

# Efficiency of Agricultural Land Resources Protection Policy in the Czech Republic

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## Abstract

This contribution evaluates efficiency of land resources protection policy in term of institutional economy in the Czech Republic. It resumes results of investigation in form of standardised interviews that was aimed at evaluation of individual phases of the programme cycle, from the problem analysis through proposal of a solution instrument to the problem resolution and implementation and monitoring of measures. The chosen measures were Land Consolidation and Good Agricultural and Environmental Conditions. The authors found that the soil erosion problem had been well identified and that it was generally perceived by the public as serious. However, many shortcomings were identified in the measure proposal, implementation as well as evaluation of the measure's impacts. In consequence, these shortcomings reduce efficiency of the measure.

**Keywords:** soil protection policy, land consolidation, good agricultural and environmental condition (GAEC)

## Introduction

The land resources protection policy is getting in the forefront of interest of the Government and the public of the Czech Republic. Land shall be maintained not only as means of production for agriculture and forestry. It has also an ecological importance and many other functions. At present, land resources of the Czech Republic are highly endangered by various forms of degradation. Soil degradation means disturbance of a certain soil function or property. For example, the estimated damages caused by soil degradation within the European Union represent 14 billion € a year (Janeček et al. 2007). Degradation processes endangering soil, its functions and the entire ecosystem in the Czech Republic and the Central Europe are water and wind erosion, decline in organic matter, acidification, soil structure degradation and consequent soil compaction, soil pollution, intoxication, contamination. Soil loss due to building (soil sealing) is a very noticeable negative process. This irreversible change

results in total and irreversible soil destruction and is particularly relevant at present.

Soil protection policy contains substantive shortcomings both in the CR and EU. EU does not succeed in adoption of a common regulation aimed exclusively at agricultural land protection, although a framework directive on soil protection has been discussed for several years already. Efficiency of land resources protection is not connected only with existence of relevant measures. It depends in a great degree on the way in which the measures are proposed and controlled in order to make farmers accept efficient soil protection practices. Public policy instruments include activities/methods through which it is possible to influence changes in the external environment. The typology of policy instruments is based on the theory of politic economy (Peters and Pierre 2006) and other available literature (SoCo Project Team 2009; Ostrom 2006; Winter and May 2001). One option is to distinguish between stimulation instruments (e.g. subsidy) and restrictive instruments (restriction by the law). Literature (Pražan and Dumbrovský 2011; Prager 2010) includes references to research made in the field of policy assessment of agri-environmental measures. Some foreign studies focused on cost efficiency of voluntary and directive soil protection policies (Winter and May 2001).

This article describes knowledge concerning assessment of a program cycle of two policy instruments for soil protection against water erosion. The first instrument is a land consolidation (LC), in particular its part called “Plan of common facilities”. The plan of common facilities represents a future framework of organisation of rural landscape within a land consolidation area. The plan of common facilities concerns, in particular, design of scattered and accompanying vegetation, anti-erosion balks, infiltration belts, windbreaks, protective grassing and afforestation, water reservoirs, ponds, protective dikes, dry polders and protective belts along water sources. Good Agricultural and Environmental Conditions (GAEC) of the currently implemented anti-erosion measure GAEC 2 are the other monitored instrument. From the 1<sup>st</sup> July 2011, the GAEC 2 standard was enlarged to so-called slightly erosion threatened soil on which it is possible to found wide row crop vegetation only with use of soil protecting technologies. Within the survey made in 2011, it was therefore possible to monitor directly the process of implementation of the new measure.

The aim of the survey was to assess policy making through examples of selected measures, to assess its individual phases, to reveal weaknesses and to assess the impact that policy making conditions may have on efficiency of the measure. The aim of the investigation in form of questionnaires was to answer the survey question: “What are the reasons for inefficiency of soil protection and why we do not succeed to eliminate them?”

