

Agri-environmental Problems in Farming Systems of Central and Eastern European Countries Change During Transition 1989-2003¹

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Abstract

Transition to market economy began the 1990s in most of the Central and Eastern European Countries. This paper gives an overview of some of the most widespread agri-environmental problems in the CEEC with particular reference to case studies of farming systems. Suggestions and remarks on possible means to resolve the problems are made. We will mainly refer to well-documented issues and cases which we have had good access to, partly through a large EU funded research project 2000-2003 called CEESA and to quantitative data collected in 12 countries (Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Romania, Bulgaria and Ukraine).

1. Introduction

The transition to market economy in the Central and Eastern European Countries (CEEC) has influenced farming systems in many respects. The collapse of planning economy and the transition of large state owned farms into private farms has implied that the organisational structure of farms changed. Market prices of product, inputs and resources have replaced the planned economies. All these factors combined have implied a change of technology used on farms and a change in the organisation of resources on the farm. This has in turn affected the environment in various ways. Some of the influences have been beneficial from environmental point of view (e.g. reduced pressure by high intensity in crop and animal production, reduced soil compaction) while others have been negative (e.g. existing biodiversity reserves are under threat (Sumelius 2000). The new systems have been going through a transition period but are still not stable. Structural problems from the heritage of the large co-operatives have created transition problems and unstable agricultural production. Six countries in CEE are considered to be Low Income Food Deficit Countries with considerable food insecurity problems (Tanic, S. 2002a).

The purpose of this paper is to describe the relation between farming systems and environmental issues in twelve different CEEC countries and to discuss some possible general recommendations for resolving the problems. Five cases of the twelve farming system have been studied more in depth in the CEESA research group on farming systems. Two case studies related to water in two farming systems (Romania and Croatia), two to landscape and biodiversity (Estonia and Hungary) and one to water (Bulgaria). The farming systems in these countries were chosen by separate researchers who identified the farming systems and their main interaction with the environment. A detailed description of these farming systems is given in Tanic et al. (2001). A crucial issue of the CEESA research in this group was to assess the sustainability development aspects of alternative farming systems. The EU

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requirements of environmental protection will further affect the process of restructuring the agricultural sectors in the CEEC.

Some trends in the twelve CEEC were common for all countries. Privatisation and de-collectivisation of large-scale production units has led to declining production. Especially animal production has decreased in almost all CEEC. The animal production has also faced strong technological development. At the same time the number of family farms with low use of purchased inputs has increased. Unfavourable economic conditions and weak instituted policies could be identified as the largest obstacles for family farms to adjust to structural change. Switching from a protected institutional environment to an environment with uncertainty and competition with some missing rules is a problem in farming. Since the mid 1990s economic recovery and production have started to increase or at least to stabilise (Bäckman *et al.* 2000). In the next section we describe some of the most widespread agri-environmental problems in the CEEC during the transition period with reference to particular case studies. In the third section we make some suggestions and remarks on possible means to resolve the problems.

2. Agri-environmental issues in selected farming systems during transition

It is obvious that agri-environmental problems are widespread in all CEEC. Some of the environmental problems are inherited from the period before transition, when the use of external inputs, e.g. fertilisers and pesticides was intensive and the manure of large animal units was a severe cause of water pollution. During transition the production has become more extensive and the number of animals has reduced considerably. Thus the environmental burden from agriculture has decreased. However, simultaneously the deterioration of old structures like irrigation canals led to the adoption of less favourable practices. For example, in Bulgaria irrigation with ground water as a substitute for canal water irrigation increased the risk of salinization.

The case studies carried out have shown the importance of supplementing analysis of agri-environmental problems with farming systems cases. Based on general analyses of the situation in the CEEC it is possible to conclude that the problem of excessive use of plant nutrients leading to *water enrichment* was common in the pretransition period. In spite of decreasing intensities, which tend to decrease eutrophication the case studies show that in some regions that still are intensively cultivated or have intensified only after transition, this problem continues to exist. The Croatian mixed farming system situated in the region of Lonja indicate that farmers use higher than economically optimal nitrogen doses, on average well above 200 kg/ha of pure N, including artificial fertilisers and manure, in wheat and maize cultivation in 1999 and 2000. Excluding manure, the 20 farms have used from 158 kg N/ha to 193 kg N/ha of pure N in wheat production and from 144 kg N/ha to 176 kg N/ha in maize production. The estimated content of N in the manure was 50 kg N/ha on dairy farms, 57 kg N/ha on pig farms and 59 kg N/ha on beef farms (Grgić and Mesić 2001). These intensities seem to lead estimated nitrate (NO₃)-levels of 160-192% higher than stipulated by the Nitrate Directive. Technically the situation could be improved by applying alternative crop husbandry practices, which may make better use of the manure applied. Improving extension, introducing cross compliance measures and introduction nitrogen taxes or nitrogen quotas were also found possible ways of reducing nitrate leaching (Sumelius *et al.* 2003a).

In the Romanian region of Cazanesti, water pollution problems are mainly due to intensive livestock production. However, the environmental situation has clearly improved during the last ten years. The indicators collected at farm and rural community level, based on farm surveys were combined with water quality assessment in two “receptor points”, upstream and downstream the critical region. It is

obvious that the state of waters improved after the largest pollutant, a large former state farm privatised in 1999 was liquidated (Toma, 2001, Bäckman et al. 2001).

