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Assessment of the territory of the Slovak Republic for waste disposal - Maps of the suitability the area for waste disposal, inventory of waste dumping grounds

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Abstract: Maps of the suitability of areas for waste disposal on the scale 1 : 50 000 have been constructed for the whole territory of Slovakia during the period 1992-1994. Simultaneously with the completion of the maps, field inventory of waste disposal sites has been made on the scale 1 : 10 00. The presented paper describes the methods of map construction and results of the waste dumping ground inventory. The total mapped area was 48 545.059 km^2. From this, 7094.993 km^2 (14.6%) was evaluated as area suitable for waste disposal, 17 933.862 km^2 (36.94%) as conditionally suitable and 23 516.204 km^2 (48.44%) as area unsuitable for the dumping of wastes. The total number of registered waste disposals is 8389 items.

Key words: waste disposal, field inventory, inventory sheet, maps of suitability, criteria of suitability

1. Introduction

Until basic legislation (laws and executive notices) has been passed, the situation in waste dumping grounds was unorganised and chaotic. Active policies concerning environmental protection aimed at minimising negative effects of waste disposal were absent.

The year 1989 was a turning point in problems of waste disposal. Initiated by local institutions as a reaction to the new approach to waste disposal, maps of area suitability for waste disposal have been constructed for different territorial units, with various accuracy and using different approaches for their elaboration. Similarly, there were different registration methods for existing waste dumping grounds - from questionnaires to very detailed records of present state.

The necessity of unification of approaches to both problems led to the project of construction of area suitability for waste disposal maps for the whole territory of the Slovak Republic, along with registration of waste dumping grounds. The project was initiated by Geological Factors Department of the Ministry of Environmental Protection of the Slovak Republic in the year 1992, and it ended in the first quarter of 1994.

The aim of the project was to construct the basic material for decision-making concerning the situation of new waste dumping grounds of home and similar waste.

Participants of the project in the various districts of the Slovak Republic were selected by competition, while, in view of the character of the task, renowned organisations were selected, specialising in geological and hydrogeological survey.

Maps of the area suitability for waste disposal

The construction of map of area suitability for waste disposal maps was preceded by the elaboration of instructions for its construction (Instructions for the construction of maps of area suitability for waste disposal, 1993). The starting point for the evaluation of area suitability is the presence of selected relevant factors (Tab. 1). The selection of the factors, having mostly the character of geofactors, depended on the scale of the map, availability of information, coverage of the territory of Slovak Republic as well as the necessity to attain uniform coverage density for the whole evaluated territory (or, in view of existing legislation), various limitations for making new dumping grounds.

Exclusive factors exclude by their presence the whole territory, or require special approach for acquiring a licence for waste disposal. Their presence makes the establishing of new waste dumping grounds considerably more complicated and increases the costs.

Limiting factors have a lower degree of restriction. Similarly as for exclusive factors, their complicate the establishing of new waste dumping grounds and make them more expensive.

In the maps, besides factors presented in Tab. 1, phenomena and processes have been presented,

