

MANAGEMENT OF THE IMPACT ON SOIL IN REPUBLIC OF MOLDOVA: PROBLEMS AND SOLUTIONS

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ABSTRACT:

The great impact on soils in Republic of Moldova is represented by the non-ecological exploitation of agricultural land, non-sanitation of rural space, massive negligence of population and local authorities, surveillance and control authorities of land resources. The most common form of impact on soils is erosion. Very rapid increase of the surfaces affected by erosion is conditioned, in particular, by the non-compliance of environmental requirements to allocation and exploitation of agricultural land and by the actual inefficient management of land resources.

In the last two decades, there has been a significant reduction of ecological laboratories for soil quality evaluation, conditioned by liquidation of district and regional centres of plant protection. The State Ecological Inspectorate, which has the exclusive function of ecological damage evaluation, has very modest financial and human resources. As a result, despite the frequent cases of infringement of soil and land protection, because of very low evaluation capacity, most environmental damage in this area are not established and subject to compensation, and most land beneficiaries ignore normative of land and soil use and protection.

Due to financial shortages in rural areas apply minimum rates of fines, which do not reflect the real impact on the soil cover. The collected sums from the application of fines are significantly lower than the damage caused to the soils. Under the new Offences Code, it was introduced the penalty for burning stubble, substantially increasing the payment discharge and the amounts of fines for unauthorized land use and for destruction of soil fertile layer. However, there is no positive change in penalties for causing erosion, for falsifying and concealing information about the status of land.

Most damage compensation actions are brought for burning stubble and for soil contamination, while compensation actions for damage caused by erosion and landslides are a major exception. Despite the existence of adequate methodology for evaluations of soil injury, their practical implementation is very superficially, what conditioned the illicit behaviour of land beneficiaries.

1. Introduction

At present, the rural space of Moldova Republic is in deep crisis, marked by the abroad mass exodus of people, because of the ruined agriculture, the seriously

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deterioration of production and social infrastructure, access roads. Non-ecological exploitation of agricultural land and the myriad of unauthorized dumps have also a great impact. To all these are added massive negligence of the population and local authorities, surveillance and control authorities of land resources in the rural spaces. The most common form of impact on soils is erosion. Very rapid increase of the surfaces affected by erosion and its intensity are conditioned, in specially, by the non-compliance of environmental requirements when granting quotas of agricultural land in private ownership. Also, current environmental status of land and soil is conditioned decisively by the exercise of inefficient management of the main functions of land resources and the involvement of superficial parts of the institutional framework, particularly local public authorities and environmental authorities. At one insufficient level there are exercised the evaluation and control functions, regulatory and coordination of supervision and use of land resources.

2. Evaluation and monitorization of soils

In the 90s, there was a significant reduction of ecological laboratories for evaluation of agricultural land soil quality, conditioned by liquidation of district and regional centres of plant protection and by losing control over the territory on the left banc of Dniester. The State Ecological Inspectorate, which has the exclusive function of ecological damage evaluation, has only one central laboratory and three laboratories of Ecological Agencies (in 1998 it functioned six laboratories) and most used equipment is worn off. In some severe cases, it is resorted to the Investigation Centre for Ecological Institute of Ecology and Geography. In the exercise of evaluation and other environmental management functions, an important role is played by the cadastral authorities. In the field of land resources stands the Agency for Geodesy, Land Relations and Cadastre, cadastral offices, some subdivisions of the Ministry of Agriculture, and Institute for Soil Protection „N. Dimo”. Also, the concentrations of persistent organic pollutants (POPs) and of heavy metals can't be measured - only at the Central Laboratory.

Due to the insufficient financial resources and lack of qualified specialists, but especially because of the superficial approach to these problems and the miserable wages of the staff, the main functions of the land resource management are superficial exercised and destructive, thus the impact on land and soil is still rife and critical. Despite the frequent cases of violations of environmental legislation, due to very low capacity of evaluation, the majority of environmental injury caused to soils are not determined and subjected to compensation. According to the author, a benefic solution would involve the use of The Environmental Quality Monitoring Division of the State Hydrometeorological Service, which has the necessary equipment and methodology. Also, the compulsory inclusion of the environmental indicators in the cadastral evaluation and application of the mechanism of ecological certification of agricultural land is necessary.

