Japan International Cooperation Agency (JICA)
Ministry of Environment of the Government of Morocco

The Study on the National Guidelines for Solid Waste Management for the Kingdom of Morocco

Final Report

Book 1

Guidelines for National Level Policies and Actions for Solid Waste Management

August 1997

EX Corporation
&
Yachiyo Engineering Co., Ltd.

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PREFACE

In response to the request from the Government of the Kingdom of Morocco, the Government of Japan decided to conduct the Study on the National Guideline for Solid Waste Management for the Kingdom of Morocco and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA has sent to Morocco a study team headed by Mr. Masato Ohno, Director of Environmental Department, EX Corporation., Ltd., three times between January 1996 to May 1997.

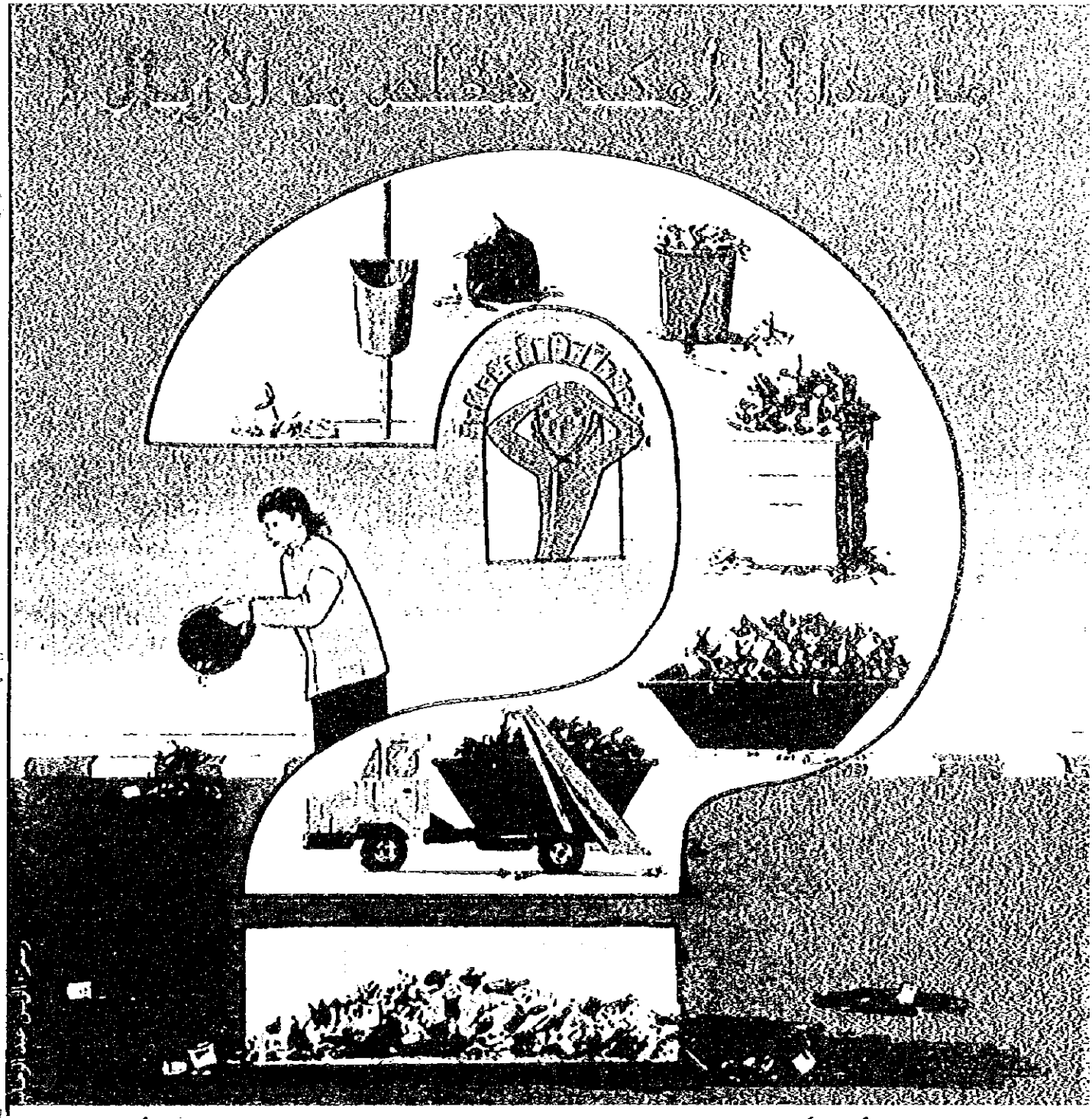
The team held discussions with the officials concerned of the Government of Morocco and conducted field surveys in the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

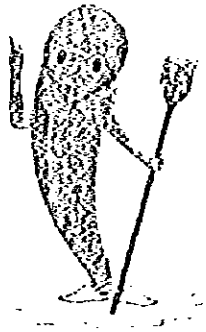
I wish to express my sincere appreciation to the officials concerned of the Government of the Kingdom of Morocco for their close cooperation extended to the team.