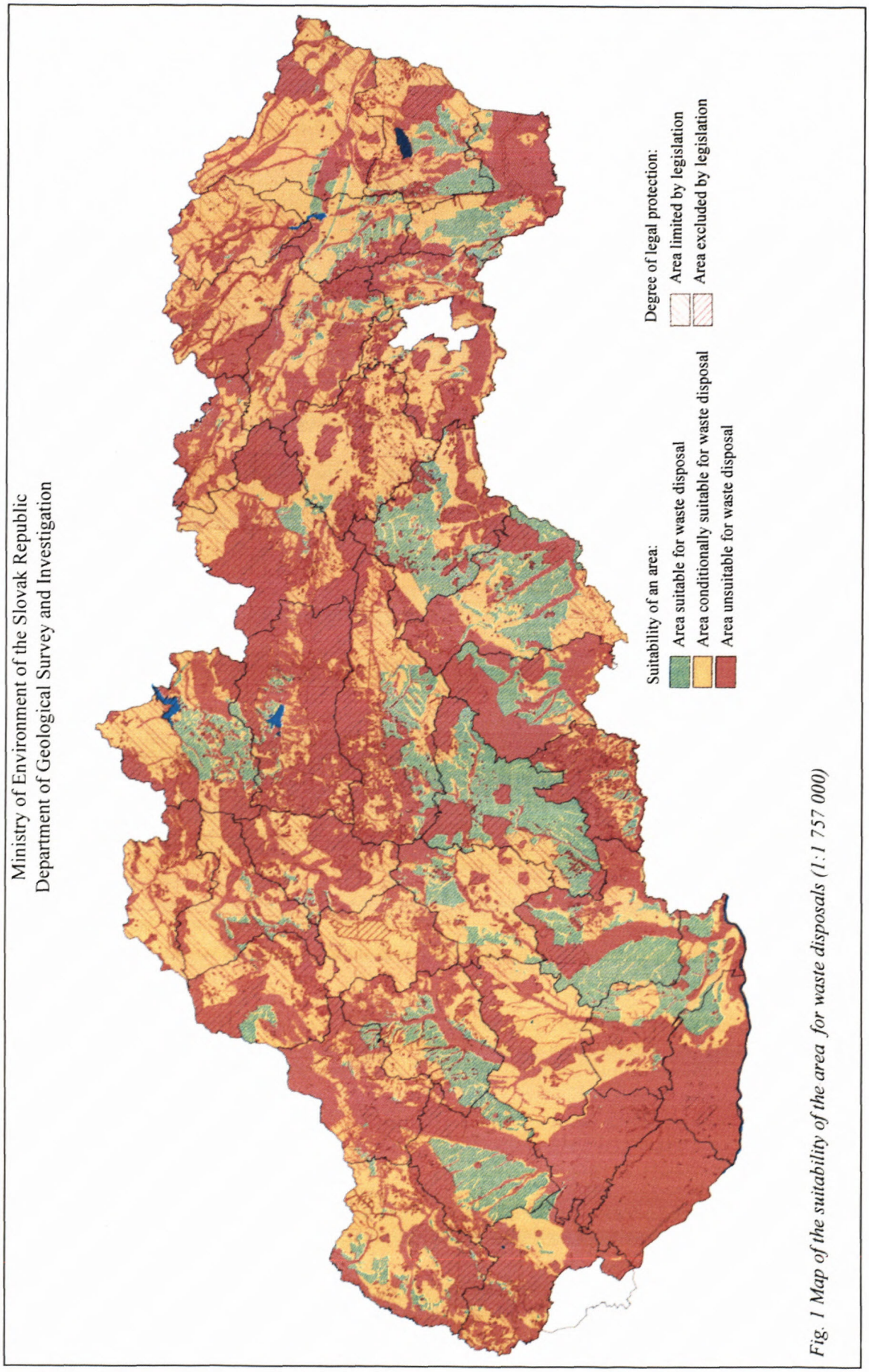


Fig. 1 Map of the suitability of the area for waste disposals (1:1 757 000)

having only informative character. They are e.g. seismicity of the territory, groundwater level depth, important geodynamic phenomena (landslides, sinking), active tectonics etc. By accepting their real importance in concrete conditions it was possible to re-classify some informative factors as limiting or exclusive.

Selected factors were evaluated and presented on the scale 1 : 50 000, in two documentation maps and resulting map evaluating the territory.

Documentation map I presents using marks, hatching and colour, by legislation determined factors for the situation of waste dumping grounds, which are protected deposit areas, protected forests, protected natural areas and protected water-management areas. For more details see Tab. 1.

Documentation map II presents other geofactors (Tab. 1), which are mineral deposits, hydrogeological phenomena, geodynamic phenomena and endangerment of groundwater. Endangerment of groundwater is a characteristic established for this special purpose, taking into consideration the position and thickness (depth) of aquiclude, the aquifer transmissivity value and the permeability type of rock environment. The method of estimating the grade of groundwater endangerment is shown in Tab. 2.

The map evaluating the territory by "traffic light" method shows the suitability, while an area suitable for making a waste dumping ground is free of exclusive and limiting factors, an area conditionally suitable is characterised by the presence of limiting factors and an unsuitable area is characterised by the presence of exclusive factors. Besides this, a coloured pattern (yellow or red) represents the presence of legislative factors (limiting or exclusive ones), not distinguished by type.

