MANAGEMENT OF CIVIL SOLID WASTE IN THE SOUTH TRANSDANUBIAN REGION

BARANYAI GÁBOR[1]

I. INTRODUCTION

The major deficiency of the Hungarian environmental protection appears in the field of waste management. As a consequence of several improvements, significant developments and initiatives have taken place in the waste management of the examined region, nevertheless, there is still work to do in their realization, as well as in the formation of further developmental conceptions.

Waste management was brought into the focus of environmental protection because of the damaging effect of accumulating, mistreated waste both on the environment and the conditions of existence of the living world and human beings respectively. Furthermore, the issue of waste gains growing economic importance. On the one hand, the placing and management of dangerous waste causes an increasingly complex problem and considerable expenses alike, while the vast majority of waste is valuable, reusable secondary raw material. Thus the rising amount of waste presumes the intensification of the society's loss of both material and energy. Namely, once the problem of recycling got solved, waste is regarded as raw or auxiliary material.

Generally speaking, the increasing amount of waste has continuously exceeded the facilities of waste management and the process of reuse in the past decades. The most significant reasons for this phenomenon are the following:

- changing consumer habits, the growth of demands (packaging, fashion);
- radical technological changes (computers, vehicles);
- artificial reduction of the usage period of consumer goods (in order to form new markets);
- the spendthrift, end-product focussed industrial growth;
- urbanisation.

The examined territory of this study is situated in the southern part of the Hungarian region Transdanubia. At the formation of the discussed region the fundamental consideration was to build on valid/living county boundaries (HAJDÚ-SZABÓ K. B. 2006.) The natural borderline of the region is represented by the river Danube in the east, Croatia in the south and south-west (serving as national

[1] PhD student, Doctoral School of Earth Sciences, Faculty of Sciences, University of Pécs, 7624 Pécs, Ifjúság útja 6., Hungary

border as well), the West Transdanubian Region in the north-west and the Central Transdanubian Region in the north. It involves 14 169 km², which makes up 15% of the country's territory. The three counties of the region (Baranya, Somogy, Tolna) *(Figure 1.)* include 654 settlements and 971 000 inhabitants, therefore they have the lowest density of population among the Hungarian regions (KSH 2006). 56% of the population lives in towns (KSH 2005.), the inhabitants are growing old and their number is decreasing in compliance with the national average.

