a review of recent verdicts on illegal poaching found that there were reindeer herders among the culprits (FORSBERG & KORSELL 2005).

3 Internal management of payments

The main research question of our empirical work was whether the Sami villages in Sweden have set up common pool regimes to manage the distribution of the payments toward collective action in conservation and whether there are interdependencies between the villages' structural characteristics and their modalities of distributing the money. From a thorough analysis of several long enduring common pool resource management systems around the world Ostrom extracted seven design principles for institutional arrangements (OSTROM 1990). These design principles are hypothesized to make long endurance of a resource management system more probable. In first results, we identified three of the principles in the Swedish case study.

An important principle is the establishment of clear boundary rules. In Sweden, these are provided, both in a geographical sense as well as in respect to the group of people. The Sami are organized in villages with clearly defined geographical borders. Explicit laws have been formulated on how to assign the performance payments if a carnivore reproduces in a border region between villages (NATURVÅRDSVERKET 2004). Additionally, only Sami people are allowed to engage in reindeer husbandry.

The design principle 'minimal recognition of right to organize' is met since the villages have full rights to manage, use, and distribute the performance payments

in whatever way they believe is best (REGERINGENS PROP. 2000/01:57). Their decisions on the use of the money cannot be overruled.

To collect data on a further design principle ‘congruence between appropriation and provision of inputs’ we sent a questionnaire to the village heads of the 51 Sami villages. 21 (41%) questionnaires were returned. Since prey is not extremely abundant, maintaining herds of semi-domestic reindeer can be interpreted as provision of input for carnivore conservation (PEDERSEN ET AL. 1999). The data reveals that in most villages where individual members’ reindeer herds are not equally affected by carnivore attacks, at least a share of the money is directly apportioned to individuals. If money is paid out to individuals, it is always distributed proportionally to the number of animals a herder owns. Though this may not be totally congruent with damage to individual herders, it has the advantage of low transaction costs. Also, the unequal distribution of attacks usually only pertains to winter pastures. In summer, all animals graze in one large flock. The loss of reindeer each herder suffers during the summer months is likely to be proportional to the number of his animals. Supposedly, the number of reindeer an individual owns is chosen as second best measurement unit for the winter months as well. The majority of the villages in which all herders are equally affected by carnivore attacks do not distribute money directly to individuals but rather spend it on the communities’ common expenses.

The presence of these first three design principles already gives some indication that prospects for the endurance of common pool resource management systems are promising in Sami villages.

Concerning interdependencies between the villages’ structural characteristics and money distribution modalities, the data from the questionnaire revealed that small villages with 10 or less reindeer enterprises use significantly more of their performance payments for community expenses than villages with more reindeer enterprises. This finding is in line with the theory of the effects of group size on collective action.

4 Discussion of scheme transferability

Whether a performance payment scheme is likely to be a viable solution for wild-life-livestock conflicts in other parts of the world will be an interesting question for further research. Deciding on how to allocate the performance payments may prove to be the most intricate problem. Payments for a defined conservation outcome should be made to those who are responsible for the outcome. In general there are two possibilities to allocate the payments: they can either be distributed to individuals or to groups of people, e.g. communities.

Making payments to an individual can be reasonable if the payment recipient is the person who indisputably has the greatest influence on the defined conservation outcome. The advantage of this approach is that it circumvents the prisoner’s

dilemma of collective action. In the carnivore conservation context, discerning who is responsible for the conservation outcome is likely to be cumbersome. Land titles can serve as a convenient linking dimension, i.e. a land owner is rewarded for carnivore offspring on his plot. However, this can only be an expedient solution if private properties are large enough to comprise the territories of several carnivores and changes of conservation outcome can be directly attributed to the respective land owner.

Tying payments to individuals' properties could be a major problem in developing countries with weak institutions and uncertain property rights (FERRARO & KISS 2002). Under such circumstances there is concern that local elites could take advantage of the unclear property rights situation and claim land titles on common land, thereby excluding less influential poor livestock owners, who eventually are more vulnerable to livestock losses. Area based direct payments for environmental services schemes have been confronted with situations where elites muscled out poor, less influential people (LANDELL-MILLS & PORRAS 2002; PAGIOLA ET AL. 2005). Thus, in cases of densely populated areas with small plots or unclear property rights, paying groups of people for performance outcomes may be more practical.

The Swedish case study exemplified this approach. Each village is empowered to design a money distribution scheme that is well adapted to its particular situation. The money may be distributed to individuals or invested in community projects that are beneficial to the whole group.

The institutional settings in other regions of the world may be less fitting for the installation of community payment schemes. In particular, group boundaries may be less well defined which could give rise to welfare magnet problems, i.e. people explicitly move to the community in hope of benefiting from the payment scheme. Nevertheless, for some regions, performance payments may be an interesting alternative to conventional ex-post compensation.

