

# LEGISLATIVE ASPECTS OF AGRICULTURAL LAND USE AND SOIL CONTAMINATION

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## ***Abstract***

This paper analyses the institutional soil protection system regards the links of land use and soil contamination. The area chosen as an example is the disposal and utilization of sewage sludge, which is a growing task for today and for the future. Protection of soil requires the evaluation and rethinking of the effectiveness and efficiency of soil conservation policies in agriculture. There is a little understanding of how policy measures should be designed to encourage farmers to adopt soil conservation practices. We would like to contribute to these objectives with our research by integrating the relevant EU and Hungarian regulations into a transparent system. To improve and clarify the agro-environmental regulation this dissertation tries to formulate general aspects for the development of soil protection regulations based on the research.

**Keywords:** soil contamination, soil protection, land use policy, soil conservation programmes, agricultural law

### *Összefoglalás*

A kutatás célja a talajvédelem intézményrendszerének, szabályozásának az elemzése különös tekintettel az agrár-földhasználat eredményeképp bekövetkező talajszennyezésre. Az összefüggés bemutatására a szerves trágya és szennyvíziszap szántóföldi elhelyezésének talajvédelmi aspektusainak probléma körét választottuk. A talaj védelme megköveteli a környezetvédelmi szabályozás időről időre történő értékelését és újra gondolását, ez indokolja, hogy a talajok minőségét veszélyeztető hatásokkal foglalkozzunk, a káros hatások lehetőség szerinti megelőzése és a talajok jó minőségének megőrzése érdekében. A kutatás eredményeként kísérletet teszünk átfogó szempontok megfogalmazására a talajvédelmi szabályozás fejlesztése számára és egy táblázatban foglaljuk össze a földhasználó kötelezettségeit EU-s és hazai szinten.

**Kulcsszavak:** talajszennyezés, talajvédelem, földhasználat, földvédelmi eljárás, agrárjog

### *Introduction*

This publication discusses the agronomic and environmental regulations for the disposal of wastewater, sludge, compost and manure on arable land and develops a proposal for the further evaluation of soil protection regulations. In order to improve the Hungarian regulations, it is expedient to review the extent to which the current regulations cover the requirements of the general prevention strategy, and where the regulations need to be clarified or supplemented.

There is a lack of knowledge about the effectiveness and efficiency of soil conservation policies in agriculture and there is a little understanding of how policy measures should be designed to encourage farmers to adopt soil conservation practices. Despite the general legal obligations of nature protection - analysed inter alia by Bánhegyi (2015) Horváth (2013), Tóth (2017) and Olajos and Gyurán (2012) - , the soil is constantly degrading (Németh et al., 2016), 75 billion tons of arable land disappear annually as a result of soil degradation processes (Kertész, 2014), the extent of which depends significantly on land use patterns (Tóth et al., 2016). Improper land use and agrotechnics, monoculture farming leads to soil compaction caused by heavy machinery used in large-scale agriculture, and changes in soil structure associated with excessive use of pesticides and fertilizers lead to erosion, soil destruction or soil pollution (Ángyán et al., 1988). Neither the EU (Peine, 2007) nor Hungary has a land codex which address land use and soil protection together. Nevertheless, in the classical sense, we cannot speak about the legal regulation specifically related to soil. The Hungarian agricultural law literature and related legislation treat this issue as the environmental aspect of land protection (Fodor, 2007; 2008). There is a lack of synergy due to the different soil concepts at the intersection of environmental law and the regulation of the arable land in Hungary. It results that the current legal definition of land and soil is incomplete and not in line with the agro-ecological concept of soil (Kurucz, 2017). There are two sides of the Hungarian regulation: the quantitative land protection and qualitative soil protection aspect. From the environmental protection point of view, the former seeks to curb the waste (utilization) of natural resources, the latter controls the pollution and deterioration (load) of the environment (Kurucz, 2017). The state performs its soil protection tasks primarily through the maintenance and operation of the system of official institutions but the land user and the landowner are directly responsible for the soil protection measures. All land uses have an impact on the environment and within it to

the soil, these complex effects differ depending on their types and in their intensity (Vermes, 2007). Thus, it is important to explore and define the environmental impacts on the soil of different land uses as accurately as possible, because only with this knowledge can we decide the protection measures that are needed against adverse harmful effects. Worldwide the regulation of contaminated sites especially concerning the question ‘who is obliged to clean up the contamination’, has become the difficult focus of the legal system governing soil contamination (Wang, 2018). In this study, the EU and domestic soil protection obligations of land users related to soil contamination phenomena are comprehensively presented. The aim of the research is to point out the stress points of soil protection regulation that can contribute to soil contamination processes.