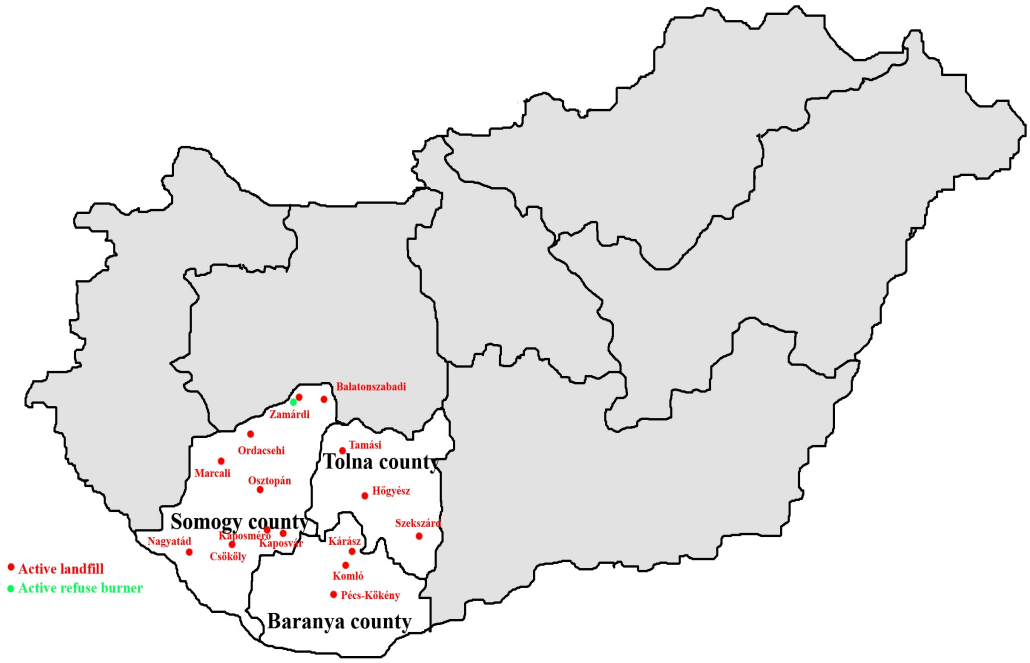

Figure 1.
The situation of South Transdanubian Region and the location of active landfills
(Source: own edition, 2007)

II. GROUPING OF DIFFERENT KINDS OF WASTE

The definition of waste

According to the law about waste management 2000/ XLIII., waste is such a remnant of production, services and consumption, which "part with, intend to part with, or is obliged to part with by its possessor". Nevertheless, being the by- and end-products of the various processes the remainder materials still belong to the category of waste even if their owner (the producer of waste) keeps, stores and accumulates them for himself. The law about waste management specifies the frameworks of the Hungarian policy and intends…

- to promote sustainable growth;
- to provide the conditions of existence and chances of the future generations;
- to decrease the consumption of energy and raw material;
- to increase the efficiency of utilization;
- to decrease the amount of waste;
- to protect human health, as well as the natural and artificial environment.

The aims of the policy follow the hierarchy defined in the developed countries, from the prevention of producing waste to the environment friendly disposal of non-reusable waste.

Grouping of waste

1. Civil waste
   - *a)* civil solid waste
   - *b)* civil liquid waste
   - *c)* civil waste water deposit
2. Waste of production
   - *a)* harmless waste
     - i. industrial and other harmless waste of production

ii. waste produced in agriculture and food industry

iii. remains of building and demolition work

b) dangerous waste

3. Waste requiring special treatment

a) refuse oils

b) accumulators, batteries

c) sanitary waste

d) waste of animal origin

e) wrappings, packagings

f) biomass

g) waste of rubber

This study elaborates on the questions regarding the civil solid waste (1.a), because most of the time the inhabitants encounter this kind of waste – the expression used in its strictest sense – which disturbs their comfort and everyday life to the largest extent.

According to the law about waste management (2000/ XLIII.), civil solid waste can be divided into:

- *household waste*: produced during the everyday life of people in their homes, in the buildings used for relaxation and recreation, in the shared rooms and grounds of dwellings as well as in various institutions;
- *waste of public domain:* arising from the traffic and the green belts of the settlements;
- *waste with similar features and composition of household waste:* produced by economic undertakings, classified as harmless solid waste by a separate rule.

III. THE SITUATION OF THE REGIONAL CIVIL SOLID WASTE

The number of settlements taking part in waste collection increased continuously, till at the end of the year 2004 every settlement of the region got provided with a regular and organized collection system *(Table 1.)*.

Table 1.
The changing number of settlements taking part in waste collection within the counties of the South Transdanubian region
(Source: KSH annals of Baranya, Somogy and Tolna county)

	1990	2000	2002	2003	2004
Baranya county Number of settlements involved	No data available	267	290	301	301
Somogy county Number of settlements involved	36	202	216	245	245
Tolna county Number of settlements involved	43	93	104	107	108
South Transdanubian region Number of settlements involved	No data available	562	610	653	654

Table 2.
Waste management in the South Transdanubian region
(Source: Companies of waste management)

Companies	Number of settlements provided with waste management services	Number of inhabitants	Landfill
Alisca Terra Kft.	17	60 464	Szekszárd
Zöldfok Rt.	14	ca. 210 000	Balatonkeresztúr
	13		Ordacsehi
	30		Zamárdi
	19		Balatonszabadi
Saubermacher-Pannonia Kft.	27	39 590	Nagyatád
Komlói Városgazdálkodási Rt.	29	ca. 60 000	Komló
Rumpold-Marcali Kft.	30	ca. 35 000	Marcali
BIOKOM Kft.	237	379 412	Pécs-Kökény Tamási Kárász
KVG Rt.	230	ca. 300 000	Kaposvár Kaposmérő Csököly Osztopán Hőgyész Harkány

The number of dwellings and holiday homes supplied with waste collection rose from 249 000 in 1990 to 416 000 in 2004. Regarding the three counties of the region, the best value is represented by Somogy (97,5% - KSH 2005).

