National Solid Waste Management Strategy for Swaziland

Waste Information System
Implementation in SEA

Final Report
28 November 2002

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List of abbreviations

Abbreviation	Meaning
CSS	Central Statistical Services
GW	General Waste
HCRW	Health Care Risk Waste
HW	Hazardous Waste
RSSW	Registation System for Special Waste
SEA	Swaziland Environmental Authority
SIC	Standard Industrial Classification codes from the Central Statistical Services (CSS)
WAGEN	Waste Generators – database containing data from a survey carried out by a local consultant
WIS	Waste Information System – database containing the reported waste data.

1.Introduction

This report is the third dealing with the Waste Information System (WIS) in the Swaziland Environmental Authority (SEA). The three reports are:

- Discussion document, cf. /1/
- User Manual, cf. /2/
- Implementation in SEA – this document

Please refer to /1/ or /2/ for more detailed description concerning system design or user interface.

The objective with this report is to:

- Support the SEA in gathering waste data
- Enable the SEA to import waste data into the WIS
- Support the SEA in processing waste data
- Guide the SEA in dissemination of waste data
- Lighten the workload connected with introducing and running the WIS
- Anchor the WIS in the SEA body

2.WIS course

In order to enable the SEA staff to operate and utilise the WIS, a course was offered in the SEA. The course was held 21 and 22 November 2002 at SEA in Mbabane. The course consisted of theoretical presentations by Dr Lybye and hands-on exercises. The exercises were carried out in teams of two participants.

Please refer to the Appendices A – C for details on participants, slides and exercises.

3. Information in the WIS

The WIS is shipped with a set of preloaded information. The information covers:

- Generators
- Disposal sites
- Waste control areas
- Landfill data

3.1 Generators and disposal sites

Many of the generators and disposal sites are already in the system. The data derives from a survey "Special waste (hazardous and health care risk waste): gathering and collation of waste data – final report", cf. /4/. The survey gathered waste data concerning generation. This information is stored in a MS Access 2000 database, named WAGEN.MDB. The database is also stored on the WIS installation CD.

3.2 Waste control areas

During the main project "National Solid Waste Management Strategy for Swaziland" two areas in Swazi Nation Land was proposed as waste control areas. This implies that the areas must monitor/report their waste data. The areas are Kwaluseni and Siphofaneni. The Kwaluseni area is divided into zones. A waste survey was done in these two areas. This information was fed into the data base. The data covers year 2002.

3.3 Mbabane landfill

The Mbabane landfill has reported the received waste amounts. The monthly data for year 1998[1], 1999 and 2000[2] has been imported into the WIS.

[1] Only the months June to December were reported

[2] Only the months January and February were reported

4.Legislation

The legal framework for waste management is defined by the "Waste Regulations 2000", cf. /3/. This chapter describes the link between the regulation and the WIS according to:

- Collecting obligations
- Reporting obligations
- Utilisation of collected information

4.1 Collecting obligations

The regulation describes that the authority shall collect and analyse statistical waste data:

Part III, 7, n, page 24:
The authority[3] shall collect and analyse statistical data on waste produced and waste composition in Swaziland and include the findings of this research and appropriate recommendations in the annual report of the authority.

It is recommended to store the data electronically in order to process the data. By storing the data in a database the data follows a unique format and the database is designed for analysing and aggregating the data. The WIS utilise a MS Access 2000 database. Please refer to /2/ for further details on the database.

4.2 Reporting obligations

Different waste managers/operators have reporting obligation:

Part III, 8, 2, page 24:
Each local authority shall report annually to the authority on the quantity of household, commercial, industrial, hazardous and clinical waste generated and disposed of within its area of jurisdiction and on the implementation of its waste management plan.

Part IV, 15, 5, d, page 29
The consignee[4] shall ensure that the remaining two copies[5] are given, within 7 days of receipt of the consignment, to the waste regulation authority for the area to which the consignment has been transported.

[3] The authority means SEA

[4] The consignee is the treatment facility of the hazard waste. The generator and transporter of the waste are called consignor and carrier, respectively.

[5] Copies of the signed consignment note

The local authority shall then afterwards send copies of the consignment notes to the SEA. However, it is recommended that copies of the consignment notes are sent directly to the SEA. This should improve the quality of the received consignment notes in SEA mainly because the information is received directly from the source.

Both the local authority and the receiver (facility) for hazardous waste must report. The information shall be collected by the SEA, cf. section 4.1. However, if the reporting is not performed the regulations describes different actions that can be performed:

Part III, 7, l, page 24
The authority shall take enforcement action where necessary, including variation, revocation and suspension of licenses in the case of breach of license conditions

Part IX, 21, 2, page 33
Any person who contravenes sub-regulation (1) commit an offence and is liable on conviction to a fine not exceeding twenty five thousand Emalangeni and on a second or subsequent conviction, to a fine not exceeding fifty thousand Emalangeni and, in case of a natural person, to imprisonment to a term not exceeding two years, or to both imprisonment and a fine.

