Land Use Policy 47 (2015) 253–261

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Owner or tenant: Who adopts better soil conservation practices?

Petr Sklenicka*, Kristina Janeckova Molnarova, Miroslav Salek, Petra Simova, Josef Vlasak, Pavel Sekac, Vratislava Janovska

Czech University of Life Sciences Prague, Faculty of Environmental Sciences, Prague 165 21, Czech Republic

ARTICLE INFO

Article history:
Received 25 January 2015
Received in revised form 25 March 2015
Accepted 19 April 2015

Keywords:
Soil erosion
Tenure security
Rural development
Sustainable land use
Farmland degradation

ABSTRACT

Land tenure security is widely considered to be a fundamental factor in motivating farmers to adopt sustainable land management practices. This study aims to establish whether it is true that owner-operators adopt more effective soil conservation measures than tenant-operators, and whether well-designed agro-environmental instruments can provide sufficiently strong motivation to compensate for the differences between these two groups.

An analysis of the level of adoption of four types of erosion control measures on 263 blocks of arable land endangered by water erosion in the Czech Republic has proved that all measures were adopted by owners significantly more frequently than by tenants. Compared to tenants, owners applied wide-row crops in crop rotation schemes 2.4 times less frequently in the last 5 years, while they applied soil-improving crops 1.9 times more frequently. Contour farming was adopted 1.8 times more often by owners, and the slope length in production blocks farmed by owners was on an average 2.4 times shorter than in blocks farmed by tenants. However, the study has also shown that, in cases where conservation measures are supported by incentives based on Good Agricultural and Environmental Conditions (GAEC) standards cross compliance, the differences in the approach to soil conservation between owners and tenants were minimized or eliminated, due to the adoption of responsible practices by tenants. The study has proved that a well-designed system of environmentally determined subsidies can compensate otherwise substantial differences in the attitude of owners and tenants towards soil conservation.

1. Introduction

The well-known saying "No one washes a rented car", attributed to several different authors, encapsulates the basic idea investigated in this study. As long as there are countries where farmland is operated mostly by tenants (e.g. 11 of the 28 EU countries), it is important to ask whether the tenants take responsible care of this natural resource. In the spirit of the above saying, a negative answer can be presumed. However, this answer needs to be verified on the basis of real data. We should know whether differences do exist between owners' and tenants' farming practices, and, if so, how significant these differences are. We should also know how farmers' decisions are affected by motivational tools, such as the European GAEC cross-compliance standards, which support sustainable management practices on farmland. Are well designed subsidy policies able to compensate the differences between owners and tenants?

Soil erosion as a physical process has been consistently studied for the last two centuries (Dotterweich, 2013) by scientists from backgrounds as diverse as geography, agronomy and engineering (Boardman et al., 2003). However, the causes of this physical process are firmly rooted in the socio-economic, political and cultural environment in which the land users operate (Stocking and Murnaghan, 2001), which is a fact not taken into account in the majority of soil erosion studies (Boardman, 2006).

Farmers' decisions to employ practices leading to soil conservation, rather than to soil degradation, can be divided into three categories according to their motivation: farmers' voluntary decisions based on their values, decisions motivated by economic incentives, and decisions determined by legal restrictions. In traditional agricultural societies, voluntary soil conservation was the key to long-term survival, and episodes of increased soil degradation generally marked a significant setback to the human population (e.g. Pregill and Volkman, 1999). In some parts of the world, such as the Mediterranean uplands (McNeill, 2002), this effect was less

* Corresponding author at: Czech University of Life Sciences Prague, Faculty of Environmental Sciences, Kamycka 129, Prague 165 21, Czech Republic.
Tel.: +420 776 323 824; fax: +420 234 381 848.
E-mail addresses: sklenicka@fzp.czu.cz (P. Sklenicka), janeckova@fzp.czu.cz (K.J. Molnarova), salek@fzp.czu.cz (M. Salek), simova@fzp.czu.cz (P. Simova), jvlasak@fzp.czu.cz (J. Vlasak), pavel.sekac@mze.cz (P. Sekac), janovska@fzp.czu.cz (V. Janovska).

http://dx.doi.org/10.1016/j.landusepol.2015.04.017

pronounced as the soils are degraded more slowly. In other places, notably the tropics, soil degradation tends to be much faster, leading to an immediate and dramatic effect on agricultural yields. Therefore, unless sustainable alternatives were found, the populations quickly ceased to grow (Henley, 2008). In the Central European region, farming within traditional small-scale field patterns (Sklenicka et al., 2009; Skaloš et al., 2012) was relatively effective in soil conservation (Kovář et al., 2011).

In the present day, a number of methods are available to increase short-term agricultural production, regardless of possible long-term effects on the soil quality. The decision to employ soil conserving practices, at the expense of immediate financial gain, is therefore a complex one, influenced by a number of factors. Some authors (e.g. Löw and Míchal, 2003) argue that "ties to the land" are critical in the farmer's decision to protect the soil, and that land which has been owned and farmed by a family for several generations is much more likely to receive long-term erosion control measures. Similarly, Stocking and Murnaghan (2001) note that security of land tenure affects farmers' decisions in a similar way, and Hardin (1968) discusses the "tragedy of the commons", pointing out that common property resources are the most vulnerable to degradation. Ervin (1982) has also demonstrated better use of soil conservation practices by owner operators than by tenants. On the other hand, Boardman et al. (2003) state that in the developed world, there is no evidence that owners conserve soil better than tenants. They hypothesize that this could be due to the high level of land tenure security for tenants.