The collection of civil solid waste is provided by 7 larger companies (BIOKOM Kft, Zöldfok Rt., KVG Rt., Rumpold-Marcali Kft., Saubermacher-Pannonia Kft., Alisca Terra Kft., Komlói Vg Rt.), their activity covers 646 settlements *(Table 2.)*. In the case of the other 8 settlements, the task of waste management is supplied by smaller economic organizations and the local governments.

The region's landfills accommodating civil solid waste

According to the data of the end of the year 2004, the waste produced in the settlements taking part in the regular collection was placed in the region's 34 working landfills. From 1. January 2006 there are 3 landfills in Baranya, 9 in Somogy and 3 in Tolna county which possess a valid operational permit, though there are only 6 out of them with proper technological protection. In the case of the lack of this kind of protection, the landfills are unsatisfactory from the point of view of environmental protection – they are not equipped either with an insulation system, nor is there any drainage, and the fence around them is also missing. In the 1960s and 1970s the majority of the landfills in the country and in the examined region as well were designated by the decisions of the local authorities. For the purpose of laying down they marked discarded mines or the fields in the outskirts of settlements, which were lying low, therefore unsuitable for agricultural cultivation. The standpoints of environmental protection were not considered: the drainage originating from waste contaminated the soil and the phreatic water alike, which problem is worsened by the stink and the aesthetic harms. Another difficulty is represented by the frequent cases, in which the landfills catch fire – either in a natural way, or intentionally, in order to increase capacity.

At the end of December 2002 the small landfills (73) were closed down, and the settlements joined a larger landfill – mainly one in the small region – and the companies operating it. In May 2003 there were 368 discarded landfills in the region. On 31. December 2005 another two landfills (Harkány, Balatonkeresztúr) have been deprived of permission. All the other landfills possessing a valid operational permit provide the accommodation of waste till 31. October 2007. According to the data of the South Transdanubian Authority of Environmental Protection, Nature Conservation and Hydrology, there are 44 companies in the region possessing permission to collect and transfer, while 5 companies to recycle the civil solid waste.

There are 368 discarded landfills accommodating civil solid waste in the region, which were run without any appropriate technological protection. The problem is caused by the fact that some of the illegal and abandoned landfills are still in use, and sometimes the territories being recultivated serve as depots of waste as well. The former are wound up with the enforcement of the responsibility de-

Figure 2.
Map of the illegal landfills based on the results of the questionnaires filled out in the small region
(Source: Strategic Development Programme of South Transdanubian region)

termined in the 19/2004. (VII.21.) decree on the one hand, nevertheless the recultivation programmes of the civil landfills also contribute to the closing down and recultivation of annually 50-100 landfills all over the country.

There has been a research carried out in the small regions and cities respectively, regarding the situation of the illegal landfills *(Figure 2)*.

The results are the following:

- the small regions keep a record of 211 illegal landfills,
- while the local governments of the towns listed 157 such illegal landfills.

The survey displayes the fact that the well-known, larger landfills are situated within the city, which could mean, that either the representatives of each small region know the environment of the city much better – and they do not have any information about the rural territories –, or the number of illegal landfills is really higher around the cities, which phenomenon can be explained by the larger population.

The selective collection of civil solid waste

There are no adequate data about the waste collected selectively, which can be explained by the various interpretations of the definition of selective waste collection itself. Some local governments classify the collection of paper, metal and batteries carried out at schools as selective collection, while others put only the organized collection into this category. Basically, the effective selective waste collection is present in cities – i.e. only in a low number of settlements –, at most places it just represents an occasional initiative.