This means the court can impose fines, sentence to imprisonment and the SEA can withdraw waste management licenses. According to the regulation every person that manage hazardous waste[6] must have a waste management license:

Part IX, 23, 1, page 34
A person shall not keep, treat or dispose of special waste except under and in accordance with a special waste management license issued under this regulation.

Besides the described reporting obligation the generators of hazardous waste must keep records so the authority can track the consignment notes back to the generator:

Part IX, 23, 7, b, page 35
To ensure that adequate records are kept and contractual arrangements concluded to enable the authority to track any consignment of waste from the place where it is produced to the place where it is finally disposed of and to determine which party had custody of the waste at each point.

[6] Hazard waste is called special waste in the regulation

4.3 Utilisation of collected information

The SEA can utilise the collected information for different purposes, e.g.:

- Monitor the management of waste
- Monitor the amounts of waste
- Select biggest quantities of waste distributed on waste types
- Make assumptions for waste management plans
- Forecast future quantities of waste
- Publish annually waste statistics
- Monitor the implementation of the waste management plans

Some of these purposes are stated in the regulation:

Part III, 7, c, page 23
The authority shall monitor the management of waste in waste control areas

Part III, 7, k, page 24
The authority shall monitor compliance with licenses issued under these regulations

Part III, 7, m, page 24
The authority shall review and monitor the implementation by local authorities of waste management plans.

Part III, 8, e, page 24
The local authority shall, within the local authority's area of jurisdiction prepare waste management plans in accordance with regulation 31.

5.Guidelines for the implementation

In order to ease the implementation of the WIS in SEA guidelines for both short and long term are described.

5.1 Short term – within 6 months

The following list displays the main tasks to be carried out in the SEA within the next 6 months.

1. Appoint administrator of the WIS
2. Appoint sub-administrator of the WIS
3. Describe and perform standard procedures for collecting data
4. Develop paper forms for the data reporting, i.e. forms for:
   - Reports from local authorities
   - Consignment notes
   - Waste control areas
5. Define unique numbering system for the consignment notes
6. Estimate key figures, cf. figure 5 in /2/
7. Describe backup procedures
8. Appoint backup computer

Ad 1 and 2 – Appoint administrator and sub-administrator
In order to ensure that waste data is collected, processed, disseminated, back-ups made etc a WIS administrator must be appointed by the SEA. The administrator will be responsible for these actions. The sub-administrator is the substitute for the administrator. This appointment is very important and is crucial for the success of the implementation of collecting, analysing and publishing of waste data. The appointment should be performed within 1 month. The appointed person must be allocated the required time. The required time in SEA is estimated to be between 1 and 2 man months per year. In addition time has to be allocated in the local authorities for data collection. The required time in the local authorities is assumed to be similar to the SEA. Furthermore, the waste control areas must also allocate time for the data gathering. This required time per waste control area (Inkhundla) is estimated to between 0,5 and 1 man month per year.

Ad 3 - Describe and perform standard procedures for collecting data
Standard procedures for collecting data should be developed and implemented. This should ensure uniform collecting procedures and ensure that successors can easily perform the collecting. Figure 1 shows the dataflow for general waste data collecting and following procedures. Firstly, the authority, which shall receive the data, sends a reminding letter. If the reporter does not reply another remind letter is sent. This letter should stress that it is illegal not to report according to the waste regulation, cf. /3/.