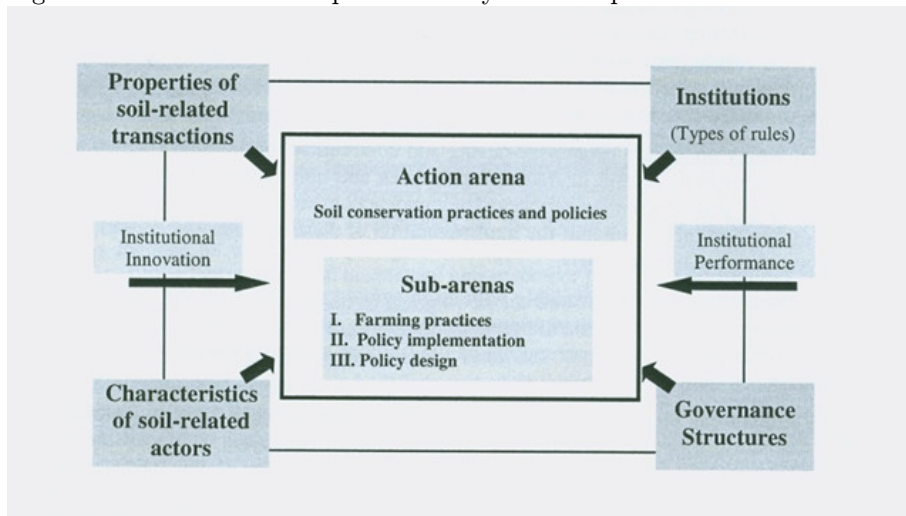
## **Materials and Methods**

Methodology of solution of the problem was based on knowledge of institutional economics. In contrast with other economic theories, the institutional economics does not treat exclusively economic phenomena taking place within

a given institutional organisation. It treats, on the contrary, the institutional framework formed by both the formal (e.g. laws) and informal institutions (e.g. habits or culture of the society) and conditions of action of the institutions and policy instruments, theory of ownership rights and contracts (relations).

The general framework that takes into consideration mutual dependence between ecological and social systems was used as a theoretical base of the survey and drafting of questionnaires. The Institutions of Sustainability (IoS) framework (fig. 1) shows the complexity of agents influencing soil degradation and protection. It is able to offer a systematic structure for analysis and understanding of diverse problems and relations taking the role in soil protection policy. It serves to integration of various survey approaches derived from soil science, business economics, political sciences and institutional economy.

Figure 1 IoS framework adapted for analysis of soil protection



Taken from: source (Prager et al. 2010): Applying the Institutions of Sustainability Framework to the case of agricultural soil conservation

Actions relevant for protection and degradation of soil take place in 3 sub-arenas:

- I. Level of farms (decision of the farmer to adopt special soil protection procedures).
- II. Level of policy implementation (agricultural or environmental administration implementing special procedures and monitoring compliance with restrictions in use of land).
- III. Level of policy making (policy makers at the EU, national and regional levels defining concrete restrictions in use of land in nature protection zones or agro-environmental protection system).

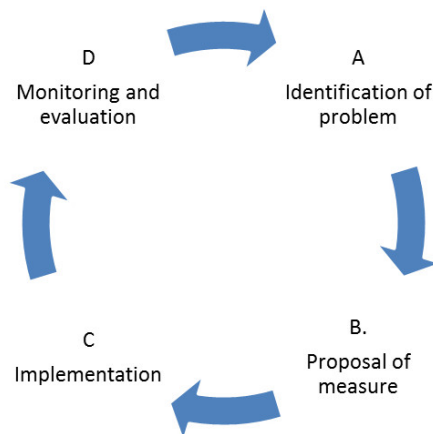
IoS identified 4 outer factors influencing each state of activities, forming their context and determining the result.

1. Transaction properties (in relation to land) that result from or are protected by the state of activity (including biophysical soil properties).
2. Nature (behaviour) of actors participating in the activities.
3. Institutions (sets of regulations and rules).
4. Governmental structures executing regulations.