Based on the Waste Management Plan of the South Transdanubian Region, in autumn 2002 there were 27 settlements in Baranya county, which took part in any way in the selective waste collection. Out of these, 13 cases were reported by the companies as effective and organized collection. Somogy county included 25, while Tolna county had 22 settlements applying some methods of selective waste collection. All in all, there are 74 settlements in the whole region, where the selective waste collection as such appeared in any form. The number of settlements taking part in this kind of waste collection rises continuously, mainly due to the utilization of the various applicational facilities. According to a questionnairy filled out in January 2006, there are 238 settlements in the region, where the selective waste collection operates.

In consequence of the spreading of the selective waste collection more and more civil solid waste becomes recycled (up to even 6 000 tonnes in 2001). There are two working "sorting factories" in the region (in Zamárdi and Pécs), their total capacity makes up 24 000 tonnes a year.

The reuse and disposal of civil solid waste

The 4 operating junkyards of the region (one in Pécs and Barcs respectively, two in Kaposvár) accommodate the selectively collected waste of the local residents. Unfortunately, there is no similar undertaking in Tolna county. In order to recycle the green waste, there are compost producer works (e.g. in Kaposvár, Pécs, Garé, Zamárdi). The only refuse burner of the region operates in Zamárdi, having a capacity about 600 m^3 a year.

Table 3.
The quantity of waste collected by the waste management companies and their applied methods
(Source: Companies of waste management)

Companies	Types of waste	Quantity (tonne)	Method of waste management	Quantity (tonne)	Ratio compared with the quantity of the produced waste (%)
BIOKOM	*civil:* communal selective collection	82 852 6 043	recycling	25 354	17,8
	industrial,commercial: communal selective collection	23 807 30 164	compost production	5 737	4
	total:	142 866	laying	108 498	76
			disposal	3 277	2,2
Zöldfok RT	remains of building and demolition work:	32 053	recycling	932	0,85
	junk:	5 288			
	biologically dissolving waste:	5 512	compost production	5 512	5,15
	Other, mixed, reusable secondary row materials:	63 639			
	total:	106 492	laying	100 048	94

The largest territory in the region is covered by the companies BIOKOM (Mecsek-Dráva Waste Management Project, Pécs) and Zöldfok Rt (Southern Lake Balaton and Sióvölgy Civil Solid Waste Management Project, Siófok). The project directed by these two undertakings manages the waste of more than 800 000 inhabitants, therefore, considering the data published by them, we can ascertain quite reliable conclusions valid for the whole region.

The general practice for the disposal of the civil solid waste produced in the region is represented by its laying, there are only 9 small regions with organized collection of green waste, and two small regions, where the selectively collected waste of light fraction is recycled by burning. The re-use of inert waste is insignificant as well. Based on the information provided by the waste management companies operating in the South Transdanubian region, we can come to the conclusion that only a few percentage of the produced waste gets recycled *(Table 3.)*.

IV. THE WAYS OF THE FUTURE, THE COMPLEX REGIONAL WASTE MANAGEMENT PROGRAMMES

The reasons for the establishment of the complex regional waste management projects are primarily represented by the realization of the instructions of environmental protection included in waste management, as well as by the enforcement of the European Union's policy of environmental protection aiming at the improvement of the environment's state. The necessity of the preparation and realization of the projects can be explained by the following:

- There are only 6 landfills in the region with appropriate technological protection and insulation.
- Out of the total number of 27, only 3 are permitted to accommodate waste even after 31 October 2007, their capacity is limited.
- The problem of the recultivation of the illegal and discarded landfills has to be solved urgently.
- Except for the companies of the larger region, the organized collection is out-of-date, the vehicles work without compression or their efficiency is very low.
- The problem of the proper waste management, the selective collection and recycling, as well as the separate collection and reuse of organic waste is only partially solved.
- There are two sorting factories and some compost producer works in the region, their capacity is not enough to manage the whole amount of produced waste.