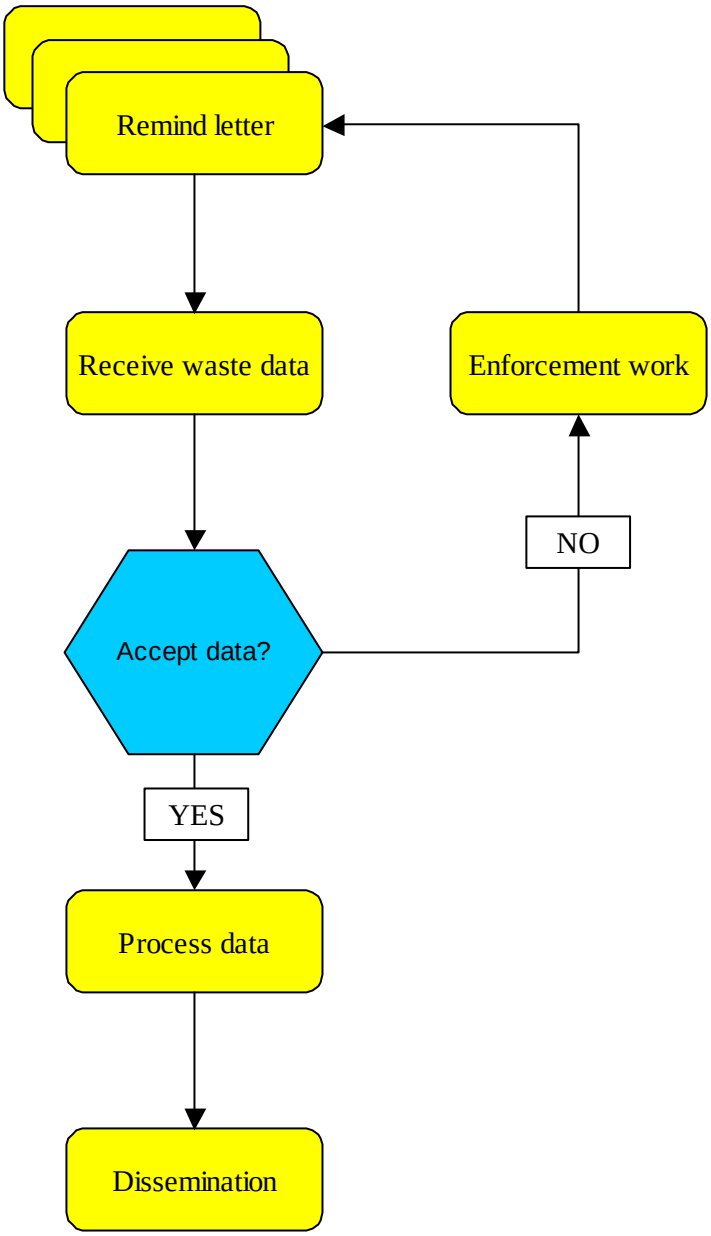


Figure 1 Data flow for general waste data. The flow starts with one or more reminding letters. The received waste data is either accepted or not. If the data is not accepted enforcement work should be carried out. When the data is accepted the data is processed and will finally be disseminated in waste statistics, state of the environment reports etc.

If the reporter still does not report a final reminding letter is sent. This contains treats of fine, withdraw of waste license or/and imprisonment, cf. section 4.2.

Figure 1 shows the dataflow for general waste. However, the reminding procedures can also be carried out for industries, which generate hazardous waste but the industries are not stated on any consignment note.

Ad 4 - Develop paper forms for the data reporting
In order to standardize the reporting procedures, paper forms for the reporting must be developed. There are mainly three different reports:

- Treatment facilities – sending the consignment note to the local authority
- Local authorities – reporting waste data to the SEA. This information is based on the reports from the landfills and the received consignment notes.
- Waste control areas – this information is collected by the local Inkhundla.

The forms must have predefined waste types, which are equal to the actual types defined in the WIS. Each form consists of two sections:

- Reporter information
- Waste information

The recommended information for the two sections is shown in Table 1 and Table 2, respectively.

Field	Description
Name of reporter*	The organisation that reported
Name of contact person*	The person that reported
Telephone number of contact person*	
Fax number of contact person	
E-mail address of contact person	
Town of reporter	The town, where the reporter is situated
Region of reporter	The region, where the reporter is situated
Economic activity*	Description of the reporters line of business according to SIC[7]
Waste management license number	Should only be stated for a) landfills and b) generators on the consignment note.
Signature	The signature of the contact person on behalf of the reporter

Table 1 Information on the paper forms concerning the reporter. Please notice the fields marked with * are required in the WIS. For consignment notes the above fields are required for both the generator, the transporter and the treatment facility. For waste control areas only the name of the control area must be specified.

[7] Standard Industrial Classification (SIC) codes from Central Statistical Services (CSS). For example A is the code for Agricutual, hunting and forestry.

Field	Description
Waste type*	According to the classification system in the WIS
Quantity of waste*	Amount in tonnes – the WIS utilise tonnes
The period, which the quantity covers	For example month, year. This information is not necessary for the consignment notes.
Reporting date	
Description#	Additional description of the waste. For waste control areas a description of the units must be stated. For example the units are butcher shops. For waste control areas the description can also contain information of the data ground, like who collected the data etc.
Generated waste per unit per year in tonnes#	
Total number of units#	

Table 2 Information on the paper forms concerning waste. Please notice the information marked with * are required in the WIS. However, for waste control areas the fields marked with # are required.

It must be emphasised that every form can only cover one waste type. For example a truck cargo with two different waste types requires two sets of consignment notes.

Ad 5 – Define unique numbering system of the consignment notes
It is required that transportations of hazardous waste are traceable. Each set of consignment notes (the five copies) must therefore have a unique number. The number should as a minimum consist of:

- Year
- Month number
- Country code or name,

There are trans-boundary movements of hazardous waste between Swaziland and South Africa. Therefore, it is recommend that the South African numbering system is investigated.

Ad 6 - Estimate key figures, cf. figure 2 in /1/
The waste classification system in the WIS is dynamic. Figure 2 shows the present waste classification in the WIS.