August 1997

Kimio Fujita
President
Japan International Cooperation Agency



أنا أساهم في نظافة مدينتي ...! وأنت ؟

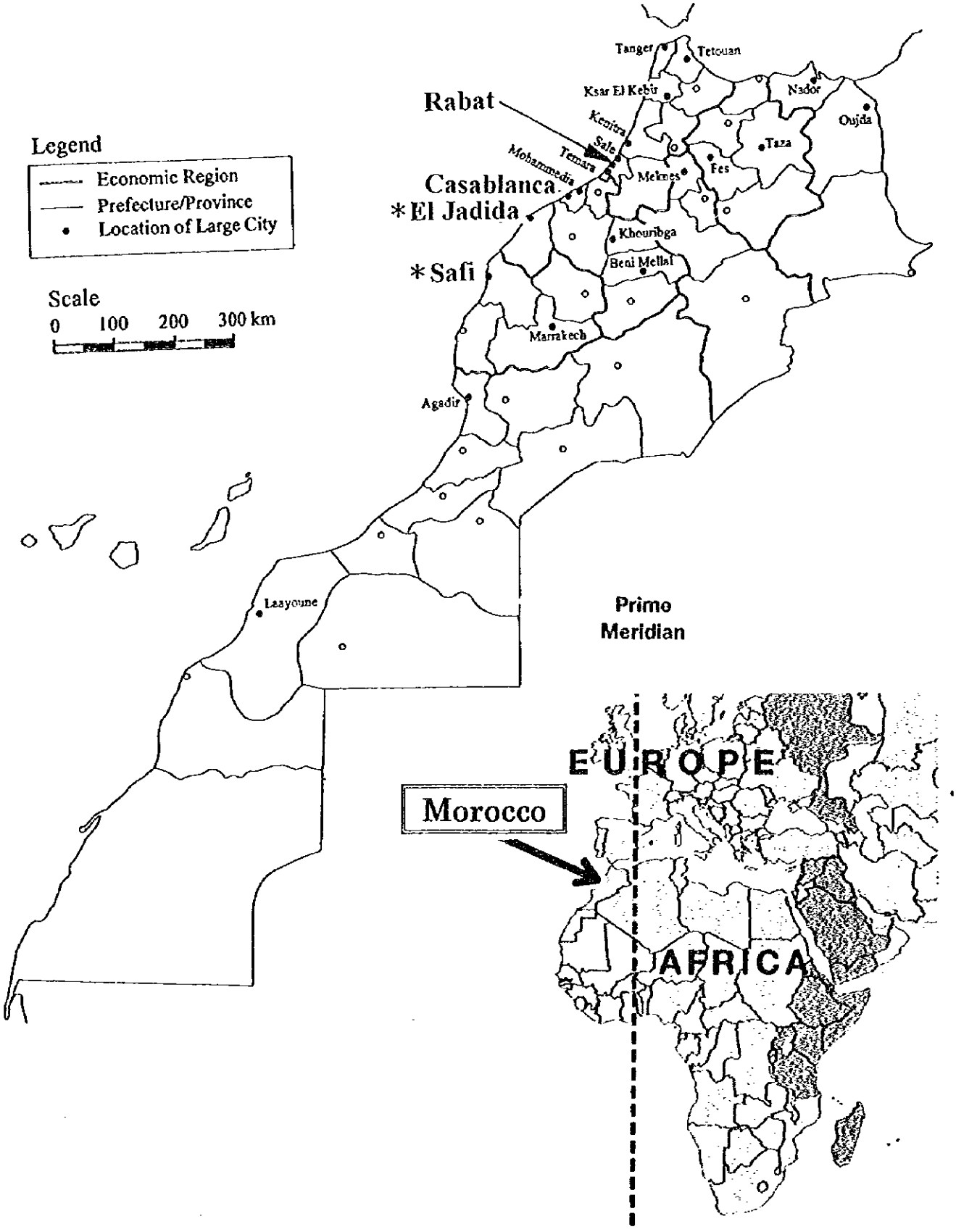


وزارة الداخلية - وزارة البيئة

الوكالة اليابانية للتعاون الدولي

مدينة آسفي

Location Map of Morocco



* Safi and El Jadida were selected for the second year study of this project.

Guidelines for National Level Policies and Actions for Solid Waste Management

Part 1
National Strategy

Exchange Rate (as of July 1997)

1 Dirham = 0.115 US dollars = 13 yen

Abbreviation List

BMH	Municipal Health Service
CNE	National Council for Environment (Conseil National de l'Environement)
CRE	Regional Council for Environment (Conseil Régional de l'Environement)
DAHIR	Law, Decree, or other legal document signed by the King
DH	Dirham
EU	European Union, E.E.C
FEC	Fond D'Equipement Communal Communal Fund for Equipment
GDLC	General Department of the Local Government, MoI
HCS	Haul Container System
MoA	Ministry of Agriculture
MoC&I	Ministry of Commerce and Industry
MoE	Ministry of Environment
MoEM	Ministry of Energy and Mines
MoH	Ministry of Health
MoI	Ministry of Interior
MoPW	Ministry of Public Works
NP	National Promotion
ONEP	National Office for Drinking Water
SWM	Solid Waste Management
USE	Under Secretariat for Environment, MoI
Veh.	Vehicle

Final Report
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Current Book and Part are marked with "*".

