

NATO-CCMS Pilot Study
Tour de Table - Greece

Contaminated Land in Greece
Recent Developments

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Contaminated Land in Greece: Recent Developments

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Contaminated Land in Greece: Recent Developments

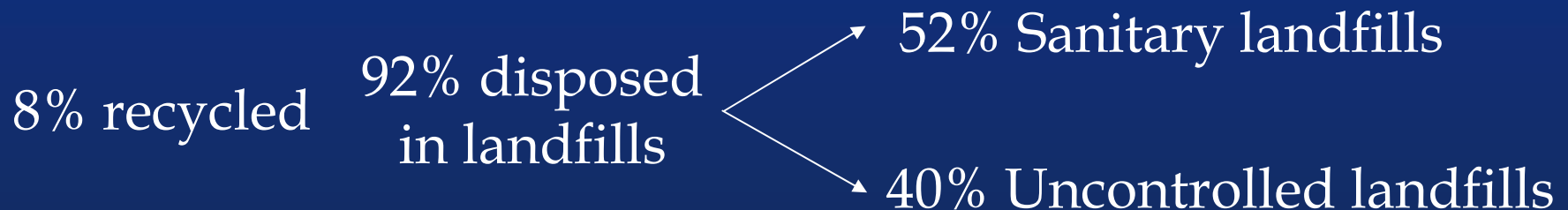
Introduction

- There is *no specific legislation* for soil or for the management of contaminated land
- There is *no comprehensive inventory* of contaminated sites
- There is progress in the *registration* and *rehabilitation* of contaminated sites related with:
 - Improper disposal of municipal wastes
 - Improper storage and disposal of hazardous and non-hazardous industrial wastes

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Rehabilitation of old landfills (MWS)

- Land disposal is the predominant method for the management of municipal solid waste (4.6 Mt/y):



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Rehabilitation of old landfills (MWS)

- The National Solid Wastes Management Plan was issued in 2003 and set two parallel objectives:
 - Eliminate and rehabilitate all the uncontrolled landfills
 - Create the required new infrastructure for appropriate MSW management and disposal

Both to be completed till the end of 2008

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Rehabilitation of old landfills (MWS)

➤ New infrastructure for MSW management and disposal :

	In operation	Under construction
▪ Sanitary landfills:	45	56
▪ Waste Transfer Station:	6	48
<i>Population served</i>	<i>55%</i>	<i>40%</i>

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Rehabilitation of old landfills (MWS)

- The programme of rehabilitation was launched on July 2004.
- The implementation of the programme comprised the following steps:
 - ✓ **Nomination of a Working Group** to promote and manage on a national level all the rehabilitation projects
 - ✓ **Questionnaires sent to the Municipalities** to collect the initial information (occurrence, size, location, main characteristics, etc.) and establish the complete list of 'uncontrolled' landfills

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Rehabilitation of old landfills (MWS)

- Main steps for the implementation of the rehabilitation programme (continues):
 - ✓ **Development of a Risk Assessment Methodology**
 - a. to set the priorities for remediation and
 - b. to facilitate the selection of rehabilitation measures
 - **Elaboration of Guidelines** that were sent to the municipalities for the preparation of required technical studies:
 - a. **Preliminary Technical Study** to obtain the permits
 - b. **Final Technical Study** to obtain the funding

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Rehabilitation of old landfills (MWS)

The Risk Assessment Methodology

A simplified procedure based on the “Source-Pathway-Receptor” principle, comprising the following steps:

1. Evaluation of the “**source**” taking into consideration
a) the volume and (b) the type of wastes
2. Evaluation of the “**pathway**”, i.e. permeability, distance from the aquifer.
3. Evaluation of the “**receptors**”, e.g. distance of landfill from drinking water wells, inhabited areas, sensitive ecosystems, etc.

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Rehabilitation of old landfills (MWS)

The Risk Assessment Methodology

Matrix M1:		Contamination Source			
Waste Volume (m ³)	Excavation materials	Demolition materials	Municipal		Hazardous wastes
			> 30 y	< 30 y	
<1.000	0	5	10	15	45
1.001-5.000	1	7	14	19	47
5.001-10.000	2	10	18	23	49
10.001-20.000	3	13	22	27	51
20.001-50.000	4	15	26	31	53
50.001-100.000	5	17	29	34	54
100.001-500.000	5	19	32	37	55
>500.000	5	20	35	40	55

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Rehabilitation of old landfills (MWS)

The Risk Assessment Methodology

Matrix M2:		Pathway		
Distance from aquifer	Permeability, m/sec			
	$K_f < 10^{-6}$	$10^{-4} > K_f > 10^{-6}$	$K_f > 10^{-4}$	
> 10 m	0	4	8	
2 - 10 m	1	5	10	
< 2 m	3	8	13	
Inside the aquifer	9	12	15	

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The Risk Assessment Methodology

Matrix M3:						Receptor	
Distance from:	>1000m	501-1000m	101-500m	<100m	inside		
Abstraction of drinking water	0	15	25	25	25	a1	max a
Future abstraction of DW	0	0	0	0	10	a2	
Other water sources	0	0	12	12	25	a3	
Children Playground	0	0	10	10	25	b1	max b
Gardens - Fields	0	0	10	10	20	b2	
Houses-Schools	0	0	10	10	20	b3	
Industries	0	0	0	5	20	b4	
Roads	0	0	0	5	10	b5	
Mines-Quarries	0	0	0	2	10	b6	
Estuaries	0	0	0	2	5	c1	max c
Surface waters	0	0	2	2	5	c2	
Protected ecosystems	0	0	0	2	4	c3	