The State's Hydrometeorological Service has the lead role in monitoring the quality to hydrometeorological stations and posts and in the 60 selected fields for this purpose (3500 ha) of 12 farms located in 12 districts (4 each from each

region). Monitored households are changed every year. Also, recently, there have been monitored scientific reserves, the representative soils from plots of background of Balti and Bugeac steppes, alluvial in the water basins and streams, lakes soils and alluvial in the city parks and near deposits of pesticides, to determinate the concentration of POPs and heavy metals.

3. Mechanism of administrative sanction

A major influence on the low efficiency of regulatory and supervisory functions of the impact on land resources and implementing is the superficial administrative sanction mechanism. Although soils are declared the main wealth of our nation, fines for unauthorized use of land and causing various forms of degradation, were very low (up to 100 lei MDA). Most fines were imposed for illegal occupation of land and for actions that cause soil pollution. There are very rarely applied administrative sanctions for the destruction of fertile soil layer, and also there are not taken measures to prevent soil erosion, raising the upper fertile soil layer of forest land, for forgery and concealing information about the status of land. After the force entry of the new Offences Code, there has been a substantially increasing amount of fines for unauthorized land use, destruction of fertile soil layer and for failure of lands to state, which to ensure their use by destination.

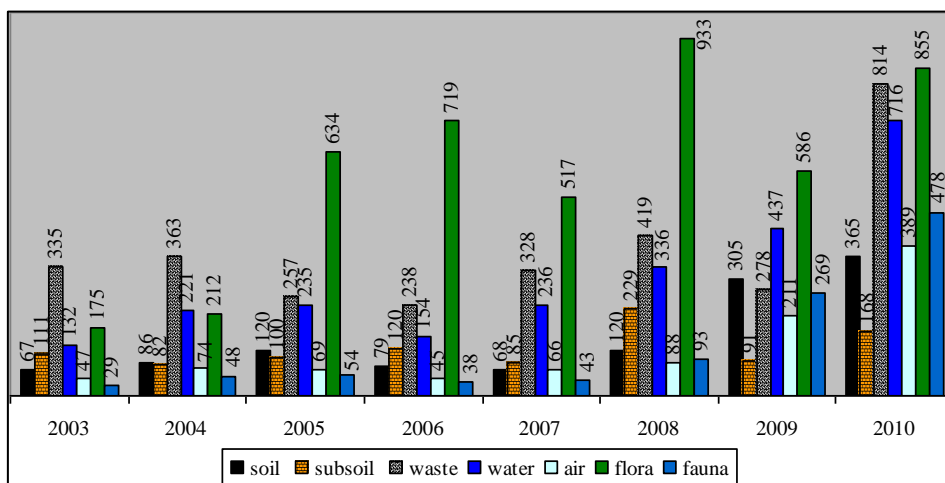


Fig. 1. The amounts of fines applied for infringement of environmental legislation (thousand lei).

Source: *Rapoartele BNS (Biroului Național de Statistică) privind aplicarea sancțiunilor administrative în anii 2003-2010*

According to the new Offences Code (of 31 may, 2009), that substantially increased the payment discharge and the amounts of fines for unauthorized land use and for destruction of soil fertile layer and for failure of lands to state, ensured

their use by destination. There have been excluded warnings and introduced as additional forms of sanction, *community work and for legal persons and in charge - the suspension of economic activities for a period up to 1 year*. There was introduced the penalty for burning stubble (art. no 115.3, Offence Code of Republic of Moldova), for which being brought most action to recover of the damage caused soil. However, the increasing of the payment discharge conditioned reduction (about 3 times) of fines number applied for such offenses. However, this measure has influenced the directly proportional increase in the sum of fines imposed for offenses in the land resources (figure 1, table 1). The Substantially increased amounts of the fines applied for unauthorized land use, for destruction of fertile soil layer and for failure of lands to state, so to ensure their use by destination.

In 2010, for violations of land legislation, there were applied 770 fines, the amount to 365 thousands lei. The maximum number of fines were imposed in the Central Region (table 1), including districts Nisporeni (115), Straseni (85), Hancesti (71) and Ialoveni (43). The maximum amount of fines is registered in the districts Nisporeni (57,6 thousand lei), Hancesti (41,4 thousand lei), Kisinev (45,8 thousand lei) and Balti (31,5 thousand lei). The number and amount of fines found are conditioned, to a large extent, by frequency and effectiveness of control measures by local environmental authorities, and by their collaboration with cadastral authorities, with local authorities and, in specially, with the territorial courts. The maximum amounts in Chisinau and Balti are explained by the frequent punishment for illegal occupation of land (art. 116. 2), and lately for the destruction of fertile soil layer (art. 115. 1), both related to unauthorized construction, common not only in these big cities, but also in other urban and suburban centres, with a better socio-economic situation. Another cause of increased frequency of these offenses is the difficult and expensive procedure for disposing of land, which allows only the positive government decision in this regard.