These 4 outer factors are interconnected and they influence each other (Hagedorn 2008): but “institutions” and “governmental structures” seem to be independent of “properties” and “nature of actors”.

The process of policy making was monitored on the given measures in such a way that the survey carried out could enable assessment of strengths and weaknesses in all phases of the programme cycle and in all sub-arenas from the point of view of the IoS framework. The programme cycle diagram is shown on fig. 2.

Figure 2 Programme cycle diagram



Source: Adapted according to OECD<sup>1</sup>

The survey took form of semi-standardised interviews according methodology of Majerová and Majer (2003). The aim of this technique was to acquire orientation in questions of soil conservation. Most of the questions were given in advance and fixed questions, their clear framing, their order during the interview represented a standard feature. The survey performed included non-standardised additional open questions that facilitated qualitative analysis of answers. Some questions used an assessment scale, but in principle, the questionnaire was compiled in such a way that offered sufficient space for expressions of views, observations and findings of respondents.

<sup>1</sup>It includes links to websites of international organisations such as the Organisation for Economic Co-operation and Development (OECD), research institutes and other organisations which give information about policy-making internationally in a wide range of areas.

The questionnaires were prepared in order to include all phases of the programme cycle and all types of actors in the area of designing and applying policy instruments for water erosion soil protection. The questionnaire survey focused on the central and regional level and relevant scientific establishments. The central level – i.e. policy makers – was represented by representatives of Ministry of Agriculture (MA), Ministry of Environment (ME), research establishments, The State Agricultural Intervention Fund (SAIF), The Central Land Registry (CLR).

The regional level and the policy implementation level were represented by Agencies for Agriculture and Rural Areas of the Ministry of Agriculture, complex land consolidation planners, advisers, regional SAIF offices.

Interviews took place also with representatives of agricultural non-governmental organisations and associations of farmers, managers of agricultural holdings and farmers. Interviewed persons were employees experienced in the field of soil erosion and persons participating in working groups preparing proposals of measures.

Assessment of each measure was based on approximately 30 interviews with workers engaged in preparation and evaluation of measures. In a certain stage, new interviews had not already brought new answers. Therefore, the investigation was assessed after performance of about a half of controlled interviews. The assessment took into consideration also observations obtained from investigation of a set of 59 representatives of agricultural holdings. Farmers were asked about the practical part of application of measures against water erosion. The investigation was made in such a way that could enable to determine whether the soil conservation need was correctly defined, whether correct procedures were followed in defining the problem when policy instruments were set up and whether a suitable policy instrument was used efficiently in order to obtain a solution. Furthermore, the investigation wanted to find out if implementation took place well, if there was enough time to implement the measures and if implementation tasks were accurately specified and performed in a correct order. No less important was searching for information whether evaluation of the measure was well set and whether there is a continuous and transparent system of evaluation of impact of the soil conservation policy instruments. The objective of the investigation was to answer the following questions:

1. Was the soil conservation problem correctly defined in the period of setup of policy instruments?
2. Were correct procedures observed in defining the problem (who and how defined it)?
3. Was a suitable policy instrument used for efficient problem solution?
4. Was the implementation of the policy well performed?
5. Was there enough time to implement the measure?
6. Were implementation tasks accurately specified and performed in a correct order?
7. Was evaluation of the soil conservation measures well set up?