In the map there are also registered waste dumping grounds marked accordingly to show suggested procedures for their further existence.

Maps constructed by the above method were made for all districts of the Slovak Republic, with the exception of the cities Bratislava and Košice, where, before the construction of the above described maps, maps of suitability for wasted dumping grounds had been made on the scale 1:25 000, with extended contents.

All information collected according to the Instructions for different districts were digitised and printed by a uniform method for all districts of the Slovak Republic. The responsibility for data processing and map printing was delegated to Geofond Bratislava.

Maps of area suitability for waste dumping grounds were constructed for 36 districts of the Slovak Republic. The costs varied in the range of 300-500 thousand Sk, according to the size of the district. The price includes also costs of waste dumping ground registration and map printing.

An overview map of area suitability for waste disposal of all Slovak territory is presented in Fig. 1.

Tab. 3 shows the proportion of areas suitable, conditionally suitable and unsuitable for waste disposal in different districts of the Slovak Republic in km^2 as well as per cent.

The situation on the whole Slovak territory is the following:

Total evaluated area	48 545.059 km^2
Area suitable i.e. 14.62%	7 094.993 km^2
conditionally suitable i.e. 36.94%	17 933.862 km^2
unsuitable for waste disposal i.e. 48.44%.	23 516.204 km^2

From the above overview it follows that almost the half of the evaluated territory is unsuitable for waste disposal.

Territory suitable for waste disposal constitutes the smallest proportion of the total territory evaluated, while the number of districts with:

0 - 1 % of suitable areas is 6, i.e. 16.67%,
1 - 10 % of suitable areas is 15, i.e. 41.67 %,
10 - 20 % of suitable areas is 5, i.e. 13.89 %,
20 - 30 % of suitable areas is 5, i.e. 13.89 %,
30 - 40 % of suitable areas is 4, i.e. 11.11 %
40 - 50 % of suitable areas is 0,
50 - 60 % of suitable areas is 0,
60 - 70 % of suitable areas is 1, i.e. 2.78 %.

Of 36 districts, a proportion of areas suitable for waste disposal sites up to 40 % have 35 districts. Of these, as much as 17 % have a proportion of suitable areas up to 1 % and approximately 43 % of them a proportion of suitable areas of 1 to 10 %. This indicated unfavourable situation in making new waste dumping grounds. Reality will force people responsible for decision making to enter less favourable conditions, which will cause more confrontations of interests and increased costs of new waste dumping grounds.

Territory conditionally suitable for waste disposal forms approximately the third of the total territory evaluated, while the number of districts with:

0 - 1 % conditionally suitable areas is 1, i.e. 2. 78 %
1 - 10 % conditionally suitable areas is 1, i.e. 2.78%
10 - 20 % conditionally suitable areas is 6, i.e. 16.67 %
20 - 30 % conditionally suitable areas is 5, i.e. 13.89 %
30 - 40 % conditionally suitable areas is 9, i.e. 25.00 %
40 - 50 % conditionally suitable areas is 5. i.e. 13.89 %
50 - 60 % conditionally suitable areas is 2, i.e. 5.56 %

Tab. 1 Classification of factors controlling the suitability of an area for waste disposal

Type		Category	
		Exclusive	Limiting
Determined by legislation	Water - resources management- protected areas	- sources of mineral and thermal water and their protection zones of degree I and II - sources of drinking surface- and groundwater and their zones of hygienic protection of degree I and II - flooding area of dams under construction	- protection zones of mineral and thermal water - zones of hygienic protection of degree III of surface and grounwater sources - drainage area of a water-resource-management related waterflow - protected water-resources-management area - protected areas with groundwater resources
	Protected areas of nature	- National Park - State Nature Reserve - protected occurrence - protected work of nature and monument - protected park and garden - protected study area	- protection zone of a national perk - protected land area - protection zone of a protected land area - protection zone of a protected occurrence
	Protected forest	- special purpose forestts - preotection forests	
	Protected mineral deposit areas	- mining area of an important surface deposit - protected deposit area of an important surface deposit	- mining area of an important underground deposit - protected deposit area of an important underground deposit - survey area of a deposit
Other	Groundwater endangerment*	- high and very high	- medium
	Geodynamic phenomena	- area with manifestations of undermining on the surface	- areas with the occurrence of slope deformations** - areas affected by scouring erosion**
	Hydrogeologic phenomena	- wetlands - inundation areas	- areas with important groundwater resources
	Mineral deposits		- mined surface deposits of less important minerals