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Rehabilitation of old landfills (MWS)

The Risk Assessment Methodology

The scores from the three matrices are summed up and the landfills are classified in four categories:

Category	Priority	Score
A	Immediate rehabilitation measures are required (a` priority)	≥ 90
B	Immediate rehabilitation measures are required (b` priority)	70-90
C	Rehabilitation measures should be taken but there is no urgency	30-69
D	There is no need for rehabilitation measures	0-29

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Rehabilitation of old landfills (MWS)

Selection of Rehabilitation Measures

- The results of the risk assessment analysis were used by the municipalities (and/or their consultants) for the selection of appropriate remedial measures
- The Guidelines issued by the Ministry included some general suggestions for the minimum requirements of the rehabilitation measures, according to the risk category of the landfills

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Rehabilitation of old landfills (MWS)

Progress of the Rehabilitation Programme

- According to the data collected during the registration phase, the number of uncontrolled landfills amounts to (April 2005):

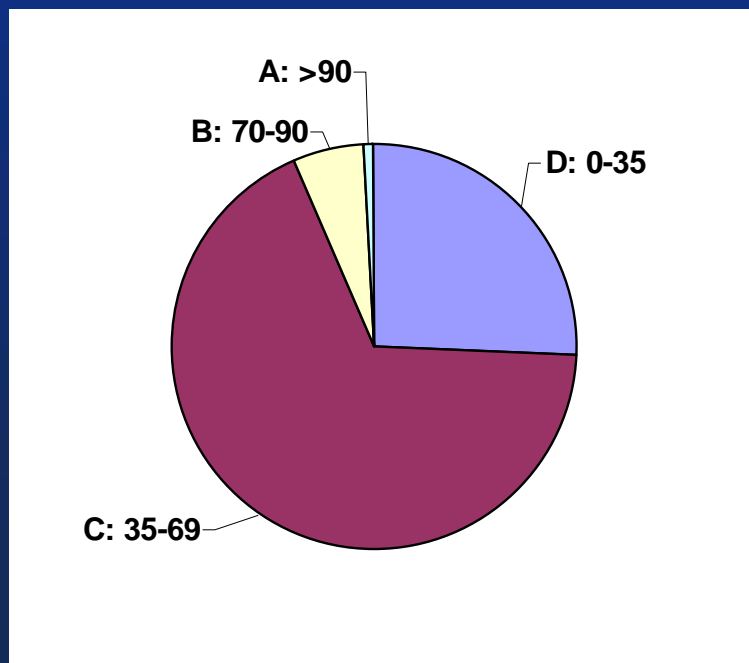
Inactive	1.173
<u>Active</u>	<u>1.453</u>
Total	2.626

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Rehabilitation of old landfills (MWS)

Progress of the Rehabilitation Programme

- Distribution of landfills in the various risk categories:



Category A :Risk rating	>90	0,7 %
Category B : Risk rating	70-89	5,6 %
Category C : Risk rating	35-69	67,9 %
Category D : Risk rating	0-35	25,8 %

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Rehabilitation of old landfills (MWS)

Progress of the Rehabilitation Programme

➤ Actions completed till 28/3/2006

<i>Actions completed (28/3/2006)</i>	<i>Percent of sites</i>
Decisions for closure by the Prefecture	87,6 %
Decisions for rehabilitation permits by Regional Authorities	67,6 %
Implementation of rehabilitation measures using only the resources of the Municipalities (no need for external funding)	9,9 %
Rehabilitation projects included in various funding programmes	24,6 %
Rehabilitation projects, ready for inclusion in funding programmes	22,7 %
Rehabilitation activities completed	0,8 %

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Industrial Hazardous and Non Hazardous Wastes Management

- New legislative framework for Hazardous Wastes recently issued: J.M.D. 13588/725/2006, March 2006.
- This J.M.D. includes provisions for the rehabilitation of sites contaminated due to improper management of hazardous wastes
- Will be soon supplemented with General Technical Specifications

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Industrial Hazardous and Non Hazardous Wastes Management

Few data were available before 2004, e.g.

- Total annual production of HW : 280.000 tons/y (1998)
- 90% produced by ~20 industries

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Industrial Hazardous and Non Hazardous Wastes Management

- Since October 2004, all industrial units are asked to submit Managerial Plans for their wastes (hazardous and non hazardous) with details about
 - ✓ Wastes produced during their operation
 - ✓ Wastes stored in the facilities
 - ✓ Specific schedules and plans for the final disposal of stored wastes and for the rehabilitation of storage sites.
- Submission of Managerial Plans is today still in progress.

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Conclusions

- Considerable *delay in the legislative framework* for soil and contaminated sites
- *Progress in the Rehabilitation of Uncontrolled Landfills*. The implementation of this programme is expected to contribute in the *built-up of valuable know-how* in all the levels of administration
- Managerial Plans, submitted by the industries since 2004, are expected to contribute in establishing the *inventory of industrial sites*, which are contaminated due to the disposal or storage of hazardous and non hazardous industrial wastes