Intensive agriculture seem, however, to be an exception of a more general tendency, lack of sufficient plant nutrient inputs to the soil. Therefore, the more widespread phenomenon seems to be that of *nutrient depletion*. In this case, the reserves of phosphorus and potassium tied to soil particles are depleted, which leads to problems with the fertility of the soil. This, in turn, may aggravate processes like erosion and phosphorus runoff. With the exception of Slovenia, use of mineral phosphorus fertiliser decreased from 1989 to 1998 by over 100% in all the twelve countries examined. The reduction in nitrogen fertilisation was somewhat less, still over 100% in most cases (Bäckman et al. 2000, CEESA national inventories).

Soil degradation has been a major environmental problem in many farming systems of the CEE. Yet, the most widespread problem, erosion, existed prior to the economic transition, and still remains there. Erosion, as well as compaction, is particularly common on the large-scale farms that are common in most of the CEE countries. A severe phenomenon is also the salt accumulation that is taking place in some arid regions where agriculture is dependent on irrigation. This was the case in the Bulgarian farming case study in the region of Plovdiv. Salt accumulation is the most significant soil degradation problem in this region. Of 22 villages surveyed within CEESA (76 villages is the total in the region) three were found to suffer from primary salt accumulation. Switching to alternative farming practices for the salt-affected soils were found reducing salt accumulation. The main elements of such practices include deep tillage (levelling), water quality (frequency), organic matter (mulching) and crop rotation. The alternative farming practices, were found economically viable. A low level of vocational training, fragmentation of parcels and too small financial sources for farmers to switch to other farming practices were found to be the main obstacles (Aleksiev, 2002). It seems also from the experience of Ukraine that a part of soil degradation could be prevented by a set of management practices. Therefore, institution-building and the improvement of human capital through better education, extension and information-spreading in order to promote the uptake of such practices are needed.

Large-scale *abandonment of land* is a recent trend in many farming systems of the CEE countries. This abandonment serves as an indicator of the loss of rural cultural patterns. Abandonment indicates the presence of severe land-use problems. While land abandonment is common in most CEE countries, it seems to be particularly widespread in particular countries or regions. Abandonment may severely decrease landscape values in countries such as Estonia, where almost 40 % of former agricultural land still was in fallow during the last reorganisation of agriculture in Estonia (Hiemäe and Roosma, 2001). There are at least two reasons for these circumstances 1. property rights for land are unclear or the privatisation process has not been finished. 2. agricultural policies have been almost completely liberalized which has lead to imports, reduced profitability of farming and reduced use of agricultural land.

Abandonment of traditional farming systems poses a *threat to biodiversity* in some CEEC. While agriculture in the major areas of Europe has become intensified, there are still relatively large areas in the CEE countries that are dominated by natural and semi-natural grasslands, areas that are rich in natural features or important for wildlife. In mountainous areas like the Carpathians grasslands play an important role regarding the preservation of biodiversity. Toma (2000) mentions 57 endemic and 171 subendemic plants species in Romania, of which, eight species are listed as vulnerable. An additional 25 species are listed as rare, including two that are very rare. According to Toma, without adequate conservation management, their protection and sustainable use will be threatened. A similar situation also looms for mountainous regions of Slovakia, the Ukraine and the Czech republic where extensive farming systems still exist (Brouwer et al. 2001, Křůmalová and Bäckman 2003). Not only in

mountainous regions does agriculture have a big value for biodiversity. In the flatlands of Hungary traditional grazing management is important. Farming systems are a major preserver of the rural step like landscape and the main wildlife habitat for many species, for instance the Great Bustard (*Otis tarda*) (Podmaniczky *et al.* 2001). These cases show that traditional farming systems have not received enough attention in order to preserve the biodiversity. Many farming systems are under strong pressure to change. The political, commercial and institutional environment the work in is not stable. To create a stable setting for their preservation would be important.

It is obvious that poor profitability, poor credit possibilities and insufficient compensation payments for good agricultural practices all impede the implementation of alternative sustainable farming practices. Development of farmer associations, farmer advisory services, and information services and exchange remains an important challenge. In some cases negative effects are a consequences lacking property rights regimes and the associated fair distribution of costs and benefits. Another difficulty resulting from the privatisation process was land fragmentation and land abandonment. The restitution of land to farmers has resulted in a large number of small plots. In addition, in many countries, land titling has been slow and the property rights have not been clear. Fragmented parcels of land are costly to manage and maintain which often leads to abandonment of those fields.

How can the situation be changed? What would be the remedies for the problems? How could a more sustainable agriculture be encouraged?

Measures to resolve agri-environmental problems in the CEEC.

To improve income opportunities and food security for the rural population and to decrease some of the environmental pressures that exist, farming systems in CEEC will need to become more intensive but at the same time more sustainable and diversified (Tanic 2002b) The farming systems have to provide that:

- farm productivity is sustained or enhanced over the long-term;
- adverse impacts on the natural resource base of agriculture and associated ecosystems are minimized or ameliorated;
- residues resulting from the use of chemicals in agriculture are minimized;
- the net social benefit derived from agriculture is maximized;

Such farming systems could improve the well being of individual farming families by approaching both the private and social goals. They also need to be sufficiently flexible to manage risks associated with the variability of climate, markets and instituted policies. To be able to design and to develop such farming systems, it is important to have the appropriate knowledge about the environment (natural, social, economic and political) in which farmers operate in order to assist them in the adoption of appropriate production and management practices.

Achieving sustainable development in the farming sector requires solidarity and a sense of community, independence and empowerment among the farming community which can help in creating a community driven civil society (Petersen and Norman, 2002). The property relations in Central and Eastern Europe needs also to be taken into account. In many CEEC landowners are not farmers and there exists a high number of tenant farmers. After privatisation, many small landowners in CEEC have sold or leased their land to large co-operatives or limited liability companies. These pay very low rents, if any, and continue agricultural activities on a medium to large scale.

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