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Book 1-Part 1

THE STUDY ON THE NATIONAL GUIDELINES FOR SOLID WASTE MANAGEMENT FOR THE KINGDOM OF MOROCCO

INTRODUCTION

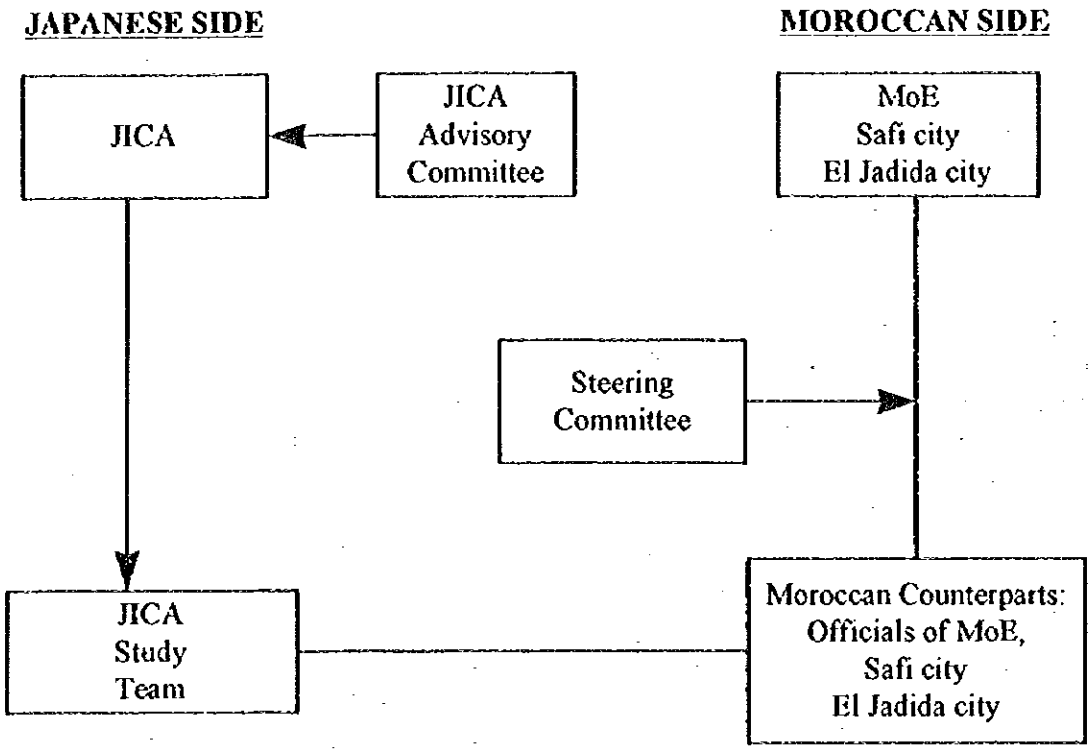
1. Objectives of the Study

The objective of the Study is to strengthen the capacity of solid waste management at both national and local levels. This study has been executed by Japan International Cooperation Agency (JICA) based on the request from the Government of Morocco. JICA commissioned the study to a joint venture comprising EX Corporation and Yachiyo Engineering Co., Ltd. The joint venture has organized a study team comprising of 11 specialists. The Study has been conducted jointly by Japanese consultants and their Moroccan counterparts.

The study period was about 18 months from January 1996 to July 1997. The Study is divided into two phases, the first phase being from the beginning up to September 1996, and the second phase being from October 1996 till the end. The objective of the first phase study is to formulate the guidelines and action plan for solid waste management at both national and local levels. The objective of the second phase is to apply the guidelines formulated and check their applicability. Two cities, i.e. Safi and El Jadida were selected for the second phase. The Study team in collaboration with the counterparts in Safi city have formulated a plan for improvement of solid waste management. In addition, we have implemented a public education campaign (demonstration project) aiming at strengthening citizens' understanding and cooperation concerning city cleansing. We have also formulated a plan for improvement of disposal of solid waste for El Jadida. It is expected that the plans will serve as a model for other local authorities in Morocco.

2. Study Organization

The study organization is shown in the figure below. This study has been conducted jointly by the Study Team led by Mr. Ohno and the Moroccan counterparts, i.e. officials of Ministry of Environment, Safi city and El Jadida city. A key counterpart agency on the Moroccan side is the Ministry of Environment. For the smooth execution of the study, the Moroccan side formed a steering committee comprising of representatives of the Ministry of Environment, Ministry of Interior, Ministry of Health, Ministry of Public Works, and Ministry of Commerce and Industry. Mrs. Layachi, Director, Department of Observation, Study and Coordination, Ministry of Environment served as chairman of the steering committee. On the Japanese side, an advisory committee was formed for the study. Dr. Masaru Tanaka, Director, Department of Waste Management Engineering, the National Institute of Health, served as chairman of the Advisory Committee.



MoE: Ministry of Environment

3. Reports

This study has produced the following reports:

1. Inception report
2. Progress report (1)
3. Interim report
4. Progress report (2)
5. Draft final report
6. Final report

The final report consists of the following books:

Book 1 Guidelines for National Level Policies and Actions for Solid Waste Management
- Part 1 National Strategy
- Part 2 Laws, Institutions, and Finance
- Part 3 Industrial and Hazardous Waste
- Part 4 Infectious Waste

Book 2 Guidelines for Improvement of Solid Waste Management for Urban Communes and Communities
- Part 1 Management and Institutions
- Part 2 Technical Guidelines

Book 3 National Action Programs for Solid Waste Management

Book 4 Solid Waste Management Plans for Safi and El Jadida
- Part 1 Solid Waste Management Plan for Safi
- Part 2 Waste Disposal Plan for El Jadida

Book 5 Summary

Book 6 Supporting Report :
Current Conditions of Solid Waste Management in Morocco

Book 7 Data Book:
Appendices to Solid Waste Management Plan for Safi

Book 8 Japanese Summary

All the Book except for Book 8 has been prepared in English and French.

4. Guidelines for National Policies and Actions for Solid Waste Management (Book 1)

The Guidelines consists of the following four parts:

- Part 1 National Strategy
- Part 2 Laws, Institutions, and Finance
- Part 3 Industrial and Hazardous Waste
- Part 4 Infectious Waste

CHAPTER 1 INTRODUCTION

Solid waste management in Morocco has not been so far the subject of proper legislation. As a result of this, disposal sites are creating social problems in many cities. Industrial waste discharged into rivers causes water pollution, damaging Morocco's precious water resources and tourism potential.

Such problems will only get worse if remedial actions are not taken.

1. As the urban population continues to increase, urban sanitation will continue to deteriorate in the absence of proper SWM

2. As industrial development advances, additional industrial waste will be generated, causing environmental pollution and water resource degradation; social costs to citizens will increase, which may prevent industry from further development.

In order to prevent the above risks, the government should become seriously involved in SWM. However, SWM legislation is not yet developed, and essential bases for sound SWM such as human resources and technical know-how are also not well formed.

Therefore, the government should start to create the basis for improving SWM. Based on this idea, these National Guidelines for Solid Waste Management were prepared, presenting policies to tackle SWM issues. There are many tasks presented in these Guidelines. This report presents a national strategy for SWM, introducing what should be done in order to recognize governmental roles and attain SWM improvement. The report shows that numerous tasks are required.

The national strategy that this report presents is a development strategy at the same time. It aims at promoting human resource development and investment in facilities related to SWM. Both of them are investments in Morocco's social infrastructure, and will enhance industrial development and employment opportunities.

This report consists of a introduction and five succeeding chapters.

Chapter 2 explains the principles of SWM. Chapter 3 covers responsibility for SWM and governmental roles. Chapter 4 introduces existing SWM and national goals. Chapters 5 and 6 refer to national policies and actions to administer SWM by local governments and private sector management of industrial, hazardous and infectious waste.