### ***Materials and Methods***

This paper surveys the normative obligations of land user in case of soil contamination processes. Literature and legal document analyses were complemented on EU and Hungarian level in order to generate qualitative data. We cannot deal with all land use methods here, so we explore features that can be used to develop regulations with the examples related to the agricultural utilization of sewage, sludge, compost, and manure. To illustrate the results of the policy survey analyses we designed a simple schematic table (Table 1). EU policies (EUR-LEX database) use a range of different types of instruments, the analysed policy documents can be divided into two major groups: 1. for the protection of soils which are not considered to be contaminated, and 2. regulations for remediation of already contaminated soils.

## *Results and Discussion*

Impacts of land use on soil quality can be expressed in terms of their consequences by changing the physical, chemical and biological quality of the soil (Kádár, 2011). Depending on the extent of these modifications, the functionality of the soil changes, which decisively determines the soil fertility thus its type of use in the future (El-Swaify, 1994). The soil can therefore be loaded up to the limit until this undesirable change occurs, and this is considered in the regulation as a load level (still an acceptable level of load) (Várallyay, 2016). In the case of soils, this so-called The "A" value is the reference value for good quality, "clean" soil. Soil contamination occurs when substances are introduced into the soil which, alter it in a way that is detrimental to life and human use. In the following sections, the main EU and Hungarian policies and legal sources are presented that mainly affect soils contamination issues by sewage sludge, compost and manure from the perspective of the land user.

Regards the EU legislation on soil contamination we can state that although in 2006 the European Council adopted the Commission's Thematic Strategy for Soil Protection, which sets out the threats to soil resources and the tasks to prevent soil pollution in Europe, subsequently, a proposal for a framework directive existed (COM (2006) 232), but no final strategy has been decided since then. At the same time, the EU, primarily in the context of its environmental and agricultural policy, is increasingly paying attention to soil protection aspects, regulating it directly and indirectly. It resulted in that the EU's environmental directives are diverse however not complete protection of the soil. The polluter pays principle is known from international and EU documents, according to which the polluter is responsible for restoring the original state. In the EU environmental action programs the first version of the National Environmental Program (NEP-I) under the banner of the fundamental questions of Planning-Regulation-Financing can

be found the “Polluter pays” principle. The “Polluter pays” principle can be applied in a limited way only if the regulation disciplines any breach of law, because the principle is not based on the actionable conduct. The precise legal application of the principle prevails in Hungary in the Act XLIII of 2000 on the waste management, whereas the polluter shall be responsible for the abatement of environmental pollution caused by the waste, for the restoration of the state of the environment and the reimbursement of damages including costs of restoration (Bobvos et al., 2006). Agricultural use of sewage sludge falls within the scope of a separate directives. The contamination of soil and groundwater and heavy metal concentration of sewage sludge can greatly reduce soil biodiversity and thus fertility. To understand the Community legal framework for the sewage sludge utilization management we have to go back to the mid 1970s until the first Waste Framework Directive was established. As a result of significant changes over the decades, Directive 2008/98/EC has become the central element of current regulation, which defines the general rules for waste management which includes sewage sludge. The Directive contains basic provisions and limit values (heavy metals: Cd, Cr, Cu, Hg, Ni, Pb, Zn) for the use and treatment of sewage sludge, which farmers cannot ignore. The directive requires the Member States to take all necessary measures to ensure that the disposal and recovery of waste is carried out without endangering human health and the environment. In Article 13, the importance of preserving soil is emphasized in addition to water, air, plants and animals, the disposal and recovery operations referred to in Annexes I-II. Council Directive 86/278/EEC (Sewage Sludge Utilization Directive) regulate the agricultural use of sewage sludge so that it does not have a detrimental effect on land, flora, fauna and humans. The Sewage Sludge Utilization Directive primarily defines the protection of soils against heavy metal pollution in agricultural soils and the permissible concentration in the sludge to be recovered. The detailed test requirements for the characterization of soil and sludge are defined by the Member States.