Also, there is an improvement collaboration of the environmental authorities with statistical and cadastre authorities and with branch subdivisions of production and research and of agricultural and land regulatory. However, there is need for more effective cooperation with local courts, which often manifests a superficial attitude to environmental review and to apply of necessary penalties, that increases the negligence of land beneficiaries and of local authorities for preventing destructive and toxic impact on agricultural land.

About $\frac{1}{4}$ (272) of the number and amount (71 thousand lei) of fines applied refer to burning crop residues on agricultural land (stubble) or adjacent space of them. In this case, we find the complementarity of the two components of economic sanctions: fines and actions for recovery of damages caused to soil. For an optimized management of land resources, it is necessary that the complementarity principle to be applied to other types of damage. Moreover, applying of fines for burning stubble is more uniform and is found in most districts, especially in areas with higher share of arable land. Meanwhile, in some districts, there is no direct relationship between the amount of fines imposed and actions brought to recover damages caused to soil by burning waste vegetable, because initiating action is more difficult, given that includes the evaluation

procedure as methodology in force and judicial procedure of review and approval it.

Table 1. The number and amounts of fines applied for infringement of environmental legislation.

Nr.	Territorial Administrative Unit	The number of fines						The amounts of fines (thousands lei)					
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009	2010
1	Briceni	53	12	6	14	4	2	1,9	1	0,44	4,6	1,3	1,1
2	Ocnîța	57	2	9	3	9	5	27	1	0,52	0,2	0,3	1
3	Edineț	83	24	28	16	32	15	3,5	1,1	2,1	0,66	34	5,38
4	Dondușeni	72	49	7	35	14	11	5,34	2,68	0,48	2,5	5,4	11,6
5	Drochia	64	42	23	25	19	15	3,3	4,04	2,3	2	5	11,7
6	Soroca	12	42	30	86	36	23	1,14	3,4	3,3	4,26	7,4	8,2
7	Florești	83	25	23	13	7	5	1,9	1	1	0,9	1,6	3,6
8	Râșcani	126	24	6	17	10	31	15	1,1	5,1	7,3	9,3	9
9	Glodeni	50	63	10	35	28	5	2,1	1,8	0,4	1,28	5,9	2,6
10	Fălești	35	11	14	7	39	49	1,05	0,38	5,94	0,42	17	11,6
11	Bălți	47	75	91	79	56	31	3,15	3,54	4,38	4,1	90	31,5
12	Sângerei	2	0	0	11	2	0	0,18	0	0	0,5	0,8	0
13	Șoldănești	81	159	0	109	26	8	1,78	4,72	0	4,2	3,9	4
14	Rezina	59	20	31	17	24	13	1,6	1,06	0,76	0,46	0,8	6,2
Northern Region		824	548	278	467	306	213	69	27	27	33	183	107
15	Telenești	0	6	4	3	2	9	0	1,2	0,1	1,04	0,3	3,4
16	Orhei	7	37	3	10	8	5	0,27	1,7	0,24	1,04	0,5	1,2
17	Criuleni	59	50	16	22	30	7	2,13	2,2	1,2	1,72	5,6	3,8
18	Dubăsari	0	0	0	0	9	0	0	0	0	0	1,7	0
19	Anenii Noi	9	11	6	16	7	28	0,6	0,7	0,76	1	0,3	19,4
20	Ialoveni	0	20	5	3	0	43	0	2,92	0,22	0,9	0	4,3
21	Strășeni	17	17	12	17	39	85	1	1,2	2,1	0,45	7,8	18,8
22	Călărași	100	177	96	0	7	19	3,23	4,32	3	0	2	4,4
23	Ungheni	4	1	1	5	9	18	0,18	0,02	0,02	0,78	2,5	5,6
24	Nisporeni	118	70	40	50	31	115	2,4	1,5	1,04	1,7	6,4	57,6
25	Hâncești	73	76	29	30	39	71	3,6	4,1	1,7	2,4	14	41,4
26	Kisinev	61	84	67	967	23	33	13	13	17	62	24	45,8
Central Region		448	549	279	1123	204	433	26	33	28	72	65	206
27	Căușeni	251	104	68	53	26	12	7,9	4,8	3,04	4,1	2,6	3,2
28	Ștefan-Vodă	76	95	27	48	22	25	2,4	2,6	0,82	3	9,7	9,3
29	Cimișlia	60	40	23	14	2	4	5,3	2,66	1,28	0,92	0,4	1,4
30	Basarabesca	5	8	7	1	3	0	0,56	0,62	0,44	0,04	1,3	0
31	Leova	21	76	34	38	46	36	0,91	3,58	1,47	1,46	5,4	8,7
32	Cantemir	2	5	3	12	15	9	0,07	0,18	0,06	0,52	3,9	6,6
33	Cahul	30	3	2	8	7	4	3,36	0,22	0,96	0,56	0,3	2,9
34	Taraclia	140	113	110	113	4	3	3,7	3,4	4,5	3,5	2,2	7,2
35	UTA Găgăuzia	5	33	14	24	52	31	0,4	1,18	1,52	1,1	32	12,4
Southern Region		590	477	288	311	177	124	25	19	14	16	58	51,7
Total		1862	1574	845	1901	687	770	120	79	68	120	305	365