Waste (W)	84%	General waste (GW)	5%	Brick and concrete (G01)
			10%	Glass (G02)
			15%	Metal (G03)
			5%	Biodegradable organic (G04)
			10%	Paper (G05)
			15%	Plastic (G06)
			10%	Rubber (G07)
			5%	Textile (G08)
			5%	Wood (G09)
			20%	Other (G99)
	16%	Hazard waste (HW)	2%	Explosive (H01)
			18%	Flammable liquids (H03)
			20%	Flammable solids (H04.1)
			3%	Spontaneous combustion (H04.2)
			3%	Emit flammable gases (H04.3)
			10%	Oxidizing (H05.1)
			4%	Organic peroxides (H05.2)
			5%	Poisonous (Acute) (H06.1)
			10%	Infectious substances (H06.2)
			5%	Corrosives (H08)
			5%	Toxic gases (H10)
			2%	Toxic (Delayed or chronic) (H11)
			3%	Ecotoxic (H12)
			10%	Yielding any of H1-H12 (H13)

0 1 2

Waste classification level

Figure 2 The waste classification in the WIS, cf. Figure 5 in /2/.

For every waste type a key figure is specified. For example the key figure for glass is 10%, cf. Figure 2. This means that on average 10 percent of all general waste contains 10 percent glass. If waste is reported at different levels, like general waste, glass, paper etc then the key figures are utilised for the statistics. It is therefore important that the key figures reflect a reasonable picture of the waste in Swaziland. The key figures in the WIS are fictitious. It is therefore required that surveys to determine the waste composition are carried out. For example the cargo on 10 trucks are examined according to the present waste classification in the WIS. This procedure is carried out on 5 different landfills. There should be no need for updating key figures for the hazard waste types (like explosive, flammable liquids etc). That is, the waste classification on the consignment notes should be at level 2.

Ad 7 - Describe and perform backup procedures
It is vital that the SEA describes and implements backup procedures for the WIS. The backup procedures could include, cf. /2/:

- Following each substantial input of work the system database must be copied internally on the WIS PC
- Each month on completion of the reporting cycle a copy of the database is copied to a CD and stored safely, definitely not in the same room as the computer and preferably in another building. If a CD-burner is not available the backup can be done using diskettes together with a compression tool, e.g. WinZip.
- Backups from e.g. January and July are kept permanently.
- The remaining backups are kept for one year and can then be used for new backups or discarded.
- All backups must be clearly labelled, e.g. "Waste Information System Backup, 15 January 2001".

It must be stressed that a lot of extra work like re-importing the waste data can be avoided if backups are carried out regularly, cf. the above list.

Please refer to /2/ for further details on how the backup is carried out.

5.2 Long term – within 2 years

The following list shows the main tasks to be carried out in the SEA within the next 2 years.

1. Describe and perform procedures for quality assurance of collected waste data
2. Develop annual waste statistics
3. Maintain the waste types in the WIS

Ad – 1 Describe and perform procedures for quality assurance of collected waste data

All the data in the WIS must be accepted before the data is used in statistics etc, cf. Figure 1. This shall ensure that the SEA does not base waste mangement plans, statistics, legal process of waste generators on wrong data[8]. The quality assurance could consists of:

- Compare with previous years – previous statistics
- Compare with similar data sources (generators, transporters or disposal sites)
- Compare with similar statistics
- Compare with similar countries
- Common sense of the WIS users

The most important of the above issues are the common sense of the WIS users. Because this should avoid obvious errors like too small or too high amounts etc.

In time the quality assurance is becoming easier because the experience and the amount of data in the WIS are increasing.

Ad – 2 Develop annual waste statistics

When the quality assurance is a normal procedure in the SEA the statistics in the WIS should be reliable. The SEA can then publish annual waste statistics. Links to the present waste statistics should be added on the SEA internet homepage.

Ad – 3 Maintain the classification system in the WIS

The statistics depends on the key figures in the classification system, cf. section 5.1 and Figure 2. It is therefore important that the key figures are revised regularly, e.g. every second year. The revision could consists of surveys as described in section 5.1.

[8] However, there will also be errors in some of the reported data.

6.References

/1/ Waste Information System – Discussion Document. Dated 8 November 2001.

/2/ Waste Information System - version 1.0 – User Manual. Dated 29 November 2002.

/3/ Waste Regulations 2000, p. 19 – p. 54 – Supplement to the Swaziland Government Gazette.

/4/ Special waste (hazardous and health care risk waste): gathering and collation of waste data – final report. Dated November 2002. The report is developed by the consultant company STCS.