Member States should determine the maximum amount of sludge that can be applied to soil per unit area and per year. Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (Official Journal, 1991) lays down the criteria for the designation of waters affected by nitrate pollution and a framework for Good Agricultural Practice measures to be taken to protect of vulnerable zones. The so-called Nitrates Directive is aimed at protecting human health and aquatic ecosystems against pollution caused by nitrates mainly from agricultural sources. This is required to achieve mainly by limiting the input of inorganic N fertilizers and manure on farmland. It requires that manure and slurry should not be stored in a way that endangers or damages the environment, especially groundwater and surface water. Member States are expected to identify and designate so-called Nitrate Vulnerable Zones (Tóth, 2017) and to draw up action programmes to reduce nitrate pollution. Requirements of Good Agricultural Practice contains the amount of active substance nitrogen applied to nitrate-sensitive agricultural areas per year. It is forbidden to apply manure from 15 October to 15 February, except for the top-dressing of autumn cereals. During fertilization, nutrients must not enter the surface waters directly or indirectly through infiltration or erosion. When determining the amount of nutrients to be applied in the field, the nutrient supply of the soil and the nutrient requirements of the cultivated plant adapted to the conditions of the production area must be taken into account. If the groundwater level can be reached within 5 meters on the irrigated area the quality of the groundwater must be checked every 5 years.

In Hungary Act LIII of 1995 on the general rules for the protection of the environment establishes a harmonious relationship between man and the environment, to protect the elements and processes of the environment, and to ensure the environmental conditions for sustainable development. The quality and quantity of arable land is protected by the Ministry

of Agriculture, however currently there is no effective legislation on contaminated soils in the Hungarian legal system that includes soil quality criteria and procedural rules too. Soil Protections Authorities may carry out control measurements on the basis of the authorization of the Environmental Protection Act, and may intervene if necessary in case of suspicion of contamination of arable land. 15. § of Environmental Protection Act stipulates that only such activities may be carried out both on the ground and in the ground, and substances may be placed there that do not endanger, pollute or damage its quantity or quality. Section 41 of Act CXXIX of 2007 on the protection of arable land (Arable Land Protection Act) stands that the land user is obliged to protect the arable land from soil contaminants that degrade its quality. Section 42 states that in the course of land use, environmentally friendly nutrient management shall be carried out, taking into account the nutrient supply of the soil and the nutrient requirements of the cultivated plants. According to the Arable Land Protection Act the purpose of arable land is agricultural utilization, which, if done properly, results in the maintenance or renewal of soil quality. According to the concept of the Arable Land Protection Act soil is a conditionally renewable natural resource and its most important feature is its fertility. The first level of quantitative land protection is the land use obligation and the regulation of its forms (Kurucz, 2018). It means that lands registered in the real estate register as vineyard or orchard have to be cultivated in accordance with their special needs for cultivation, but regarding the other types of lands it is enough to prevent the growing of weeds besides complying with the rules of soil protection (Csirszki, 2018). The Arable Land Protection Act distinguishes between the humus layer, which is the top layer of soil, and makes it the responsibility of the land user to preserve it, but it does not differentiate between living (edaphon) and dead organic matter in the soil, thus it cannot not provide adequate protection for the soil as a whole and its individual components. According to the Arable Land Protection Act, a soil protection plan is required for



the decision-making during certain procedures of the soil protection authority. The substantive requirements of soil protection plans are regulated by the Decree no. 90/2008. (VII. 18.) FVM on detailed provisions of the making of soil protection plan. The purpose of the soil protection plan is to explore from soil samples the soil characteristics of the area designated for the utilization of wastewater, sludge, compost and manure during which it can be determined whether the designated area is suitable for the application. According to Annex 2.2. an "average sample" of 20 subsamples shall be taken from the cultivated layer along different diagonals of the designated plot per different soil patch, but at least on every 5 hectares. Soil samples should be collected from depths of 0–30, 30–60, 60–90 cm. The following soil tests should be made on samples in each case: pH, KA, humus%, total salt%, CaCO<sub>3</sub>%, and nitrate-N content. The degree of contamination is judged on the basis of the concentration of the substance, compared to the contamination lists and limit values. The Dutch list, the Berlin list and the limit of the Hungarian sectoral technical directive "Disposal of sewage and sewage sludge" (MI-081735/1990) is used. Government Decree 50/2001 on the rules of agricultural use and treatment of municipal wastewater and sewage sludge and compost lays down that when and which crops special fertilizer is permitted and the characteristics of the soil on the angle of inclination the use of sewage sludge compost is prohibited. This regulation is in line with European directives, although it differs in that Annex 5 provides only a single value for the permissible limit for each parameter in sludge, while the EU limit apply intervals, which allows a more appropriate consideration of local conditions. Regulation 27/2006 deals with the rules for the designation of nitrate vulnerable zones. The designation of nitrate sensitive areas should take into account the characteristics and environmental properties of the water and soil, the behaviour of nitrogen compounds in the environment, and the agricultural activities that may affect surface and groundwater. The appointments shall be reviewed every 4 years. Regulation