Symbol	Degree of groundwater endangement and costs of remedial measures	Structure of the rock environment remedial measures												
A	very high	1A4												
B	high	1A3	2A3	2A4	1N3	1B4								
C	medium	1A2	2A2	3A3	3A4	1B2	2B2	2B3	2B4	1C3	1C4	2C3	2C4	
D	low	1A1	4A4	1B1	3B3	3B4	1C2	2C2	3C3	3C4	1D3	1D4	2D3	2D4
E	very low	4B4	1C1	4C4	1D1	1D2	2D2	3D3	3D4	4D4	E			

Transmissivity of aquifers:

- A ≥ 10^{-3} m^{-2} s^{-1}
- B ≡ 10^{-4} m^{-2} s^{-1}
- C ≡ 10^{-5} m^{-2} s^{-1}
- D ≡ 10^{-6} m^{-2} s^{-1}
- E < 10^{-6} m^{-2} s^{-1}

Thickness (depth of the surface) of aquicludes:

- 1 – 0– 2 m
- 2 – 2– 5 m
- 3 – 5–10 m
- 4 – > 10 m
- izolátor – $k_f \leq 10^{-7}$ m . s^{-1}

Structure of the rock environment:

2A3
- Depth of the surface of underlying aquiclude
- aquifer characterised by transmissivity
- thickness of surface aquiclude

Types of rock environment permeability

- I – pore
- II – fracture-pore
- III – fracture
- IV – karst-fracture
- V – karst

Examples of complex symbols of the rock environment

2AIV4	1BI3	CII3
2´IV4	1BI3	3CII
inhomogeneous aquiclude	insufficient data on the thickness of the aquiclude	unclear position of the aquiclude

Tab. 3 Assessment of the district of the Slovak Republic according to their suitability for waste disposal