The following list explains the SWM terminology that will appear in this report.

Municipal waste:	Waste for which local governments provide SWM service. This waste includes household, commercial, market, and garden waste.
Industrial waste:	Waste that factories, etc. generate and for which local governments do not provide SWM service. Businesses generating this waste are responsible for its management.
Special waste:	Waste that requires special measures due to its public health and environmental impacts
Hazardous waste:	Special waste generated primarily by industry. Household waste of hazardous quality is not classified as hazardous in this report.
Infectious waste:	Special waste that is potentially infectious, especially that generated in medical institutions
Controlled disposal site:	A disposal site that satisfies legal disposal site standards

CHAPTER 2 SOLID WASTE MANAGEMENT PRINCIPLES

This chapter presents principles and targets of SWM that Morocco should adopt.

2.1 Fundamental Principles of SWM

Morocco should follow three guiding principles in its SWM.

1. The first principle of SWM is **to maintain a sanitary living environment.** This is based on the idea that everybody should be safe from threats to their health. Socially weak people, such as the poor and those who have less chance of choosing their lifestyle, typically do not receive adequate waste collection service. Disposal sites are often located near such people. Living without proper waste collection constitutes a threat to public health.

2. The second principle of SWM is **to reduce environmental pollution.** It has been recognized in the past 20 to 30 years that inadequate waste treatment may bring about some risks to human health indirectly by polluting groundwater, rivers, and sea areas. In order to reduce such risks, pollution loads must be minimized.

3. The third principle of SWM is **to support sustainable development.** Environmental degradation caused by inadequate waste treatment poses a threat to sqcial well-being and national economic growth and is therefore an obstacle to sustainable development. In Morocco, precious water resources are contaminated by waste.

   According to "the National Strategy for Environmental Protection and Sustainable Development" published in May, 1995, costs of SWM (needed to prevent health and environmental damage) are often much less than damages caused by inadequate SWM (costs of curing the damage). Environmental degradation prevents efficient use of resources, and absorbs financial resources that could be invested in new development. In Morocco, where the fishery industry is very important, the nation's economy can be damaged seriously if sea areas are polluted.

   These three principles are included in Agenda 21, which Morocco signed at the Earth Summit held in Rio de Janeiro in 1992. The ideas have also been incorporated in the National Strategy for Environmental Protection and Sustainable Development, which was published in May, 1995.

2.2 The Objectives of SWM

In the process of waste treatment, the following objectives must be considered based on the foregoing principles.

1) Municipal Waste

a. Storing Waste by Households

In order to maintain household sanitation, a target should be established to remove all waste before house flies' eggs are hatched (normally 7 days in the summer time) and to store waste in containers that will not help breed cockroaches, rats, and other animals and insects.

b. Collection and Transport

From a sanitation viewpoint, collection of household waste should be conducted at least once a week based on rules that waste will not be picked up if it is not placed in a container or is left after the designated collection time, especially if it is placed on curbside.

Also the following is to be regarded as a target; minimizing nuisance to neighboring areas, such as noise and emission gas; avoiding spilled water from waste bags or containers on the street; and preventing scattering of waste during transport.

c. Treatment of Waste

There are two intermediate treatment systems that are worth studying for Morocco, i.e. composting and incineration.

Composting is a means of recycling municipal waste. However, Morocco's experience with it has not been satisfactory.

Composting may face problems with heavy metals that are contained in waste. Such heavy metals have led many composting projects to be failures worldwide.

Selection of suitable materials is vital for producing compost or good quality. It is possible to produce good compost with the use of kitchen waste only. It is desirable that kitchen waste should be used as much as possible for producing compost if feasible. Feasibility of composting should be examined very carefully.

In order to achieve waste reduction and stabilization, incineration of municipal waste is an effective method; however, release of emission gas to the environment should be taken into consideration.

d. Disposal

Landfilling is the most widely used method of disposing of municipal waste in the world. This is also true in Morocco. Landfilling sites should not cause problems of sanitation or threaten the environment. The following is necessary for landfilling from a sanitation point of view. First, landfill sites should be located far from residential areas. Second, cover soil should be applied regularly to prevent flies and smoke. Third, access to the site by people and animals should be restricted. If groundwater

near the site is used for drinking, or leachate drains into water intake facilities, the location of the site should be changed.

From an environmental point of view, leachate is the major pollution problem at landfill sites. Leachate is an extract from the water contained in waste. It may pollute groundwater and rivers. It contains high density BOD and is colored black. It should be noted that hazardous metals in waste can leak in the leachate after metals are oxidized by organic acids in the leachate. Heavy metals do not penetrate through to the ground water because they are trapped in the soil after reaction within the soil.

Extra care must be taken to avoid threats to groundwater pollution when waste oil or organic solutions are mixed with municipal waste. They can even penetrate into the clay layer, whose infiltration coefficient is low, and can pollute groundwater.

In order to avoid these pollution problems, the government should establish targets to construct landfill sites based on proper engineering.

e. Recycling

Recycling is desirable for resource saving and global environmental protection. Recycling should be an integral part of SWM in view of its economic merits. Materials such as paper and metals should be recycled in view of material circulation.

2) Industrial and Hazardous Waste

Industrial and special waste bring the same kinds of environmental and sanitation problems to SWM as municipal waste does. Among these problems, hazardous waste intrusions into the environment should be specially noted. Hazardous waste can enter the environment by various routes; for example, from factories to rivers and ground water, or from disposal sites into groundwater, rivers, and soil. In order to prevent the damage caused by pollution, proper treatment facilities must be developed.

Most industrialized countries have experienced this kind of environmental pollution. In the United States and Japan, even fatal accidents have occurred.

3) Hospital Waste

With regard to hospital waste, infectious waste contaminated with B type hepatitis and the AIDS virus creates a particularly sensitive issue. The government should establish a goal that infectious waste must be sterilized inside hospitals before being taken away, or treated properly at treatment facilities outside hospitals.