8. Is there a continuous and transparent system of evaluation of impact of the soil conservation policy instruments?

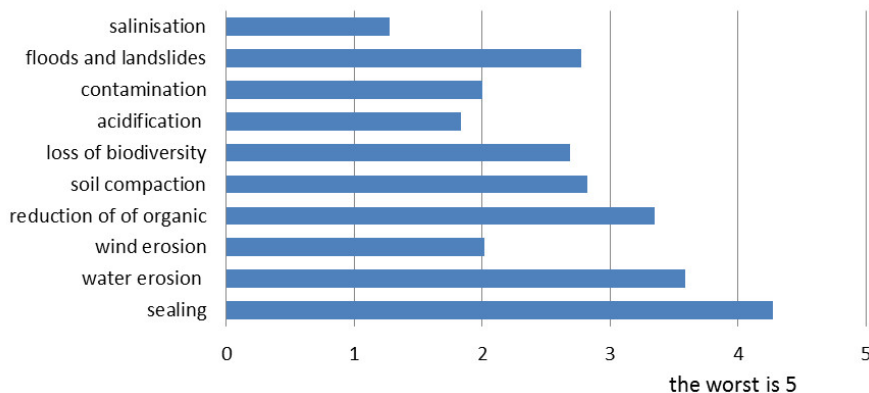
## Results and Discussion

### Identification of the problem

The investigation concerned also general awareness of the importance of individual types of agricultural land degradation. For this purpose a set of actors participating in the process of proposal and application of given measures was used. Using an evaluation scale from 1 to 5, the respondents rated the importance and scope of a particular soil degradation type in the CR. 1 means a small scope or importance of degradation, 5 means severe soil damage with a deterioration trend.

The most serious problem, according to respondents, was irreversible loss of agricultural land (sealing). Most often it was rated 5. The agricultural sector has, nevertheless, only a limited impact on this degradation type, as it is caused primarily by expanding of urbanisation in the landscape. The second most serious problem, according to the respondents, was water erosion. It was not evaluated as little serious by any of the respondents. View of the wind erosion was influenced by the fact that this type of soil degradation is present only in some areas. The wind erosion was often considered as danger of medium importance. After water erosion, the respondents consider as very serious the  $\text{CO}_x$  loss in soil. This type of degradation was mostly given a score 4. In their supplementary comments, the respondents expressed their concern that this unfavourable situation would deteriorate. This is due to continuous reduction of livestock population. In 2011, cattle population decreased to 38% (ČSÚ 2012) of the state in 1990. Biodiversity loss as well as floods and landslides due to water erosion were considered as quite serious. On the contrary, soil salinization occurs rarely in Czech conditions. Comparison of average rating by importance of soil degradation is shown in Graph 1.

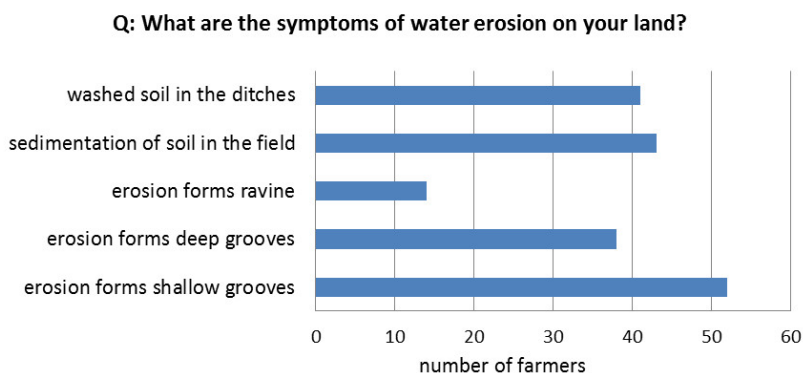
Graph 1: Evaluation of soil degradation types by severity



Source: own investigation

The Czech land resources protection policy should focus preferentially on prevention of irreversible loss of land resources. The investigation confirmed the justness of focus of the survey on efficiency of the water erosion protection policy. Additional investigation showed that farmers most often observe signs of water erosion on their land blocks as erosion by rills, which is a moderate form of signs of soil losses. More than a half of the respondents are well acquainted with sedimentation in ditches or edges of fields.