Source: Rapoartele BNS privind aplicarea sancțiunilor administrative în anii 2003-2010.

Not recorded positive changes in applied of penalties for causing erosion, which are the most common and serious forms of impact on soil. In 2010, for such offenses (art. 118) were applied only 5 fines (in the districts Hâncești,

Cimișlia, Căușeni and Ștefan- Vodă), amounts to only 2400 lei. It is necessary to adequately apply fines for causing erosion and a major part of the collected sums to be allocated, as grants, to land beneficiaries who permanently take effective measures to prevent erosion. Also, very few fines are imposed for unauthorized use of state forest land (art. 134) and for raising the upper fertile soil layer on those lands (art. 120), for falsifying and concealing information about the status of land (art. 115.4) and for failure of lands to state, which to ensure their use by destination (art. 117.1). Thus, much of applied sanctions do not reflect the real impact on the soil cover. Illegal occupation of land is not a direct form of impact on soils, and excessive pollution of soil, under conditions of acute financial shortage in rural areas, is much widespread than their erosion. Therefore, the current mechanism of administrative sanctions for damages caused to soil should not create incentives for prevention and mitigation, and the funds collected from fines are not enough to undertake measures to protect land for any villages.

A greater impact not only on soil, but also on groundwater and on the air it generates by a large number of unauthorized dumps and non-sanitation of most localities of the republic. In the previous edition of the Offences Code, for breach of legislation on waste were provided only warnings and symbolic fines, the absolute majority of them have been imposed for breach of rules for planning and clean settlements (art. 150). Despite the big number of fines imposed, their amount was very small, only returning to a fine of up to 10 lei. Thus, the previous procedure for administrative sanctions in this area was rather a tool to stimulate insalubrities than environmental protection. Number and amount of fines varying on function by settlement area, number of residents and enterprises, and by the efficiency of police work, ability to detect and examine of these offences.

In the new Offences Code, the payment discharge of fines applied was increased several tens of times, and warnings were excluded, with some exceptions. Also, it was introduced a new form of punishment – community work, which is frequently applied in EU countries for such offenses, called social, along with breach of silence and public order. According to the current provisions of Offences Code, detection and examination of these offenses was transferred from police to ecological authorities. Without doubt, this decision is fair because environmental authorities possess higher skills in environmental impact assessment. Unfortunately, environmental control authorities have insufficient human, technical and financial resources for adequate exercise of this function. As a result, after the force entry of the new Offences Code, the number of applied fines in this area has decreased several tens of times (from 41000 in 2008 to only 1584 in 2010). Also, recent significant efforts of many local councils and sanitation companies are wasted, and many of our villages and towns are haunted by unsanitary, with major impacts on soil, air, groundwater and human health.

The amount of fines imposed for contraventions of the waste has increased slightly, from 419 thousand lei in 2008 to 814 thousand lei in 2010 and in 2009 was lower (278 thousand lei) compared to previous years (figure 1). In rare cases apply, as a form of sanction, community work. In 2010, that form of punishment was applied in 12 cases for violation of planning and ensures cleanliness in the settlement area (art.. 181) and only 2 cases for non-compliance to the requires of collection, storage, transport, storage, combustion, neutralization and disposal

wastes (art. 154.1). In this respect, it is absolutely necessary to apply, as a form of punishment, community service work, which has a major educational effect. That punishment should be applied, in specially, for offenses committed in the area of public land, in particularly, in green areas and other urban and suburban areas of recreation haunted by unsanitary. Also, it is necessary that a portion of fines applied for waste generating and for failure to cleanliness in these public places are used to finance current public works of sanitation and cleanliness in these areas.