CHAPTER 3 RESPONSIBILITY FOR SWM AND GOVERNMENT ROLES

3.1 Responsibility of SWM Staff

In Morocco, the legal responsibility for SWM in a given site primarily belongs to the owner and occupant of the site. Land owners and occupants of urban communes fulfill their responsibility through local governments. In this sense, local governments are considered to be responsible for management of waste generated by residents. On the other hand, industrial waste generators are responsible for waste where local governments do not accept its management. Those who are involved in SWM, such as citizens, local governments, business, and hospitals, hold the following responsibilities.

1) Responsibility of Citizens

Citizens are obliged to clean their surrounding areas; to discharge their waste in a manner that local governments have set; to avoid generating waste; and to participate to recycling.

2) Responsibility of Local Governments

Local governments have the following obligatory tasks in their respective jurisdictions:

1. Collection of municipal waste from citizens, and carrying out sanitary and environmentally-sound treatment
2. Proper instruction for citizens and businesses to discharge and treat municipal waste and to recycle waste
3. Proper control of collection to avoid hazardous waste; waste monitoring at disposal sites; and preventing hazardous waste from being disposed of incorrectly at disposal sites
4. Coordination with the central government; regulation of and instruction on industrial waste management

3) Responsibility of Businesses

Businesses that generate industrial and hazardous waste have the obligation to manage inventory information and dispose of waste that has been made harmless and stable, using appropriate methods. They are also obliged to shift to the use of non-hazardous materials and improve production processes in order to curb the generation of hazardous waste.

To conduct proper waste management, business establishments are responsible for setting up waste management systems for implementing proper treatment.

Hospitals must manage infectious waste separately from other waste. Infectious waste must be transported outside hospitals after being made harmless. Where treatment of infectious waste is impossible in hospitals, it remains the hospital's

obligation to properly transport the waste and ensure that it is treated properly at treatment facilities.

Hospitals must develop an internal waste management system for conducting proper waste management.

3.2 Governmental Roles

The national government has the following basic roles in the field of SWM.

- Relating to local governments

  a. Instructing and regulating local governments
  b. Offering assistance to local governments

- Relating to businesses

  a. Setting waste management standards for business managers
  b. Monitoring and instructing managers to respect the standards

1) Local Governments

Based on the decentralization process started in 1970, local governments are basically responsible for municipal SWM. It is necessary for local governments to conduct proper SWM. The national government should be responsible for offering assistance and instruction, and supervising aspects that local governments cannot handle alone.

Following are some important tasks for which the national government should be responsible.

- Development of relevant laws (including management standards)
- Preparation of facility standards
- Nationwide information management for SWM and evaluation of present SWM
- Presentation of policies for SWM of local governments and businesses
- Development of methods of financial and economic assistance
- Technological development, and international cooperative relationships
- Human resource development

2) Business Establishments

The national government is responsible for establishing and enforcing laws concerning industrial and hazardous waste so that business establishments can treat waste properly. Additionally, it has the following responsibilities.

- Drafting national policies for industrial and hazardous waste
- Development of relevant laws (including management standards)
- Preparation of facility standards
- Monitoring and instruction for proper waste management in business establishments
- Providing technical information to business establishments
- Introducing economic incentives for businesses to invest in waste management
- Human resource development for industrial waste management

CHAPTER 4 SWM ISSUES AND GOALS

4.1 SWM at Present

4.1.1 Municipal SWM at Present

There are 248 urban communes and 1297 rural communes in Morocco, the urban population accounting for 51 % of the country's total.

Urban communes supply cleansing service to the residents. Although data on waste collection service in all the urban communes are poor, a survey conducted in about 20 communes confirmed that 70 % to 90 % of the population receives collection service. The survey concluded that collection service in urban communes is conducted relatively well regardless of insufficient budgets, equipment, and human resources. Waste collected is either dumped or landfilled; however, and most of the waste is not treated sufficiently from the viewpoints of sanitation or environment.

Important SWM problems in Morocco include the following.

1. Service coverage is not 100 %.
2. Landfilling is not operated in a sanitary manner.

The factors that cause the above two problems are as follows.

1. Budgets are inadequate.
2. Human resources are required
3. Collection services are inefficient.
4. Management is poor.

4.1.2 Treatment of Industrial and Hazardous Waste at Present

1) Industrial Waste

The amount of industrial and hazardous waste generated in Morocco is not large since the industry sector itself is not large. Pollutants, however, are discharged without being properly treated into rivers and the sea. Some waste, which would be classified as hazardous waste in developed countries, is disposed of without being made harmless and stable.

Business establishments manage the treatment of waste they generate. The government does not know how industrial hazardous waste is treated and there are no governmental or local governmental regulations over industrial waste management.

2) Hospital Waste

Infectious waste is not properly separated from other waste in hospitals. Moreover, the waste is disposed of at municipal disposal sites without being made harmless.

4.2 National Goals for the Future

4.2.1 Future Waste in Morocco

The amount of waste in Morocco will inevitably increase due to economic and population growth. Assuming a 3 % annual increase in the amount of waste, which is an average of 75 % of the 4 % economic growth rate, the following table 4.2.1 can be obtained. The amount of industrial waste is assumed to increase at yearly rate of 4 %, which is the same as the economic growth rate, until the year 2000. It will increase at a yearly rate of 2 % after 2000 due to enforcement of new pollution legislation.

The amount of municipal waste will increase from 5,600,000 tons in 1996 to 1.14 times that quantity by the year 2000, 1.56 times by 2010, and eventually double by 2020. The amount will grow more rapidly in urban areas, and means that threats to urban sanitation will be more pressing. Simply assuming that all waste will be collected, the necessary number of concerned staff and vehicles will be twice as many.

This estimation of the per capita amount of municipal waste is as low as 880 g/capita. An average of 660 g/capita was estimated for 1995. Based on this estimation, waste quality will be largely changed, and packages, containers, papers and plastics will account for an increasing proportion of total waste.

In this context, the change in waste quality means that the amount of recyclable waste will increase and the content will not be suitable for composting.