Graph 2: Perception of signs of water erosion by farmers



Source: own investigation

Most of persons participating in preparation of the measure (in particular on regional level and representatives of farmers) thought that the scope of areas within GAEC 2 and the proposed soil conservation technologies were based on expert analyses of scientific institutions. The authors concluded that the above mentioned investigations of RIMSC were not taken into consideration during preparation of the measure. The problem of water erosion was disparaged in time of the policy set-up. The Ministry of Agriculture, however, admits stricter limits expressing erosion threat level in the LPIS system in the future period.

Respondents were asked to express their opinion concerning the need of a rural policy instrument that would limit farming and cultivation in areas threatened by erosion. They were asked:

- a) In your opinion, is it appropriate to define in advance obligatory soil conservation technologies?
- b) In your opinion, is it more appropriate to let the farmer decide about the way of use of erosion threatened land and to punish him only when there are any damages?

The first question was answered positively by 75% of respondents. They argued that prevention costs less than reparation of damages and that it is often difficult to prove guilt and determine the degree of responsibility, in particular in case of storm rainfalls. Farmers want to decide themselves what they consider to be appropriate for protect of soil. Mostly they would like to decide about

the way of use of land, but GAEC 2 was done from central level. However, even this group of respondents admitted that measurement of indemnity for damages caused and especially precise determination of a concrete responsible person would be complicated.

In case of punishing of farmers for damages caused, a half of respondents, especially advisers, expressed the opinion that punishment would be more efficient than an imposed obligation. However, mostly they inclined to consistent sanctions in case of non-compliance with obligations imposed for concrete land.

### **Proposal of policy instrument**

The investigation included views of respondents on appropriateness of proposed instruments for water erosion prevention. The respondents were asked to assess, based on their experience and conviction, potential impact of erosion prevention measures and to estimate the real impact of their application in practice. The score 1 means high impact on reduction of erosion, 5 means minimum or no impact on water erosion. The average score of answers is shown in Table 1.

Table 1: Average score of measure efficiency assessment

Measure	Potential	Reality	Difference
LC organisational measures	1.67	3.83	-2.16
LC technical measures	1.83	2.42	-0.58
GAEC 2	2.33	3.25	-0.92

Source: own investigation

Potential impact of given erosion preventing instruments was assessed very favourably for the land consolidation (LC) and a slightly lower potential of the measure was observed for GAEC 2. Potential benefit of GAEC 2 was assessed low especially by research representatives who considered proposed technologies as little efficient. Also representatives of agricultural practice and farmers were sceptic, maybe because they were not sufficiently informed about preparation of this measure. Assessment of real achieved efficiency of the measure was much worse. In all the cases the respondents expected lower efficiency during application of the measure. The reason, according to them, was inconsistency and lack of finance in case of the LC, unenforceability of realisation of the most efficient project proposal, unwillingness to respect the anti-erosion proposal of the common facility in agricultural practice. In case of GAEC 2, the stated reason was incomprehensiveness for some farmers, inaccuracy of delineation of areas threatened by erosion in LPIS land blocks and inefficiency of proposed technologies in case of storm rainfalls.

As far as the core of the measure proposal is concerned, implementation of GAEC 2 was initiated by the Ministry of Agriculture. In the working group whose task was to propose suitable soil protection technologies, the initiative was taken over by experts from RIMSC together with experts from agricultural universities. It was found out that agricultural advisers did not participate in preparation of the measure. The working group discussed proposals of soil

protection technologies. Communication took place through e-mails, written documents were prepared and submitted for assessment.

The system of communication within the working group was most often rated 3, i.e. as average. The committee met regularly and discussions were very intensive and searching for consensus was very difficult. Increased attention of the public paid to questions of soil erosion was perceived as positive.