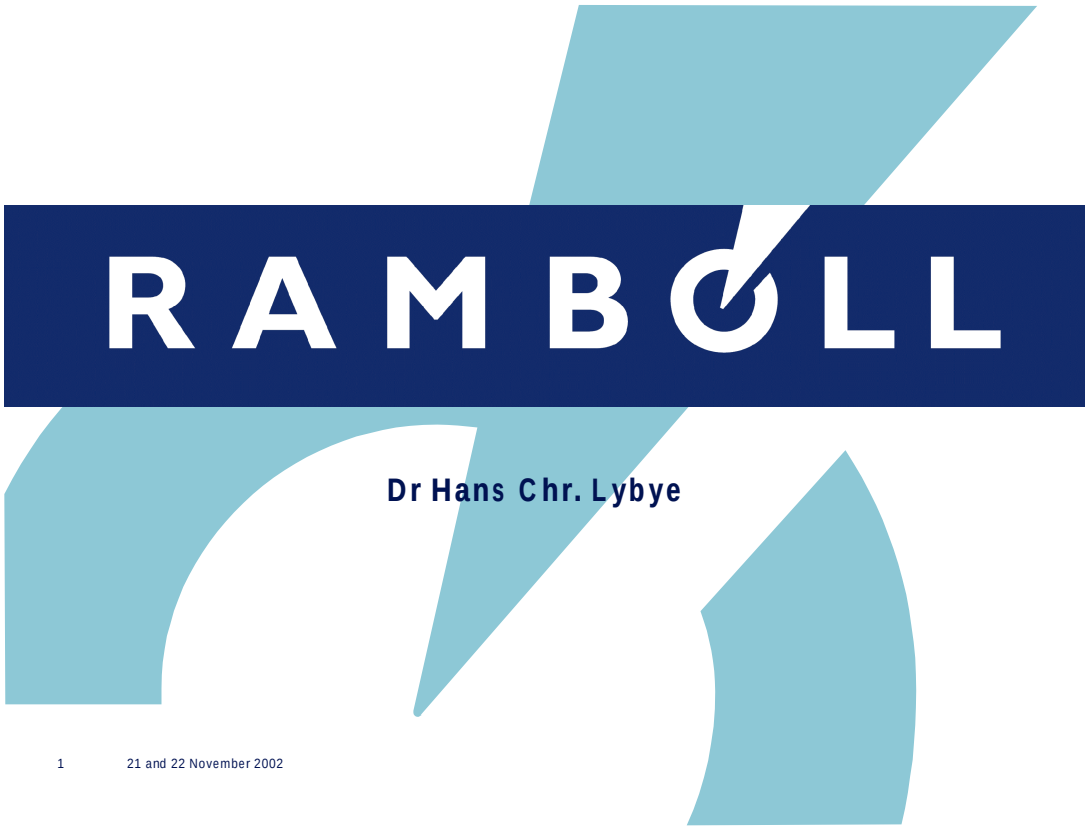
Appendix A: Participants at the WIS course

The participants at the WIS course are listed below. The course was carried out 21 and 22 November 2002 at the SEA in Mbabane. The conceding appendices cover slides and exercises from the course.

Name	Position	Organisation
Hans Chr. Lybye	Waste Data Specialist	RAMBØLL
Tilly Zondi	Environmental Analyst	SEA
Stephen Zuke	Senior Environment Officer	SEA
Titus Dlamini	BCBNA Project Coordinator	SEA
Mboni Dlamini	Senior Environment Officer	SEA
Setle Maphalala	SABSP Associated Coordinator	SEA
Lungile Gumbi	Environmental Inspector	SEA
Sifiso Simelane	Assistant Librarian	SEA
Mlungisi Mkhunza	Assistant Librarian	SEA
Tinus Joubert	CTA	RAMBØLL
Bongani Cele	NOV	SEA
J. D. Vilakati	Director	SEA
Khanyse Mascikei	Secretary (BASP)	SEA
Gertrude Nhonyane	Secretary	SEA
Constance Dlamini	Trainee - student	SEA
Musa Dlamini	Senior Accountant	SEA

Appendix B: Slides from the WIS course

The 15 slides from the WIS course are listed below.



WIS – Swaziland, Course at the SEA in Mbabane

- Agenda – Thursday 21 November
  - 8 am - 10 am: Definitions/backbone of the WIS
  - 10 am - 12 am: Application, exercise on importing data
  - 12 am - 1 pm: Lunch break
  - 1 pm - 5 pm: Application, exercise on importing data…

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2 21 and 22 November 2002

WIS – Swaziland, Course at the SEA in Mbabane

- Agenda – Friday 22 November
  - (8 am - 9 am: Legislation)
  - (9 am - 10 am: Quality assurance)
  - 10 am - 1 pm: Application, exercise on statistics

    (Lunch break)
  - 1 pm - 3 pm: Next steps – how do we make it happen?

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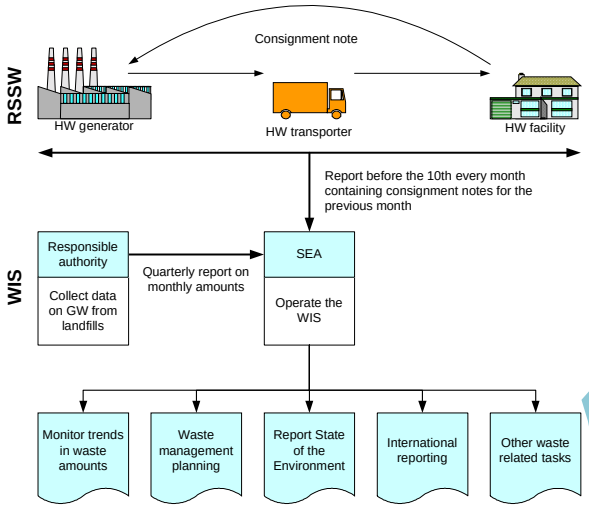
3 21 and 22 November 2002

WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- **Definitions/backbone of the WIS**