4. Evaluation and compensation of soil damages

The level of soil damages varies, in function on the type of damage, quantity and quality of destroyed soil, geo-morphological and hydrological features of affected agricultural land, area expansion of this damage. According to national legislation it is calculated in cases of land burning, soil pollution and erosion, landslides. The present methodological basis permits adequate and complex evaluation of soil damages. Sufficiently are reflected the physic-geographical and ecological indicators of the injury. However, economic-geographical and economic indicators are less important. The damage level should take into account the economic and geographical position, the market land price with is manifested active forms of degradation, the inflation rate and the agriculture incomes and so on. Also, the damages amount should also include its evaluation costs. These additional requirements could motivate land beneficiaries to run prevention and minimization of these forms of soil degradation. In this way, can be avoided and any losses that land use and the number of proceedings instituted and satisfied the environmental damage will increase substantially.

Most damage compensation actions are brought for land burning as well as for soil contamination, while compensation actions for damage caused by erosion and landslides are a major exception. Moreover, frequent instances of non-compliance with the requirements of erosion and prevent landslides can be found in almost every locality

Failure to comply with environmental requirements and implementation of recovery actions very superficial damage to the soil is conditioned not only by financial shortages, which dominated the rural areas, by deficit of qualified personnel in the field of ecological control, by insufficient technical equipment of environmental laboratories, but also by negligence of central and local authorities responsible for managing those resources and by inefficient coordination of these measures. Thus, each year about half of the territorial-administrative units' action has not been brought for soil damages. Due to political instability and low frequencies of environmental control in recent years, there is a considerable reduction of the amount actions brought for these damages (fig. 2).

In 2010, the amount of actions brought for damage caused by soil were only 88 thousand lei, including in the North Region – 32 thousand lei, in the Central Region – 53 thousand lei and in the South Region – 3 thousand lei. Usually, is brought actions for damage compensation only for stubble burning and excessive soil pollution and very rarely for soil erosion and landslides. Therefore, despite

the existence of an adequate methodology for evaluation the soil damage, their practical implementation is very shallow, which makes an illicit behaviour of land beneficiaries.

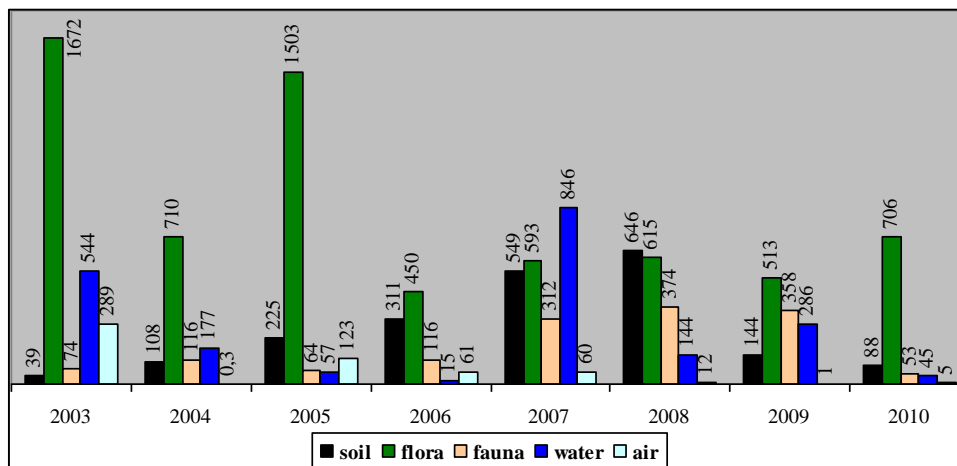


Figure 2. The amounts of actions brought for environmental damages (thousand lei).

Source: *Anuarele privind calitatea factorilor de mediu și activitatea Inspectoratului Ecologic de Stat pentru anii 2003-2010.*

Overall, there is no complementarity of the procedure of applying fines with of the instituting actions to recover soil damages, which should form an integral mechanism of economic sanctions to offenders. However, environmental authority’s reports do not contain complete information on civil actions in this area. Also, the proceeds of fines and damage recovery actions are significantly lower than the damage caused to soil cover. Meanwhile, World Bank data tell us the annual damage of about 200 million \$, due only to soil erosion. This situation confirms us about very superficial implementation of juridical and economic mechanism of establishment, evaluation and compensation of such damage, about massive negligence on the requirements for soil protection – the most valuable resources of our people.