Besides the practical purposes, the following priorities occur:

- Formation of a consistent practise in the field of waste management;
- Prevention of waste production, the reduction of the quantity of waste as well as its harmful effects (principle of prevention);
- Recycling of produced waste to the possibly largest extent (principle of recycling);
- Laying of non-reusable waste with the consideration of environmental protection.

After joining the European Union the local governments had the opportunity to apply for financial assistance in order to build up regional waste management systems. In the South Transdanubian region, there are three larger waste management projects, which can be realized:

- Southern Lake Balaton and Sióvölgy Management Project of Civil Solid Waste
- Mecsek-Dráva Waste Management Project

- Kaposmenti Waste Management Project

According to the information provided by the Ministry of Environmental Protection and Hydrology, the vast majority of settlements joined one of these three larger programmes, 7 settlements chose the Waste Management Programme of the Central Danube Region, while 11 settlements do not belong to any such programme so far.

The major features and aims of the waste management projects

Southern Lake Balaton and Sióvölgy Management Project of Civil Solid Waste (ISPA)

- *Territory affected:* 202 settlements (a part of Somogy – Tolna – Baranya counties),
- *Population concerned:* 372 530 residents, in high season (Lake Balaton) hundreds of thousand guests; the population regarding the corrected annual data: 468 000
- *The amount of waste:* 129 000 tonnes (estimated quantity – 2001), approximately 210 000 tonnes in the last year of the project (forecast for the year 2029).

  Main purposes:

  - Recultivation of 40 landfills;
  - Building up of 805 groups of public dustbin, 3 sorting factories, 8 compost producer factories, 19 civil junkyards and 4 transfer stations;
  - Development of a new, environment friendly and EU-compatible landfill capacity about 2,795 million m^3.

Two new landfills would be built in Som (1,1 million m^3) and Cikó (1,2 million m^3) respectively, while the third one would be realized by the modernization of the landfill in Ordacsehi (0,495 million m^3). For the settlements taking part in the programme, the opportunity of selective waste collection would be provided by 805 groups of public dustbin. With the winding up of the local landfills the residents have no more the legal way to get rid of the vast majority of waste, which can not be transported within the frameworks the regular waste collection. The former deficiency can be eliminated by the development of a system consisting of 19 junkyards, and their placing in the vicinity. The preparation of secondary raw materials for industrial utilization requires the establishment of sorting factories, the placing of which can be optimized in the large region, while the considerable amount

of transferred waste minimizes the cost of operation. For the preparation of the selectively collected, re-usable waste three sorting factories are to be built within the territory of the project, related to the regional landfills (Som, Cikó, Ordacsehi).

In order to reduce the amount of the organic components of the layed waste, it is necessary to manage/treat the organic waste separately. The compost production of organic waste is a well-controlled process, which provides the valuable nutritive supplies of arable land as well. Within the frameworks of the project, there is a plan of building 8 regional compost producer factories, out of which three (Som, Cikó, Ordacsehi) is related to the regional landfills, four (Balatonkeresztúr, Tolna, Komló, Mohács) would be established together with transfer stations, while one would be realized in Tamási.

With the introduction of the waste management in the large regions, the landfills used nowadays have all to be closed down, and the decreasing of their damaging effects requires proper recultivation. The project schedules the recultivation of 40 landfills.

Mecsek-Dráva Waste Management Project **(Cohesion Funds)**

- *Territory affected*: 295 settlements (Baranya–Somogy–Tolna counties)
- *Population concerned:* 427 437 residents
- *The amount of waste:* 171 000 tonnes (2003.). Approximately 234 000 tonnes in the last year of the project (forecast for the year 2025)

  Main purposes:

  - Building up of 2 regional landfills, 5 transfer stations, 21 junkyards, 5 compost producer works and 2 biofermentation works for the accommodation and reuse of the selectively collected green waste. Establishment of 3 sorting factories in order to manage the selectively collected civil solid waste. Development of 2 mechanical preparing factories as well as a mobile recycling factory for the management of remains of building and inert waste.
  - Extension of the amount of special vehicles: 50 for the transportation of communal waste, 10 for the collection of green waste, 5 compression vehicles for the transportation of the selectively collected waste.
  - Installation of 707 groups of public dustbin, 85 000 dustbins for green waste and 55 000 individual selective dustbins – thus providing the more wide-spread availability of selective waste collection.