A large increase in the amount of industrial waste in projected. Presently, industrial waste accounts for only 16 % of total municipal waste, but it will represent about 90 % by 2020. When legal regulations are enforced, industrial waste to be regulated will inevitably increase. It is estimated that hazardous or dangerous waste will account for 10 % of industrial waste

Table 4.2-1 Growth in Population and Waste Generation in Morocco

	Population Unit:1,000	Municipal Waste (,000t/year)			Industrial Waste (,000t/year)
		Total	Urban	Rural	
1995	26,074	5,660	3,800	1,860	930
2000	28,341	6,560	4,450	2,110	1,130
2050	30,484	7,600	5,220	2,380	2,820
2010	32,628	8,810	6,120	2,960	7,010
2020	36,914	11,850	8,400	3,450	10,2380

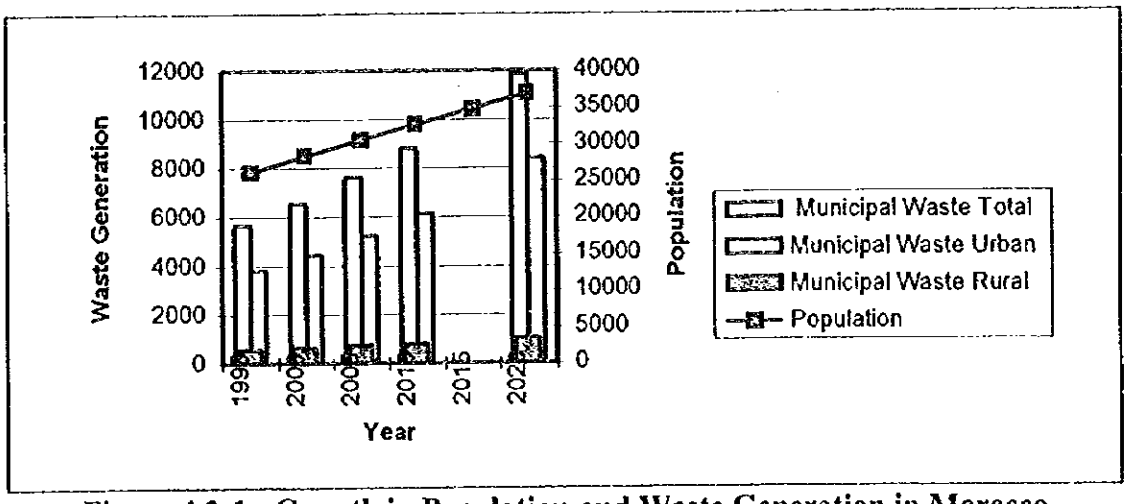


Figure 4.2-1 Growth in Population and Waste Generation in Morocco

An increase in waste generation will require additional waste disposal facilities. This means that many disposal sites need to be constructed. It also means that the environmental burden and threats to local residents will be greater unless construction is implemented properly.

4.2.2 National Goals for the Future

In order to manage the rapidly growing threats to urban sanitation, the coverage of waste collection service needs to be expanded. Expansion of service coverage has also been mentioned as a national goal in "National Strategy of Environmental Protection and Sustainable Development(NSE)", or the "Green Book", issued by MoE. The goal is to maintain healthy and environmentally-sound living for the people.

Full coverage of collection service should be achieved in urban communes and central districts of rural communes, and sanitary living conditions must be created. These goals should be achieved at the latest by 2010.

The NSE also posted a goal for implementing legally regulated disposal. Its top priority goal was to conduct disposal that satisfies legal standards in order to maintain adequate sanitary and environmental standard. As a future target, all disposal sites in urban areas should be controlled disposal sites by 2010.

It should be a goal to dispose of all the industrial and special waste at totally controlled disposal sites by 2010. Proper disposal of special waste should be given high priority.

These are ambitious targets, but they can be achieved with efforts of Urban Communes and businesses. What it takes is a strong willingness on the part of all those who aim at the goal.

CHAPTER 5 STRATEGY FOR DEVELOPMENT OF MUNICIPAL SWM

5.1 Staged Goals for Municipal SWM

1) Staged Goals for Municipal SWM

The basic SWM goals for local governments can be described in three different stages. Presently, SWM in many local governments is at the first stage. Some local governments have not yet reached the first stage, and they should achieve the first stage before taking further steps.

- 1st stage Expanding collection service coverage
- 2nd stage Implementing sanitary treatment with environmental considerations
- 3rd stage Minimizing waste, and introducing a system that takes full advantage of recycling opportunities

Local governments should place their goals in the second stage for the time being. Concerning the third stage of a recycling friendly system, sorted collection should be introduced in those communes where it is feasible.

Rural Communes should aim to implement waste collection service in central areas and markets.

2) Expansion of Collection Service Coverage and Improvement of Service Quality

If an urban commune has not yet achieved adequate collection service coverage and service quality, it should study the causes, prepare an improvement plan, and improve the service.

In the urban communes where collection service is of an adequate quality and rapid urbanization is taking place, more mechanized collection should be introduced. Also, efficient and reliable collection service should be carried out.

3) Implementation of Controlled Treatment with Environmental Considerations

All the disposal sites to be constructed should satisfy minimum standards for "controlled disposal sites." When urban communes and rural communes with adequate financial abilities plan to construct disposal sites, they should satisfy the higher standards required for "sanitary landfilling sites."

4) Waste Minimization and Recycling

Although recycling activities in Morocco are claimed to be very active currently, the flow of recyclable materials is in fact very limited. Local governments should plan to expand the flow.

In Morocco, since material consumption is smaller than that in developed countries, most municipal waste is organic. It is very difficult to further reduce the amount of municipal waste, taking the current waste composition into consideration. Recycling systems should be introduced in communes whose wastes contain a large amount of resources, since more paper, plastics, and will be seen in waste, as shown by worldwide trends.

5.2 Administrative Measures to improve Municipal SWM

5.2.1 Development of Laws concerning Municipal Development and Strengthening of Governmental Administrative Institutions

1) Development of Laws for Municipal SWM

The responsibilities of municipalities for SWM are not clear. There are no legal definitions for the scope of responsibility and authority of communes and urban communities for municipal waste management; or standards for waste disposal.