Organization engaged	District	Abbre-viation	Areas assessed as:					
			suitable		conditionally suitable		unsuitable	
			km^2	%	km^2	%	km^2	%
GP, š. p., Sp. N. Ves	Banská Bystrica	BB	373,164	17,99	819,751	39,53	881,066	42,48
GEOCONSULT, a. s., Košice	Bardejov	BV	4,889	0,48	550,690	54,33	458,097	45,19
GP, š. p., Sp. N. Ves	Bratislava vidiek	BH	44,367	3,57	387,609	31,25	808,186	65,18
INGEO, a. s., Žilina	Čadca	CA	0,366	0,04	630,853	67,45	304,111	32,51
INGEO, a. s., Žilina	Dolný Kubín	DK	315,512	19,59	644,726	40,03	650,300	43,48
GÚDŠ Bratislava	Dunajská Streda	DS	-	-	-	-	1 078,475	100,00
GEOS, a. s., Bratislava	Galanta	GA	15,239	1,55	75,936	7,70	894,788	90,75
GP, š. p., Sp. N. Ves	Humenné	HN	65,690	3,45	1 169,094	61,23	673,221	35,32
GEOS, a. s., Bratislava	Komárno	KN	114,413	10,42	129,626	11,80	853,969	77,78
GÚDŠ, Bratislava	Košice-vidiek	KS	95,772	5,39	670,497	37,74	1 010,491	56,88
Hydropol, Bratislava	Levice	LV	600,264	38,68	266,636	17,18	685,103	44,14
INGEO, a. s., Žilina	Lipt. Sv. Mikuláš	LM	96,531	4,90	352,105	17,86	1 522,476	77,24
GEOS, a. s., Bratislava	Lučenec	LN	275,101	21,15	150,154	11,55	875,147	67,30
INGEO, a. s., Žilina	Martin	MT	38,009	3,37	480,696	42,58	610,183	54,05
GP, š. p., Sp. N. Ves	Michalovce	MI	257,078	19,63	636,295	48,60	416,062	31,77
GEOHYCO, a. s., Bratislava	Nitra	NR	5,794	0,40	948,795	65,67	490,226	33,93
GEOHYCO, a. s., Bratislava	Nové Zámky	NZ	317,610	23,68	436,377	32,53	587,356	43,79
INGEO, a. s., Žilina	Poprad	PP	80,776	4,12	572,887	29,18	1 309,114	66,70
INGEO, a. s., Žilina	Považská Bystrica	PX	72,057	6,02	494,522	41,31	630,612	52,67
GÚDŠ, Bratislava	Prešov	PO	88,230	6,23	588,482	41,53	740,182	52,24
Lab. IG-PFUK, Bratislava	Prievidza	PD	2,459	0,26	730,322	76,16	226,186	23,58
GP, š. p., Sp. N. Ves	Rimavská Sobota	RS	600,874	32,94	557,700	30,58	665,504	36,48
GP, š.p., Sp. N. Ves	Rožňava	RO	570,948	35,30	441,583	27,30	604,753	37,40
GEOHYCO, a. s., Bratislava	Senica	SE	156,358	9,23	787,500	46,49	750,195	44,28
GP, š. p., Sp. N. Ves	Spiš. N. Ves	SV	39,857	2,61	971,602	63,68	514,395	33,71
GEOCONZULT, a. s., Košice	Stará Ľubovňa	SL	10,638	1,71	275,938	44,39	335,084	53,90
GEOCONZULT, a. s., Košice	Svidník	SD	8,552	1,00	587,639	68,58	260,640	34,42
GEOFAK., Bratislava	Topoľčany	TO	363,045	26,67	470,745	34,60	527,147	38,73
GEOCONZULT, a. s., Košice	Trebišov	TR	306,608	23,19	349,684	26,44	666,039	50,37
GEOS, a. s., Bratislava	Trenčín	TM	54,984	4,21	336,496	25,77	914,384	70,02
Lab. IG-PFUK, Bratislava	Trnava	TT	536,883	38,71	209,646	15,12	604,262	43,57
GEOS, a. s., Bratislava	Veľký Krtíš	VK	57,865	6,75	215,929	25,22	581,932	68,00
GEOKONZULT, a. s., Košice	Vranov n. Topľou	VR	206,887	24,73	397,947	47,58	231,621	27,69
GP, š. p., Sp. N. Ves	Zvolen	ZV	1 033,810	60,39	236,978	13,84	441,223	25,77
GEOS, a. s., Bratislava	Žiar n. Hronom	ZH	203,254	16,10	768,634	60,91	290,020	22,49
INGEO, a. s., Žilina	Žilina	ZA	81,159	7,40	591,779	53,97	423,654	38,63
Spolu			7 094,993	14,62	17 933,862	36,94	23 516,204	48,44

Tab. 4 Proposal of further management of the waste disposal site in the distrincts of the Slovak Republik

District	Abbre-viation	Proposal of further management of the waste disposal site:												
		L	LR	LM	LMR	R	MR	D	DR´	DM	DMR	M	Z	Total
Banská Bystrica	BB	38				42		5				10		95
Bardejov	BV	159				50	6	7						222
Bratislava-vidiek	BH	23				64		9					9	105
Čadca	CA	192				47	39			7		1		286
Dolný Kubín	DK	199				24				13		14		250
Dunajská Streda	DS	65				87	1	2				28		183
Galanta	GA	108	23	74	1	103	34	1	1	1		136	1	483
Humenné	HN	147	23	3	8	75	15	3		1				275
Komárno	KN	50	1	20		103	2	3				188	264	631
Košice-vidiek	KS	115				92	42	18		7		1		275
Levice	LV	26				153	6	36		17				238
Lipt. Sv. Mikuláš	LM	66				127	26	11		7		2		239
Lučenec	LN		45		20	1	1			10				77
Martin	MT	190	14	2		67	5	13	15	5	3	3		317
Michalovce	MI	95	1	3		2		1		1	1	1		105
Nitra	NR	155				187	1	4	114		2			463
Nové Zámky	NZ	68	3	9	6	21	27	1		8	1	36		180
Poprad	PP	153	66			155	8			2	1	2		387
Považská Bystrica	PX	2	96		2	47	6			6	1	6		166
Prešov	PV	77				115	29			15		1		237
Prievidza	PD	95	1			53		19		6		3	2	179
Rimavská Sobota	RS	56	1	2		71	7	13		2		1		153
Rožňava	RO	60			1	99	14	4		4				182
Senica	SE	103	1			94	2	26		6		6		238
Sp. N. Ves	SV	137	1	2	1	16	4					9	1	171
Stará Ľubovňa	SL	64				17	4	1		5				91
Svidník	SD	138				65	31	21						255
Topoľčany	TO	142	9	1		53	1	5		3				214
Trebišov	TR	139	1	1		77	27	6		45		2		298
Trenčín	TN	63				27						16		106
Trnava	TT	83	28	2	1	108	8	24	3	3				260
Veľký Krtíš	VK	227				54	1	1		18				301
Vranov n. Topľou	VR	90				33	3	2		15				143
Zvolen	ZV	28	42			91	3	4		1		27		196
Žiar n. Hronom	ZH	74	2			20	4			13		5	1	119
Žilina	ZN	106	6			99	7	21		8		22		269
Total		3 533	364	119	40	2 539	364	261	133	229	9	520	278	8 389