- The closing down and recultivation of 100 landfills owned by the local governments.

It is necessary…

- to decrease the territory of landfills (closing down of small landfills, using a central landfill, decreasing the amount of layed waste);
- to apply the methods of modern waste management within the frameworks of regional landfills and/or by the utilization of energetics (burning, mixed burning primarily in the case of selectively collected waste of light fraction and green waste), which – in contrast with the traditional laying – take place among the priorities of the European Union's waste management directives.

The efficiency of the collection and storage should be increased by compression, in order to reduce the damaging effects of transport. The same aim would be served by the establishment of a regional waste collection system, with the formation and operation of transfer stations in the more remote waste producing centres, where waste collection would take place in more stages. It is also important to improve and develop the selective collection in the case of the following kinds of waste: paper, glass, plastic, metal, biologically dissolving and organic waste. The production and trade of secondary raw materials – i.e. basic materials produced for the industry by subsequent selection – play an important role in the programme. A similar emphasis will be laid on the selective collection and disposal of dangerous waste, which prosesses are still in their infancy nowadays. Besides the activity of the economic ventures, there is also need for the forming of the population's consciousness regarding the natural environment as well as for the realization of a successful PR-activity in order to increase efficiency.

Kaposmenti Waste Management Project

The Kaposmenti Waste Management Programme is still in the planning stage, its direct purpose is the establishment of such a modern waste management system, which would fit into the regions covered by the already accepted and started ISPA programme. At the same time, it also aims at the proper operation and the covering of the whole region, whereby the up-to-date and environment friendly management and recycling of the region's waste would be provided in the long run.

- *Territory affected*: 144 settlements (Baranya–Somogy–Tolna counties)
- *Population concerned:* more than 196 000 residents

The best start for the project would be about 2009-2010, its major purpose is to provide the proper management of civil solid waste according to the EU-directives, to create the necessary technological, constitutional conditions in the region of the three counties (Somogy, Tolna, Baranya). An additional aim is to develop a new technological or even productional and operational culture; to support the economic life of the region; to establish new places of work; to protect the subsurface water base; to preserve the protected natural values.

The main purposes of the planned programme:

The laying of waste in modern landfills covering large regions;

- Dustless collection of household waste by applying compression;
- Establishing transfer stations, waste collection carried out in more stages;
- Selective collection in order to provide the separation of reusable civil waste;
- Formation of a junkyard system;
- Selection of reusable and industrial waste, its preparation for the further recycling process;
- Preparation of waste for energetic utilization in the long run;
- Recycling of green waste (by compost production);
- Closing down of the still working landfills without technological protection, as well as the recultivation of the discarded landfills.

V. Summary

After the Hungarian change of regime, the role and judgement of natural resources have been revalued radically. Subsequent to the establishment of market economy, the demand on the sustainable environment appeared, more and more committed voices opted for sustainability among the various political, economical and social actors (Szabó-Kovács. B. 2007). This small country possesses only few recources, it depends on the international economy. This fact – as well as rationalism – accounts for the careful management of available recources: we should recycle them if it is possible, and as many times as we can. Waste is not rubbish, with proper management it can represent valuable recources. Nevertheless, the inefficient management contaminates the overland and subsurface water, the air, the soil – all in all, the other available natural recources and our health as well. Fortunately, there is a growing social, political and economical demand in our region on the proper waste management. There is lot of work to do, but the process has been already started. The successful ef-

forts aim at the formation of the future generations' way of thinking related to the natural environment. Our region is leading in the recycling of selectively collected waste, and several additional developments are to be realized in the forthcoming years. In consequence of the above mentioned initiatives, our environment remains sustainable.

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