A law must be developed to define municipal responsibility for SWM in order to improve the quality of SWM. Also, it is necessary to legally define conditions for long term contracting to the private sector; the licensing system for private waste service contractors; and application for and permission to transport waste to municipal disposal sites.

Looking ahead, it is necessary in Morocco to research the application of a packaging-recycling law, which has been already introduced in the EU.

The government should conduct the following research to set up such a law.

- Research on preparation of a law concerning municipal waste
- Research on packaging-recycling laws in the EU countries
- Research on institutions for implementing SWM legislation

2) Strengthening of Governmental Management System concerning Municipal SWM

In order to improve municipal SWM activities, the national government must strengthen its own system. The following tactics should be discussed and implemented.

- Coordination of and responsibility among ministries and agencies
- Creation of a section to instruct municipalities in SWM information management and evaluation systems, and disposal site development
- Development of professional staff to regulate municipal SWM

3) Offering Training Courses

Training courses should be offered targeting top managers such as local governors, municipal engineers, and section chiefs in order to improve municipal capability for SWM management.

4) Establishment of Expert Committee for SWM at National Level

The government should set up an expert council for solid waste at the national level under the National Committee for Environment. This committee should discuss national SWM policies for municipalities and treatment of special waste, development of laws, and disposal standards

5.2.2 Policies for Developing Municipal SWM

1) Preparation of SWM Improvement Plan.

The government should instruct local governments to prepare a SWM improvement plan. Priority should be given to the most urgent problems. The government should instruct local governments to introduce proper technology.

Also, the government should have guidelines for local governments to prepare the plan.

2) Promotion of Priority Projects

The government should select local governments' SWM improvement plans for collection and disposal, judging those priorities from the viewpoints of urgency and technical development. The government should regard priority projects as national projects and help in promoting them.

Also, the government should prepare technical guidelines based on the results of such priority projects and try to disseminate high-level collection and disposal technology nationwide.

3) Assisting Local Governments to Strengthen Financial Management Capability and Securing Investment Funds

In order to improve municipal SWM, it is essential to strengthen financial management capability at the local level, and the national government should instruct them to improve their accounting systems and management of SWM costs. Regarding SWM costs as a management index for SWM, the government should compare the performance of local governments, and thus promote more efficient SWM.

In order to secure investment capital, it is essential that local governments strengthen their financial power. The national government's support is necessary to attract investment funds for investment in environmental protection.

4) Human Resource Development

Human resource development for SWM is of the highest priority. Leading experts in SWM in cities should be developed through their involvement in actual projects. They should develop SWM staff throughout the country.

5) Research and Development for Disposal and Recycling Technology

Institutions for R&D should be established. Basic R&D should be conducted to prepare technical standards and guidelines for disposal facilities and intermediate treatment facilities that suit current Moroccan requirements. This should include:

- Research on technical standards for disposal sites that suit current requirements
- Research on methods of EIA for treatment facilities

Most of Morocco's municipal waste is organic unlike that in the EU countries and Japan, where packaging waste occupies 40 % to 60 % of the total. Therefore, there is almost no way to control the generation of municipal waste. As national income increases, household waste will increasingly include non-organic materials. Waste control and reduction will become an increasingly serious problem in urban areas.

The following should be implemented since it is necessary in the future to introduce an EU system for separate collection of packaging:

- Research on technology for municipal waste control or reduction
- Survey on recycling of municipal waste, and research on a recycling system that suits Morocco's requirements

6) Producing White Paper on Solid Waste

The government should be informed of the progress of SWM including industrial and special waste. This progress should be made public periodically.

5.3 Governmental Policies for Expansion of Collection Service Coverage and Improvement of Service Quality in Local Governments

1) Investigating Obstacles to Collection Service Coverage/and Preparation of Improvement Plan

The government should implement the following administrative measures to improve collection service coverage in urban communes.

- Providing guidelines for coverage expansion
- Instructing municipalities with insufficient collection service to conduct research on the causal factors
- Preparing and implementing a service coverage improvement plan
- Monitoring progress of improvement plan

2) Providing Instruction to Local Governments to improve Collection Service Quality

In those municipalities where improvement in SWM capability is needed, the government should implement the following activities.

- Offering lectures on collection service improvement to SWM managers of urban communes
- Instructions on and assistance for introducing truck scales in disposal sites
- Preparing guidelines for research on collection efficiency and collection service improvement plan
- Monitoring implementation

3) Promoting Privatized Collection Service

It is generally accepted that private contractors offer collection service of better quality than public bodies do. Privatization of collection service of local governments is now a worldwide trend.

Private collection service has not yet started in Morocco. Conducting efficient collection does not necessarily reduce total costs because there will be inevitable cost increases in improving service quality.

The government should, as a matter of priority, evaluate the effectiveness of a pilot privatization service, and provide information on its effectiveness to local governments. It is necessary to clearly define procedures for contracting out collection service.

5.4 Governmental Policies to Promote Sanitary Disposal with Environmental Considerations

1) Instructions on Development of Disposal Sites in accordance with Facility Standards and Implementation of a Pilot Project

Disposal sites to be newly constructed should be controlled disposal sites with environmental considerations. The following administrative measures should be taken.

- Establishment of an authorization system concerning municipal development of disposal sites
- Presentation of (draft) guidelines for disposal site development to municipalities
- Presentation of disposal standards to municipalities
- Offering lectures on technical aspects of disposal site development and operation to SWM managers in municipalities
- Implementation of a pilot project based on the national government's instructions
- Evaluation of a pilot project, and review of technical standards and guidelines

The government should instruct local governments to develop higher level disposal facilities, taking local governments' financial abilities into consideration. The government should specify some disposal facility construction projects as pilot projects, using technical assistance from foreign countries.

2) Improvement of Present Disposal by Better Operational Management

The government should prepare guidelines for disposal site operation for the instruction of local governments. In case a disposal site needs improvement, the government should instruct the concerned local government regarding urgent pollution control measures to minimize damage to the surrounding area.