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WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- **Definitions/backbone of the WIS…**
  - **Data sources:**
    - **Generators/producers**
    - **Transporters**
    - **Disposal sites**

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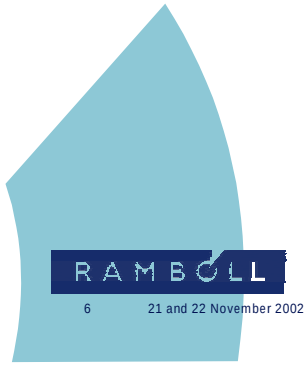
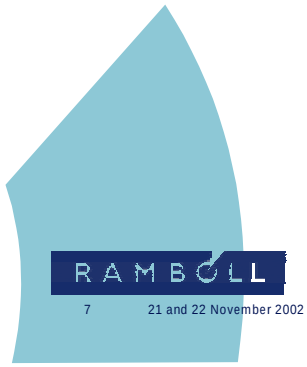
WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- Definitions/backbone of the WIS…
  - Monthly reporting - General waste
    - Disposal site
  - Consignment notes - Hazardous waste
    - Generator
    - Transporter
    - Disposal site
    - Basel convention



WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- Definitions/backbone of the WIS…
  - Unit numbers – key numbers
    - Number of units X unit number
    - Cover waste control areas



WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- **Definitions/backbone of the WIS…**
  - **Dynamic waste classification system**

Waste (W)	84%	General waste (GW)	5%	Glass (G1)
			10%	Paper (G2)
			85%	…
	16%	Hazardous waste (HW)	2%	Explosive (H1)
			18%	Flammable liquids (H3)
			20%	Flammable solids (H4.1)
			3%	Spontaneous combustion (H4.2)
			3%	Emit flammable gases (H4.3)
			10%	Oxidizing (H5.1)
			4%	Organic Peroxides (H5.2)
			5%	Poisonous (Acute) (H6.1)
			10%	Infectious substances (H6.2)
			5%	Corrosives (H8)
			5%	Toxic gases (H10)
			2%	Toxic (Delayed or chronic) (H11)
			3%	Ecotoxic (H12)
			10%	Yielding any of the above (H13)
0		1		2

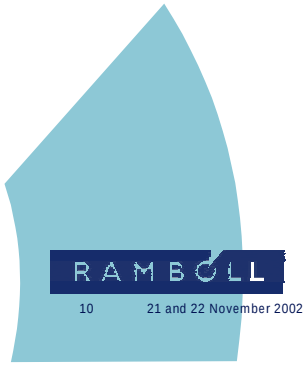
Waste classification level

WIS – Swaziland, Course at the SEA in Mbabane
Thursday 21 November 2002

- **Application - exercise**
  - **Import data**

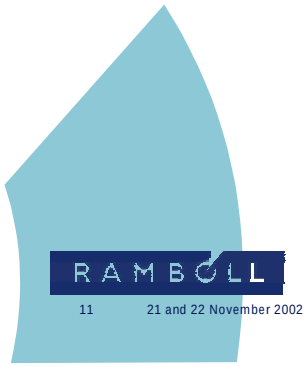
WIS – Swaziland, Course at the SEA in Mbabane
Friday 21 November 2002

- Legislation – Waste regulations 2000
  - Volunteer reporting
  - Compulsory reporting
  - Can you force the reporters to report?
  - What commitments do we have?



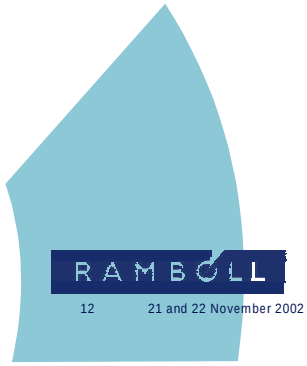
WIS – Swaziland, Course at the SEA in Mbabane
Friday 22 November 2002

- Quality assurance – in the future
  - Why
  - Compare with previous year(s)
  - Compare with similar data sources
  - Compare with other statistics
  - Compare with similar countries
  - ...
  - Common sense



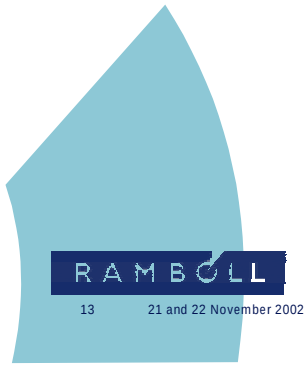
WIS – Swaziland, Course at the SEA in Mbabane
Friday 22 November 2002

- Application - exercise
  - Generate waste statistics



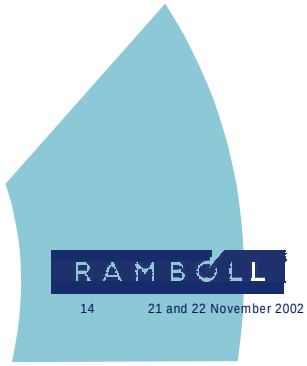
WIS – Swaziland, Course at the SEA in Mbabane
Friday 22 November 2002