Explanations: L - liquidation, R - recultivation, D - further use, M - monitoring, Z - liquidated

60 - 70 % conditionally suitable areas is 6, i.e. 16.67 %
70 - 80 % conditionally suitable areas is 1, i.e. 2.78 %

The above overview shows the relatively favourable situation in the distribution of per cent proportions of areas assessed as conditionally suitable. None of the districts (except for Dunajská Streda) is without conditionally suitable areas.

Favourable is also the number of districts with low proportion of suitable areas (up to 10%) in relation to conditionally suitable areas. From the twenty districts which have only 0-10 % of suitable areas there is:

1 district with 0 - 10 % of conditionally suitable areas, i.e. 5 %,
1 district with 10 - 20 % of conditionally suitable areas, i.e.5 %,
3 districts with 20 - 30 % of conditionally suitable areas, i.e.15 %,
3 districts with 30 - 40 % of conditionally suitable areas, i.e. 15 %,
4 districts with 40 - 50 % of conditionally suitable areas, i.e. 20 %,
3 districts with 50 - 60 % of conditionally suitable areas, i.e. 15 %,
4 districts with 60 - 70 % of conditionally suitable areas, i.e. 20 %,
1 district with 70 - 80 % of conditionally suitable areas, i.e. 5 %.

Only two districts (Dunajská Streda and Galanta) have a low proportion of suitable as well as areas conditionally suitable for waste disposal. Other districts have the low proportion of suitable areas compensated with a higher proportion of conditionally suitable areas.

Inventory of waste dumping grounds

Similarly as before constructing maps of area suitability for waste disposal, before taking the inventory of waste dumping grounds, a registration form had to be filled for each of them. The selection of information required has been made with the aim to obtain basic characteristics of a dumping ground and the waste, data on geological and hydrogeological conditions of its underlier, aimed at proposing its further existence.

The characteristics (items) are listed in Fig. 2.

The mode of data input into the registration form was adjusted to the requirements of simplicity, intelligibility, the possibility of their digital processing and further complementation of data. An important requirement was the effort to present with each item the way of data acquisition, which would be indicative of their accuracy and reliability.

Registered waste dumping grounds, in contrast to suitability maps, were marked into 1 : 10 000 maps. This scale allows accurate presentation of the waste dumping ground area. Separate instructions were given for marking dumping grounds of line or, on the other hand, spot character.

8 389 waste dumping grounds were registered on the territory evaluated (Tab. 4).
The number of dumping grounds in the districts, as shown in Tab. 4, varies considerably. The lowest number is found in the district of Lučenec - 77, the highest number of waste dumping grounds is in the district of Komárno - 631. This situation may have been caused by several factors. An important role plays the economic potential of the district. In districts with developed industrial and agricultural production we can expect higher number of waste dumping grounds. The number is considerably affected by the approach of management and controlling bodies (state administration) to environmental problems. With a benevolent approach, there is no effort to liquidate "wild" (unlicensed) dumping grounds, which reflects in their total number. Anyway, it is not possible to exclude subjective approach of different registration evaluators. In spite of having been given instructions before starting to work on the registration, local pollution, which cannot be considered a dumping ground, was sometimes included into the evidence. On the other hand, benevolent approach to waste dumping ground registration cannot be excluded as well.