Stocking and Murnaghan (2001) also emphasize the role of the location of impacts of soil conservation measures. Practices which incur benefits or eliminate costs on-site (on the farmer's land) are much more likely to be employed voluntarily than those with an impact that occurs off-site (McConnell, 1983). For example, silting of rivers and water bodies, and also mud floods, are perceived as a cost to society, not to the individual farmer (Schuler et al., 2006), and are therefore less likely to be mitigated voluntarily by farmers.

Off-site impacts are therefore often the primary concern of prevention and mitigation measures employed by governments and conservation agencies (Evans, 2002; Fullen et al., 2006; Kutter et al., 2011). These include (1) mandatory measures, which regulate environmental damage using reinforcement mechanisms such as fines or withdrawal of farming subsidies; (2) voluntary incentive-based measures, which provide financial incentives to provide environmental benefits beyond the level established by mandatory measures; and (3) awareness-raising measures, aiming to educate land users in best management practices (Kutter et al., 2011). Frequently, a combination of these approaches is used to achieve optimal results (Anderson and Thampapillai, 1990). It also needs to be noted that schemes which are formally based on incentives can in some cases have restrictive aspects. For example, 40% of farmers who participated in the first stage of the Sloping Land Conversion Program in China felt that their participation was imposed on them by the authorities (Wang and Maclaren, 2012).

In the EU, incentive-based measures have a long tradition, and overviews by Boardman et al. (2003) and Fullen et al. (2006) report mostly measures of this type. Boardman et al. (2003) state that farmers in the developed world are predominantly influenced by economic incentives, and Myers and Kent (1998) note that the extent of this influence has in some cases contributed to environmental degradation.

Voluntary incentive-based measures often form parts of regional development policies. These policies have formed a basis for many cases of conservation success in Europe, including a substantial reduction in soil erosion due to a change from autumn to spring ploughing in Norway (Lundekvam et al., 2003), mitigation of harmful sheep grazing practices in Iceland (Arnalds and Barkarson, 2003), and greater farmer involvement in soil conservation schemes in Belgium (Verstraeten et al., 2003) and the Netherlands (Spaan et al., 2010). In recent years, a large proportion of soil conservation incentives have been paid within the EU Agri-environmental programmes and as Natural Handicap payments to farmers in less favoured areas (Kutter et al., 2011). Although the acceptance of these programmes is often ambiguous (Macilwain, 2004), measures facilitated by the incentives have already contributed significantly to soil conservation in the EU (e.g. Van Rompaey et al., 2001; Schuler and Sattler, 2010).

Mandatory soil conservation measures have traditionally been embodied in the legal systems of the individual EU countries, and there was a high level of spatio-temporal variability in the 20th century. For example, while Western European countries such as Germany, the United Kingdom and Denmark have fewer but more stable mandatory soil conservation regulations (Boardman and Poesen, 2006), post-communist countries such as the Czech Republic, the Slovak Republic and Hungary experienced a rapid change from heavily regulated to almost unregulated land management in the 1990s (Dostál et al., 2006; Cebecauer and Hofierka, 2008). While the mandatory measures implemented under communist regimes were production-oriented rather than conservation-oriented, and had many negative impacts on soils and on the landscape, rapid deregulation without adequate replacement also contributed to soil degradation in many places (Janeček et al., 2002).

In 2005, the EU Common Agricultural Policy was supplemented by mandatory cross-compliance standards to prevent negative environmental impacts of agriculture. The issue of water soil erosion is addressed mainly by the Good Agricultural and Environmental Conditions standards GAEC 1 and GAEC 2, applied to agricultural parcels listed in the Land Parcel Identification System as arable land. The following summary lists the conditions of GAEC 1 and GAEC 2 valid in the Czech Republic and relevant for the purposes of this study.

GAEC 1 defines soil conservation measures on arable parcels with a slope greater than 7°. Applicants for farming subsidies on this type of land are required to sow a subsequent crop after harvest or to apply one of the following measures: (1) The stubble of the harvested crop is left on the block of land or part thereof at least until November 30th, unless this is contrary to GAEC 2 requirements on plots strongly endangered by erosion. (2) The land remains ploughed or tilled for the purposes of water absorption at least until November 30th, unless this is contrary to GAEC 2 requirements on plots strongly endangered by erosion. These measures are minimum requirements leading to a reduction in soil erosion and runoff, as well as to a decreased risk of flooding and related damage.

The main aims of GAEC 2 are to protect soil against water erosion and to reduce both direct impacts of erosion and indirect impacts caused by flooding and muddy floods. The GAEC 2 standard addressing the issue of erosion on strongly endangered soils was accepted on January 1st 2010, and since July 1st 2011 the standard has been extended to slightly endangered soils. The issue of soil erosion is addressed by regulating the crop species grown on vulnerable land and the agrotechnology that may be used.

Applicants for farming subsidies (direct payments within Pillar 1) on land classified as strongly endangered by erosion are required through cross-compliance not to grow wide-row crops on this land, i.e. maize, potatoes, beetroot, broad beans, soy, sunflower and sorghum. Cereals and rape seed crops are to be planted using soil protective technologies. For cereal crops, these measures are not required where the crop is sown into protective clover or grass-clover undersow. On slightly endangered soils, the applicant is required to grow wide-row crops only with soil protective technologies. These conditions do not need to be met where the area of endangered soil is less than 0.40 ha, provided that the wide-row crops rows are oriented along contour lines, with maximum divergence of 30°, and that below the endangered area there is