- Next steps – how do we make it happen?
  - Appoint administrator in SEA
  - Appoint sub-administrator in SEA
  - Describe and implement routines for:
    - Collecting data
    - Processing data
    - Dissemination of data



WIS – Swaziland, Course at the SEA in Mbabane
Friday 22 November 2002

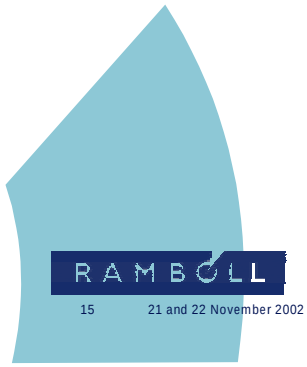
- Next steps – how do we make it happen?
  - Collecting data:
    - Reminding letters
    - Procedures for absence data – warnings etc
    - Standard format for data reporting
  - Processing data:
    - Import data
    - Quality assurance



WIS – Swaziland, Course at the SEA in Mbabane
Friday 22 November 2002

- Next steps – how do we make it happen?
  - Dissemination:
    - State of the environment
    - Annual waste statistics
    - The SEA internet homepage
    - ...

GOOD LUCK



Appendix C: Exercises from the WIS course

The following exercises were carried out at the WIS course.

PLEASE NOTICE THAT THE INFORMATION IN THE EXERCISES IS CONJECTURE AND SHOULD THEREFORE NOT BE IMPORTED INTO THE WIS.

Exercise 1 – Import data

Mbabane landfill has reported the following data:

Year 2002

Month	Plastic, kg/month	Metal, kg/month
January	149300	123790
February	115560	129580
March	178400	139360
April	164378	93260
May	113560	86670
June	147520	113590
July	140600	94080
August	152560	94600
September	189320	80900
October	197360	57980
November	168440	115350
December	147520	113590

The Mbabane landfill is situated at landfill drive 5, Mbabane. Mr Welcome has sent the report. Mr Welcome's phone number is 5186035.

Please fill the information into the WIS.

Exercise 2 – Import data

The SEA has received the following consignment notes:

Consignment note - CASE 1		
Consignor/generator	Name	Chemlog
	Contact person	Michael Patrick
	Telephone number	422 1745
	Address	P.O.Box 298, Eveni H103
Carrier/transporter	Name	Special Waste Transport
	Contact person	Clement Dlamini
	Telephone number	505 2651
	Address	P. O. Box 233, Manzini
Consignee/treatment facility	Name	Mbabane landfill
	Contact person	Mr Welcome
	Telephone number	518 6035
	Address	Landfill drive no 5, Mbabane
Waste type		Toxic gases
Amount, tonnes		0,2 (meaning 200 kg)

The consignment note is dated 22 January 2002.

Consignment note - CASE 2		
Consignor/generator	Name	Chemlog
	Contact person	Michael Patrick
	Telephone number	422 1745
	Address	P.O.Box 298, Eveni H103
Carrier/transporter	Name	Special Waste Transport
	Contact person	Clement Dlamini
	Telephone number	505 2651
	Address	P. O. Box 233, Manzini
Consignee/treatment facility	Name	Mbabane landfill
	Contact person	Mr Welcome
	Telephone number	518 6035
	Address	Landfill drive no 5, Mbabane
Waste type		Corrosives
Amount, tonnes		1,57

The consignment note is dated 22 January 2002.

Consignment note - CASE 3		
Consignor/generator	Name	Carson Wheels
	Contact person	Bernad Mdluli
	Telephone number	505-2881
	Address	P.O. Box 1015, Manzini
Carrier/transporter	Name	Special Waste Transport
	Contact person	Clement Dlamini
	Telephone number	505 2651
	Address	P. O. Box 233, Manzini
Consignee/treatment facility	Name	Mbabane landfill
	Contact person	Mr Welcome
	Telephone number	518 6035
	Address	Landfill drive no 5, Mbabane
Waste type		Flammable solids
Amount, tonnes		1,49

The consignment note is dated 18 June 2002.

Please fill in the consignment notes into the WIS.

Exercise 3 – Import data

The SEA has received the following information.

Year 2002

Waste control area - CASE 1	
Name of area	Kwaluseni, Data_zone_F
Waste type	Metal
Unit number, kg/day	0,3
Number of units	2000

The information was collected during a national survey in February 2002. The survey was carried out by the Swaziland Waste Data Experts (SWADE).

Year 2002

Waste control area - CASE 2	
Name of area	Kwaluseni, Data_zone_F
Waste type	Organic
Unit number, kg/day	20
Number of units	2000

Attention should be given on the fact that the data is based on numbers from another survey covering the Kwaluseni, Data_zone_G as described in …

Year 2002

Waste control area - CASE 3	
Name of area	Kwaluseni, Data_zone_F
Waste type	General waste
Unit number, kg/day	0,2
Number of units	2000

The data derives from a survey funded by the Danish Government, as described in ….