According to representatives of experts and agricultural advisers, they did not succeed in putting through the technologies that would be more efficient in prevention of water erosion. The original proposals became much softer under the pressure of agricultural lobbies. Besides reduction of areas threatened by erosion in LPIS indications, the width of infiltration belts, for instance, was reduced in comparison with optimal width defined by experts. Even technologies with questionable efficiency were adopted. According to representatives of the agricultural NGO, they did not succeed in pushing through higher freedom of users of the threatened land in selection of protective technologies. Adoption of technologies criticised by experts for unproven efficiency (e.g. de-stoning) is, on the contrary, evaluated positively. The final proposal of the measure was prepared without participation of both expert organisations and NGO representatives. It was prepared by employees of the Ministry of Agriculture. According to members of the working group, the soil protection technologies integrated in the final wording of the measure are not identical with those proposed by experts and discussed in the working group.

No information was received about impact of the proposed measures on farming and economic results which was considered during preparation of the proposal. The surveyed views of farmers about feasibility of selected anti-erosion measures are shown in Table 2. Results of the survey suggest also the willingness of farmers to apply the measures.

Table 2: Views on feasibility of the measures in % of number of respondents

Selected anti-erosion measures	Non-feasible	Feasible with difficulties	Easy	Very easy	Do not know
Contour ploughing	2.3	38.6	50.0	6.8	2.3
Creation of balks	31.9	57.4	0.0	0.0	10.6
Elimination of erosion-risky crops	2.2	41.3	39.1	15.2	2.2
Grassing of slope	6.8	40.9	45.5	6.8	0.0
Grassing of valley line	14.6	70.7	12.2	0.0	2.4
Sowing maize in cover crops	7.1	59.5	26.2	0.0	7.1
Specific distribution of crops	13.3	40.0	42.2	2.2	2.2

Source: own investigation

As far as LC proposals are concerned, the respondents answered that during preparation of measures, communication among individual actors took form of comments to commented proposals. The feed-back on comments was not clear.

Methodology of common facilities plan preparation within LC guidelines was assessed as the best for the methodology approval phase. Mostly the respondents inclined to a brief and clear version, when the planner has more space for work and negotiation with owners. Most of respondents from land offices and planners wish to participate in the LC methodology preparation or they even participated directly in the past.

### **Implementation and control of the measure**

It arises from answers and comments collected during interviews with respondents that huge shortcomings relating to programme cycle occurred also in the implementation phase of measures. It arises from individual answers that sufficient attention was not paid to explication of the aim of implemented measures to farmers. Representatives of agricultural practice, farmers and advisors evaluated very negatively the promotion of the newly implemented GAEC 2 measure. It was mostly rated 4, i.e. as very bad promotion. They argued that the promotion was chaotic and that in August 2011, i.e. after the effective date of the implemented measure, the promised implementation guide was still not issued (MZE 2011). The visual form of plotting into land blocks of users was several times modified, which made training of farmers by advisers very difficult.

The advisers expected difficulties in particular with the farmers who do not have good knowledge of use of PC and Internet. Agencies for Agriculture and Rural Areas helped to promote the measure, their employees however admitted that implementation was accompanied with chaos and discrepancies.

On the central level of policy implementation, the promotion was rated by employees more positively. They said that advisers were trained in time and sufficiently. How was performed communication between central bodies, experts and users or owners of concerned land? Respondents from agricultural practice, NGO farmers and advisers thought that there were no sufficiently clear rules. The time for discussion was short and the period for resolution of many appeals was insufficient. Respondents mostly gave a score 3 to this part of implementation of the measure. The total set-up of the new measure received an average score of 3.1. However, the biggest number of respondents gave a score 4. Few of respondents pointed out another unsolved gap. It was insufficient cohesion between GAEC2 and LC, which was perceived as a bureaucratic failure.