5. Subsidies of soil protection

According to the *Program for exploitation of new lands and increase soil fertility*, annually are planned agro-technical and hydro-technical measures, and forest planting made from the account amounts accumulated from the sale of public land and from of change use destination of agricultural land. Anti-erosion measures cover 70% of the arable land and it’s based mainly on agro-technical methods. In order to implement these measures, there are not allocated sufficient human, financial and technical resources. Central forest authority, as coordinator of the restoration and improvement actions, requests inclusion in the state’s

budget the necessary funds for the work provided. In the structure of anti-erosion plantations, about 2/3 is compact forest areas, which have an auxiliary role in the protection of agricultural land erosion. This situation demonstrates the declarative nature of government policies in this field. The land beneficiaries are sufficiently involved in achieving of measures for restoration and protection of soils established in this program.

A major attention is given to projects of „development of the communal forests”, but because of superficial supervision, illegal grazing, drought and negligence of local authorities and population, much of recently planted areas are destroyed.

6. Taxes for use and pollution of land resources

Another important lever of economic management of the recovery and protection of land resources in the Republic of Moldova is a land tax. The amount and method of payment of land tax in the Republic of Moldova have been established since the early'90. Applying reduced payment norm for the use of land resources has been conditioned by difficulties of transition to a market economy, financial shortages and the disastrous situation of agriculture and rural areas. Subsequently, the amount of payment has not been substantially increasing, not being adjusted to the inflation rate. Thus, despite a very large number of land beneficiaries, the total amount of land tax doesn't exceed 200 million lei. The collected amounts of land tax per administrative-territorial units depending on their surface, on the number, size and hierarchy category of urban localities in these units and on the surface of land with non-agricultural functions (industry, transport, trade).

Also, as demanded by law, about 30% of the amounts collected should be used for restore degraded land and improve soil quality, but in reality, these are allocated less than 10%. This is due to insufficient incomes and to the expenditure priorities of local budgets in the fields of education, medical and social insurance, and to negligence of solving problems of the most valuable resource of our republic. Calculating the land tax does not take into account the ecological factors such as intensity and scale of erosion processes, landslide, salinity and pollution of soil. Therefore, the social benefits resulting from use of land resources is not properly mobilized, according to the present and next of economic, social and environmental requirements.

In more advanced countries of the world, to prevent excessive pollution and internalize the costs of soil pollution there are applied various economic levers of fiscal and trade nature, such as taxes and negotiable permits for authorized and normative pollution of soil. Taxes for pollutions are more widespread in European countries with traditions in government regulation of economic environment, and negotiable permits are more widespread in countries with more liberal entrepreneurial environment and with minimum public intervention in economic activity. At present, the national environmental legislation does not provide the application of these economic levers in the regulation of soil pollution, which is due to the difficult situation in agriculture.

7. Conclusions and recommendations

1) Environmental authorities have a very limited number of laboratories, which substantially reduces the capacity of land resources assessment of damage caused.

2) It is necessary to increase spatial coverage of environmental services and laboratories and involving the laboratories of Environmental Quality Monitoring Division of the State Hydrometeorological Service, which has the necessary equipment and qualified personnel.

3) Frequently the fines are applied for illegal burning of stubble and for occupation of agricultural land and rarely for soil erosion, for falsifying and concealing information about the status of land.

4) For pollution of land, green spaces, by waste it is necessary frequent application, as a form of punishment, community service work, which has a major educational effect. A part of amounts fines collected in those areas are used to finance current public works of sanitation.

5) In the formula for calculating the damage caused soil are adequately reflected physical-geographical and ecological indicators, but does not take into account by the market price of land, and by costs of damage evaluation to the land which is manifested forms of degradation, by inflation rate and income from agriculture in that area.

6) Despite the existence of adequate methodology for evaluations of soil injury, their practical implementation is very superficial, which has conditioned the illicit behaviour of land beneficiaries.

7) Payment norm of land tax does not reflect the ecological status of soils and land. It should be increased the share of collected taxes used to restore land and to improve soil quality.

8) Because of the superficial application of economic levers to management the impact, the land beneficiaries are insufficient involved in achieving of measures for restoration and protection of soils.

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