Exercise 4 – Import data

The local authority handed the following information to the SEA:

The landfill in Matsapha named "The best landfill in Swaziland" received the following quantities: January 12.234, November 10987.2, February 109.21, December 0.19, March 4328.1, June 5179.2, July 1.23, April 1281, October 879, May 0.98, September 0.54 and August 0.97. The months July, January, August, September, May and December are all stated in tonnes per month. In contrary to the months June, February, November, March, October and April, which are all stated in kg per month. All the amounts refer to year 2002. The landfill is situated in very beautiful surroundings. The landfill is placed on the avenue called "Please dispose here" no. 15. The landfill is managed by Mr Waste. Mr Waste performs the waste data reporting. Mr Waste can be reached by calling 518 4952. The quantities cover textiles.

Exercise 5 – Import data

The SEA received the following information:

Special Waste Transport transported 14 tonnes from Chemlog to Mbabane Landfill. The transporting was performed 21 March 2002 just around lunch. The waste was characterised as flammable solids.

Exercise 6 – Import data

The waste control area "We can handle waste" reported that they in average generate 7.8 kg textiles per month per capita. 208 persons live in the area.

Exercise 7 - Statistics

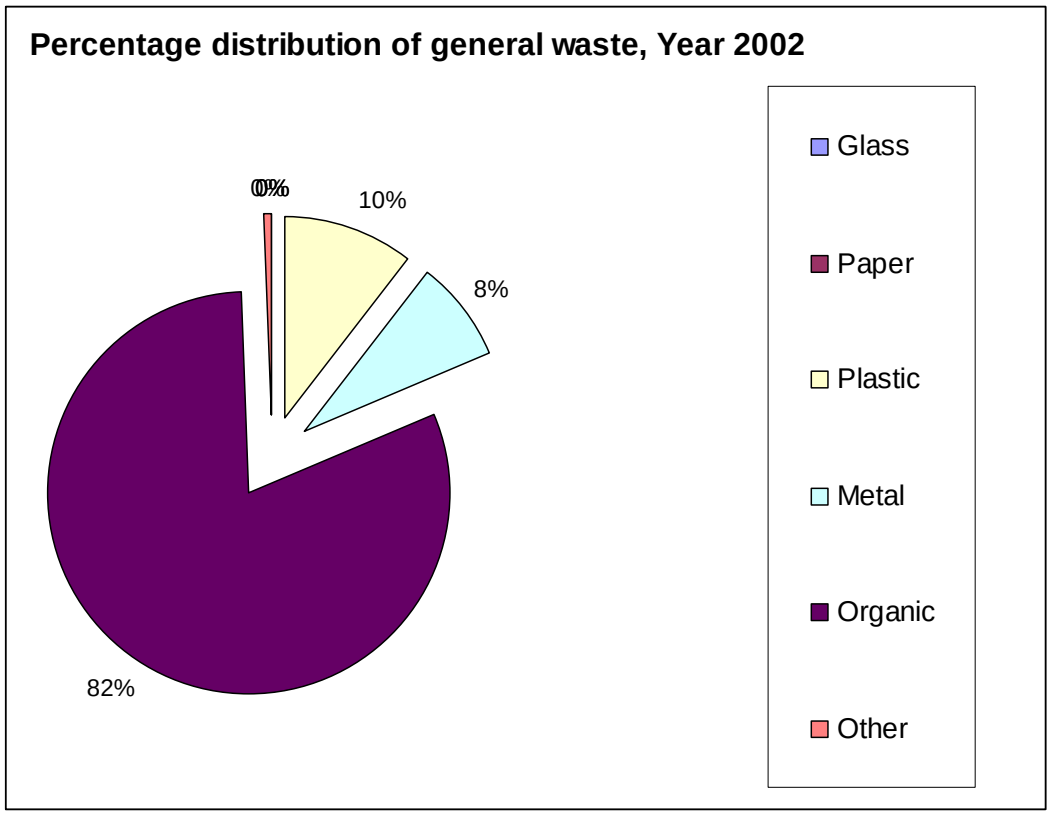
Please fill in the amounts in the following table by using the statistics functionality in the WIS.

Year 2002

Waste type	Amount in tonnes
Waste	
General waste	
Glass	
Metal	
Organic	
Paper	
Plastic	
Textiles	
Other	
Hazardous waste	
Explosive	
Flammable liquids	
Flammable solids	
Spontaneous combustion	
Emit flammable gases	
Oxidizing	
Organic peroxides	
Poisonous (Acute)	
Infectious substances	
Corrosives	
Toxic gases	
Toxic (Delayed or chronic)	
Ecotoxic	
Yielding any of H1-H12	

Exercise 8 – Statistics

Please develop a diagram, which displays the percentage distribution of general waste, i.e. the general waste types at waste type level 2 for year 2002. Hint, save the statistical report in Excel format and use MS Excel to generate the diagram. An example is shown below.



Exercise 9 - Statistics

Please check the total amount of generated metal in year 2002. Hint, calculate the totals of generated waste, general waste and metal. Combine these numbers with the corresponding key figures. The calculations can be carried out in MS Excel.