It arises from questionnaires concerning the LC that there are not sufficient financial means devoted currently to implementation of the planned measures, which prolongs the time of their realisation. This fact consequently devalues the planner's and the land office's work. There exist several possible official methodologies and guidelines for methodical management of the LC that facilitate and define the planner's and land offices' job (Doležal 2010; Kyselka 2011; Strítecký 2010). Respondents considered the LC as an instrument very suitable for reduction of erosion but they agreed that there are huge shortcomings. They estimated that only 75% of the planned anti-erosion measures would pass

the LC. Realisation of anti-erosion measures in the LC is made difficult also due to the fact that the state represented by the Land Fund of the Czech Republic has sold almost all state land that could have been used for soil protection measures. A regional soil and water protection plan as a planning instrument should be prepared on the national level and it should contain binding conclusions and conditions for the LC and their financing. One of outputs of such a plan should be a state land reserve that would be used for protection against floods and for water retention of water in the landscape. Respondents noted that financial means for after-care about newly built facilities, such as roads, polders, trenches, etc. are often unavailable.

### **Monitoring and evaluation**

Questions of impact were focused on determination of the awareness of necessity to evaluate impact of the measure. None of the questioned persons knew the answer on the question if environmental and economic analyses of impacts on agricultural operation are being prepared. They think that assessment of side effects of the measure is not prepared. Some of the respondents, however, anticipated positive impacts on biodiversity improvement, but, on the other hand, also deterioration of soil compaction due to frequent running of agricultural machines. A specific criterion applicable on impact assessment of the GAEC 2 measure was defined only by experts. The LC and especially plans of common facilities do not include sufficiently transparent monitoring of impacts and effects on agricultural land and its quality. The target indicators of evaluation of impacts of the soil conservation policy are not set reasonably in advance. For instance, no complementary tasks are prepared for land offices at the beginning of a planning period, although technical basis for planning and setting indicators exist.

### **Conclusions**

Experts and farmers are aware of the necessity of conservation of agricultural land. A lot of weaknesses were identified during monitoring of individual phases of the programme policy cycle using an example of two selected instruments of soil protection against water erosion (GAEC 2 and LC).

Problem of the soil conservation was well defined and based on results of researches of expert research institutions (RIMSC, universities). It may be considered as a shortcoming that representatives from agricultural practice and business economics experts did not participate more intensively in the phase of definition of problems. It may be helpful for the implementation of tough measures to agricultural practices and evaluation of impacts. We may evaluate positively the fact that not only representatives of central institutions, but also NGO representatives and representatives of regions, e.g. regional authorities and regional offices of the Ministry of Agriculture and land offices, were invited to participate in the working group that prepared GAEC measures. On the other hand there was some needless rejection of effective measures for

soil protection. It is very likely, that discussions in the working group were not well controlled in order to achieve the objective, i.e. the highest possible protection of soil. Within implementation of the measure, the respondents expected shortcomings a priori and in such a degree that they reduced the rating of the measure against its potential, in particular in case of the LC. Many planned measures concerning the proposed LC will not pass during realisation, especially due to lack of state land that could be used for their realisation. After-care for constructed facilities there is very small hope that they will be implemented.

Insufficient evaluation of real efficiency of adopted measures for reduction of water erosion on agricultural land represents huge weakness. No continuous and transparent system of evaluation of impact of the soil conservation policy instruments is adopted. Evaluation is aimed especially at collection of administrative data on number of implemented measures and results of inspections of their application, and not at evaluation of water erosion itself.

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## Účinnost politiky ochrany půdního fondu v České republice

Příspěvek hodnotí účinnost politiky ochrany půdního fondu z hlediska institucionální ekonomie v ČR. Shrnuje výsledky šetření formou standardizovaných rozhovorů, které bylo zaměřeno na hodnocení jednotlivých fází programového cyklu od analýzy problému přes návrh nástroje k jeho řešení, implementaci a monitoring opatření. Vybrána byla opatření komplexní pozemkové úpravy a dobrý zemědělský a environmentální stav. Autoři zjistili, že problém půdní eroze byl dobře identifikován a obecně je společností vnímán jako závažný. Ovšem při návrhu opatření, jeho implementaci i vyhodnocování působení opatření byla identifikována řada nedostatků, které snižují jejich účinnost.

**Klíčová slova:** politika ochrany půdy, komplexní pozemkové úpravy, dobrý zemědělský a environmentální stav (GAEC)

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