References

- ALBERS, H. AND P. FERRARO (2006). Economics of Biodiversity Conservation in Developing Countries. In Toman, M. and Lopez, R. (eds), *Economic Development and Environmental Sustainability: new policy options*. New York: Oxford University Press, 382-411.
- ANDRÉN, H., LINNELL, J., LIBERG, O., ANDERSEN, R., DANELL, A., KARLSSON, J., ODDEN, J., MOA, P., AHLQUIST, P., KVAM, T., FRANZÉN, R. AND P. SEGERSTRÖM (2006). Survival rates and causes of mortality in Eurasian lynx (*Lynx lynx*) in multi-use landscapes. *Biological Conservation* 131: 23-32.
- BLANCO, J. C. (2003). Wolf Damage Compensation Schemes in Spain. *Carnivore Damage Prevention News* 6: 7-9.
- COZZA, K., FICO, R. AND M. BATTISTINI (1996). The damage-conservation interface illustrated by predation on domestic livestock in central Italy. *Biological Conservation* 78: 329-336.
- DANELL, A., ANDRÉN, H., SEGERSTRÖM, P. AND R. FRANZÉN (2006). Space use by Eurasian lynx in relation to reindeer migration. *Canadian Journal of Zoology* 84: 546-555.
- FERRARO, P. AND A. KISS (2002). Direct Payments to Conserve Biodiversity. *Science* 298: 1718-1719.
- FORSBERG, J. AND L. KORSELL (2005). Illegal jakt på rovdjur: En förstudie. Brottsförebyggande rådet, Stockholm.
- FOURLI, M. (1999). Compensation for damage caused by bears and wolves in the European Union: Experiences from LIFE-Nature projects. European Commission, Luxembourg.
- LANDELL-MILLS, N. AND I. T. PORRAS. (2002). Silver bullet or fools' gold? A global review of markets for forest environmental services and their impact on the poor. Instruments for sustainable private sector forestry series. International Institute for Environment and Development, London.
- MADHUSUDAN, M. D. (2003). Living Amidst Large Wildlife: Livestock and Crop Depredation by Large Mammals in the Interior Villages of Bhadra Tiger Reserve, South India. *Environmental Management* 31(4): 466-475.
- MISHRA, C. (1997). Livestock depredation by large carnivores in the Indian trans-Himalaya: conflict perceptions and conservation prospects. *Environmental Conservation* 24 (4): 338-343.
- MONTAG, J. (2002). Compensation and Predator Conservation: Limitations of Compensation. *Carnivore Damage Prevention News* 6: 2-6.
- MUSTELID SPECIALIST GROUP (1996). *Gulo gulo*. In: IUCN 2006. IUCN Red List of Threatened Species. Available from www.iucnredlist.org. (accessed 30 March 2007).

- NATURVÅRDSVERKET (2004). Naturvårdsverkets författningssamling (NFS 2004:17): Naturvårdsverkets föreskrifter och allmänna råd om inventering samt bidrag och ersättning för rovdjursförekomst i samebyar. Naturvårdsverket, Stockholm.
- NAUGHTON-TREVES, L., GROSSBERG, R. AND A. TREVES (2003). Paying for Tolerance: Rural Citizens' Attitudes toward Wolf Depredation and Compensation. *Conservation Biology* 17(6): 1500-1511.
- OSTROM, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge.
- PAGIOLA, S., ARCENAS, A. AND G. PLATAIS (2005). Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America. *World Development* 33(2): 237-253.
- PEDERSEN, V., LINNELL, J., ANDERSEN, R., ANDRÉN, H., LINDÉN, M. AND P. SEGERSTRÖM (1999). Winter lynx *Lynx lynx* predation on semi-domestic reindeer *Rangifer tarandus* in northern Sweden. *Wildlife Biology* 5(4): 203-211.
- PERSSON, J. (2005). Female wolverine (*Gulo gulo*) reproduction: reproductive costs and winter food availability. *Canadian Journal of Zoology* 83: 1453-1459.
- PERSSON, J. (2007). Järvens status och ekologi i Sverige. Report for the governmental evaluation of the large carnivores (Utredningen om de stora rovdjuren).
- REGERINGENS PROPOSITION 2000/01:57. Sammanhållen rovdjurspolitik. Stockholm.
- SABERVAL, V., GIBBS, J., CHELLAM, R., JOHNSINGH, A. (1994). Lion-Human Conflict in the Gir Forest, India. *Conservation Biology* 8 (2): 501-507.
- SWENSON, J. E. AND H. ANDRÉN (2005). A tale of two countries: large carnivore depredation and compensation schemes in Sweden and Norway. In Woodroffe, R., Thirgood, S., Rabinowitz, A. (eds), *People and Wildlife: Conflict or Coexistence?* London: Cambridge University Press, 323-339.
- THIRGOOD, S., WOODROFFE, R. AND A. RABINOWITZ (2005). The impact of human-wildlife conflict on human lives and livelihoods. In Woodroffe, R., Thirgood, S., Rabinowitz, A. (eds), *People and Wildlife: Conflict or Coexistence?* London: Cambridge University Press, 13-26.
- WESTERN, D. AND J. WAITHAKA (2005). Policies for reducing human-wildlife conflict: a Kenya case study. In Woodroffe, R., Thirgood, S., Rabinowitz, A. (eds), *People and Wildlife: Conflict or Coexistence?* London: Cambridge University Press, 357-372.

WOODROFFE, R., LINDSEY, P., ROMANACH, S., STEIN, A. AND S. RANAH (2005).
Livestock predation by endangered African wild dogs (*Lycaon pictus*) in
northern Kenya. *Biological Conservation* 124: 225–234.