59/2008 lays down detailed rules for an action program for protection against nitrate pollution, mandatory requirements for good agricultural practice and the provision of data. Decision 59/2008 of the Ministry of Agriculture and Rural Development contains the detailed rules of the action program necessary for the protection of waters against nitrate pollution of agricultural origin. Decree 59/2008. of the Ministry of Agriculture and Rural Development regulates that the amount of nitrogen active substance applied to nitrate-sensitive agricultural land with organic manure per year may not exceed the prescribed value, and also determines the time of application. The amount of nitrogen that can be applied with sewage sludge, compost in nitrate-sensitive areas must not exceed 170 kg/ha, and in non-nitrate-sensitive areas 220 kg/ha. In the case of soil contamination, various sanctions can be applied, e.g. soil protection fine is to be paid in case of a serious violation of the soil protection obligation and requirements. Contamination limit for pollutants and test methods are given in Decree 6/2009. KvVM-EüMFVM. Unfortunately, no specific standards have been developed since the first Environmental Protection Act of 1976, so the method has been developed to impose a sewage fine even in the case of soil pollution if the pollution endangers groundwater. Fines may be re-imposed, no payment may be granted and 30 days from the date of entry into force shall be payable. The Ombudsman pointed out in his resolution (2016) that, rather than fining, companies that cause or take responsibility for pollution should be obliged to carry out remediation at the expense of the state, since in the absence of a liable actor the state must intervene.

Table 1. Legislation of soil contamination in the EU and Hungary

<b>Mandatory policy measures</b>		
<b>EU legislation</b>	<b>National legislation</b>	<b>Priority obligations</b>
1386/2013/ Environment Action Programme	Act LIII of 1995 on the general rules for the protection of the environment.	“Polluter Pays” principle
Nitrates Directive (91/676/EEC)	Decree 27/2006. of Agricultural Ministry on the protection of waters against nitrate pollution of agricultural origin	Average content values of fertilizers at formation and application
	Decree 59/2008. of the Ministry of Agriculture and Rural Development on the detailed rules of the action program necessary for the protection of waters against nitrate pollution of agricultural origin, as well as on the order of data provision and registration	Good Agricultural Practice The amount of nitrogen that can be applied with sewage sludge, compost in nitrate-sensitive areas must not exceed 170 kg/ha, and in non-nitrate-sensitive areas 220 kg/ha.
Sewage Sludge Directive (86/278/EEC)	Government Decree 50/2001 on the rules for the agricultural use and treatment of municipal sewage and sewage sludge, sewage sludge compost	Necessary tests, requirements for representative sampling and permissible concentrations of harmful substances and toxic elements in the waste water, sewage sludge and soil
	KvVM-EüM-FVM joint decree on 6/2009. the limit values necessary for the protection of the geological medium and groundwater against pollution and on the measurement of pollution	
	Decree of the Ministry of Agriculture 36/2006 on the authorization, storage, distribution and use of the yield enhancing substances	

### ***Conclusion***

In the absence of effective EU action, soil contamination continues and, more than ten years after the adoption of the Thematic Strategy on Soil Protection, no systematic European control and protection of soil quality has been achieved. There is currently no effective legislation on

contaminated soils in the Hungarian legal system that includes soil quality criteria. The exact concept of the clean and the contaminated soil is not defined. The "polluter pays" principle cannot be enforced until the establishment of the cost of actual damage and the restoration the original condition. In terms of effective legal protection, the fining procedure needs fixed points for judgment, but such fixed points do not exist, as toxicity, load capacity, uptake depend on soil features and the local, natural and farming conditions are also modifying factors. The high degree of uncertainty regarding the contamination limits creates the need of the involvement of independent environmental protection authorities in the law enforcement system. There is a need to design policies that target the existing soil contamination threats in the light of agricultural management.

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