Total number of waste dumping grounds, especially in relation to all environmental components, is not very favourable. An exact evaluation of this situation was not the aim of the registration. This situation is indicated indirectly by an analysis of data on further existence of waste dumping grounds. The workers evaluating this should have proposed, on the basis of data obtained in waste dumping ground registration, four possibilities (or their combination): liquidation of the dumping ground, its recultivation, its further use or monitoring. Some workers distinguished, on their own judgement, dumping grounds which have been already liquidated.
The results of the proposals for different districts are shown in Tab. 4.

4056 waste dumping grounds, i.e. 48.35 % from the total number of dumping grounds, are suggested for liquidation or liquidation combined with recultivation, or monitoring of the dumping grounds. This number indirectly indicates assumed bad conditions of the dumping grounds, without further specification of these conditions. We assume that this assessment results from the complex evalua-

1. Current registration number of phenomenon
2. Archive number
3. District
4. Land-register area
5. Map sheet 1 : 10 000
6. Number of
7. Co-ordinate X
8. Co-ordinate Y
9. Operator of waste dumping ground (IČO)
10. Area (m^2)
11. Co-ordinate Z, method of determination
12. Average thickness (m), method of determination
13. Maximum thickness (m), method of determination
14. Volume of waste in m3
15. Year of foundation and method of its determination
16. Year of termination of waste disposal and method of determination
17. Distance from habitation (m)
18. The dumping ground has basement protection (insulation), functionality
19. The dumping ground has drainage system of seepage water
20. The dumping ground has surface insulation (cover), functionality
21. The dumping ground has indication-control system, observation frequency
22. The dumping ground has evidence of waste type
23. The dumping ground has interlayers
24. The dumping ground is sprayed
25. Relief of dumping ground surface
26. Position of dumping grounded material in relation to surroundings

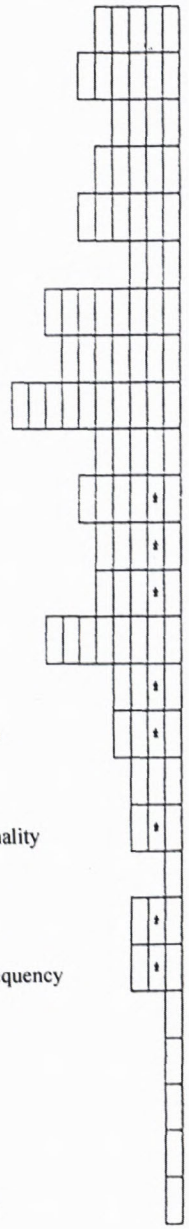
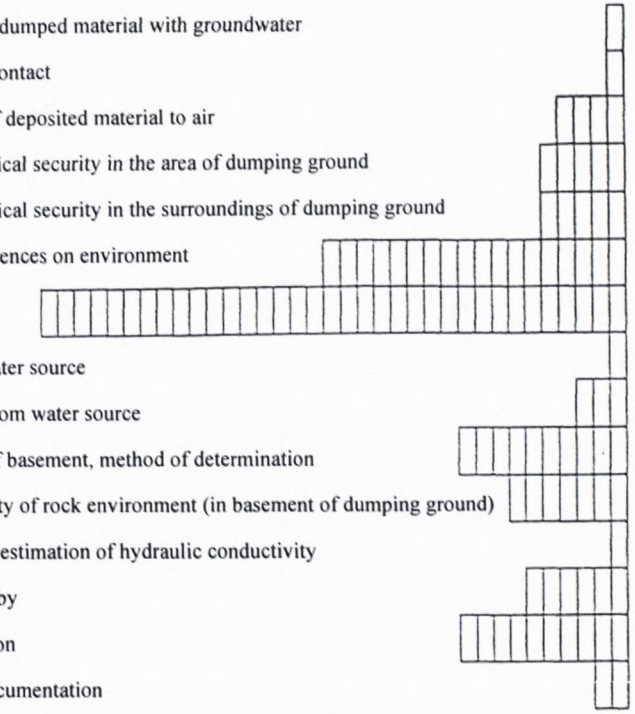
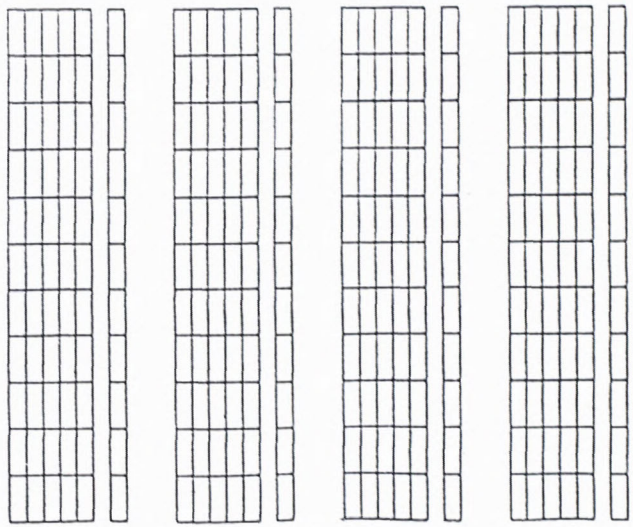


Figure 2 Registration form of solid waste dumping grounds

27. Contact of dumped material with groundwater
28. Extent of contact
29. Relation of deposited material to air
30. Technological security in the area of dumping ground
31. Technological security in the surroundings of dumping ground
32. Other influences on environment
33. Type of water source
34. Distance from water source
35. Geology of basement, method of determination
36. Permeability of rock environment (in basement of dumping ground)
37. Method of estimation of hydraulic conductivity
38. Evaluated by
39. Organisation
40. Date of documentation
41. Composition of waste and method of determination





tion of the material on the dumping ground, its technical equipment, technology of waste disposal, lithologic composition of its underlier, hydrogeological and hydrological conditions on the site.

The necessity to improve the unfavourable conditions of dumping grounds is reflected in the relatively high number of proposals for recultivation, monitoring or recultivation as well as monitoring.

520 waste dumping grounds have been suggested for monitoring alone, which is 6.2 %. We assume that this way of further management of the dumping grounds has been selected for those where only the results of monitoring would allow to make a decision on their further destiny.

The last group of dumping grounds - liquidated ones (278 waste dumping grounds, i.e. 3.3 %) were not evaluated on the basis of any criteria. The conditions on the dumping grounds, in relation to ground and surface water, soil (or rock environment) and air cannot be determined on the basis of an evaluation of registration results alone. This was not its aim anyway. The results of the registration may indicate the priorities of further action. It is essential to submit a great number of dumping grounds to an evaluation under Instructions S-1 (1993), and only on the basis of this to make decisions on subsequent actions concerning the conditions on the dumping grounds.

Conclusion

Maps of the suitability of the area for waste disposal are used for basic orientation at decision making concerning the situation of waste dumping grounds, while the selection of a locality is subject to a number of further evaluations. They allow to avoid sites which from the viewpoint of legislation or presence of important geological phenomena and processes are not suitable for a waste dumping ground. In areas assessed as conditionally suitable it is necessary to respect the presence of factors limiting the setting up of waste dumping grounds. They may be a reason for negative reaction of bodies and organisations involved in licensing the construction of waste dumping grounds. In areas assessed as suitable for waste dumping grounds maps cannot substitute geological survey of sites designed for waste disposal, however, they may be a starting point for this survey.

Maps of the suitability of the area for waste disposal together with existing registration of waste dumping grounds provide important information about the relation of a waste dumping ground to factors evaluated in the suitability maps. Environmental offices may base on this their decision making concerning further operation or liquidation of a waste dumping ground. Basic information about dumping grounds and their environment is provided by registration forms of waste dumping grounds.

References

Smernica na zostavovanie máp vhodnosti pre skládky odpadov. Vestník MŽP SR, ročník 1993, čiastka 6.

Smernica MŽP SR zo dňa 15. marca 1993 číslo S-1 o posudzovaní existujúcich skládok. Vestník MŽP SR.