3) Promotion of Private Contractors

Cost increases are inevitable for developing and operating controlled disposal sites. Private contractors will be able to develop disposal sites more effectively than public bodies do.

A licensing system must be set up to ensure that private contractors offer proper service. The government should encourage investment by contractors so that local governments can use them.

5.5 Governmental Policies to Strengthen Financial Management and to Attract Investment Funds

Cost increases are inevitable if an adequate SWM service is to be achieved. This is, however, indispensable to enrich public welfare. It is necessary to review budget allocations for public services, and local governments must secure financial resources of their own.

In order to strengthen SWM financial management abilities at the local government level, the following measures should be carried out.

- Provision of guidelines for targeted SWM costs
- Recommendations regarding financing of current SWM activity and improvement plans
- Coordination with the national government and loan agencies to secure investment funds
- Arrangements for obtaining soft loans from foreign countries

CHAPTER 6 STRATEGY FOR PROPER MANAGEMENT OF INDUSTRIAL AND SPECIAL WASTE

6.1 SWM Goals of Business Establishments

6.1.1 Principles

Principles of industrial and hazardous and special waste management are to minimize waste generation by business establishments, and to achieve proper waste treatment to prevent damage to public health and the environment.

Business establishments should aim at SWM based on the following principles:

1. Minimizing the use of hazardous materials by introducing clean production processes and technology, and controlling the generation of waste, which is the result of wasteful resource use
2. Recycling waste
3. Making waste harmless to prevent damage to public health and environment when it is disposed of

6.1.2 Establishment of Proper SWM by Businesses

1) Establishment of SWM Institutions within Businesses

Businesses whose activities generate industrial waste should educate their workers on the necessity for proper SWM; prepare in-house norms for SWM; and establish institutions to conduct proper SWM.

2) Enforcement of Proper SWM for Special Waste (Hazardous and Infectious Waste)

Businesses should implement the following tasks:

1. Minimize generation of special waste
2. Introduce treatment facilities to make waste harmless and stable
3. Operate the treatment facilities properly
4. Prevent damage to the environment
5. Dispose of treated waste at final disposal sites after confirming that the waste is harmless and stable

3) Introduction of Clean Technology

Business establishments should make efforts to introduce clean technology, which helps minimize the generation of pollutants, pay consideration to the environment, and be competitive in international markets.

6.2 National Policies for Developing Industrial and Special Waste Management

Generators of industrial and special waste should be responsible for waste management in principle. The government should encourage generators to abide by this principle.

In order to improve industrial and special waste management, the government should conduct the following tasks:.

- Development of laws concerning industrial and special waste, and an enforcement system
- Information management for industrial and special waste, and preparation of guidelines for waste treatment
- Training administrators with expertise in industrial and special waste

Along with these tasks, the government should conduct the following strategic activities to promote proper waste treatment.

- Identifying special waste that has a negative influence on the environment. Monitoring the treatment of such waste with high priority.
- Imposing intensive monitoring on businesses generating special waste, and instructing them to introduce facilities for appropriate intermediate treatment and final disposal
- Selecting some businesses that follow the above instructions as role models, and encouraging other businesses to adopt the instructions
- Examining treatment and disposal methods with businesses, and encouraging development of an environment equipment industry in Morocco
- Creating the conditions and incentives to encourage business investment in environmental protection

6.3 Establishment of Laws, Enforcement, and Administration concerning Industrial and Special Waste

1) Establishing Administrative Systems for Industrial and Special Waste

a Development of Laws Concerning Industrial and Special Waste

Laws concerning industrial and special waste management must be developed immediately. Without such laws, it is impossible to require business establishments to conduct proper SWM. Consideration should be given to integrating these laws into a general law concerning municipal waste.

b. Establishing an Administrative System for Permission, Approval, Instruction, and Monitoring Concerning Special Waste Management

It is necessary to develop institutions to administer special waste management. A section for regulation and instruction should be set up under the national government,

and local regulatory agencies should be established, based on the national decentralization policy, for regulation of and instruction on special waste management by business establishments.

c. Developing an Inventory System for Special Waste (Industrial Waste) and Technical Guidelines for Management

In order to prepare and execute the relevant laws, creation of a hazardous waste inventory is essential. The government should order business establishments to register inventory information on the amount and types of hazardous waste generated at their factories. The government should develop an inventory on hazardous waste, based on data obtained.

Also, the government should prepare disposal standards according to the types of industrial waste and technical standards for intermediate treatment.

d Establishing Institutions for Controlling Transboundary Movements of Hazardous Waste

Based on the Basel Convention and Bamako Convention, the government should control transboundary movements of the convention-defined hazardous waste and set up a management section for prevention of hazardous waste imports. The present situation concerning hazardous waste must be understood, and management procedures concerning transboundary movements of the waste should be established immediately.

2) Setting up an Expert Committee for Solid Waste

In order to introduce laws and disposal standards that suit Morocco's needs in industrial and special waste management, an expert committee for solid waste should be set up at the national level under the National Committee for Environment as already recommended for municipal waste management. Under the new committee, task force committees for SWM issues should be established, consisting of concerned officials, academicians, and non-official individuals.

3) Encouraging Special Waste Management Professionals

Professionals in the field of special waste management at the national level are expected to develop. The government should provide opportunities for academicians and consultants to participate in national committees and SWM projects.

4) Providing Training Courses to Achieve Human Resource Development for SWM

In order to improve management abilities for industrial, special and infectious waste management, training courses must be offered to top managers and senior and middle SWM managers.

5) R&D for Special Waste Management and Clean Technology

The government should establish institutions to conduct R&D to prepare disposal standards and treatment facility technology that supports Morocco in establishing special waste administration. The government should conduct research on treatment technology and clean technology that can be applied to special waste, asking for cooperation of industry.

The government should conduct research on information management regarding the toxicity of hazardous waste and its environmental impact as well as on the social benefits to be obtained by implementing waste control.

6) Economic Incentives

In order to promote investment in environmental control, including SWM, of business establishments, the following economic instruments should be considered; namely, environmental taxes, tax reduction for investment in environmental control, and a low-interest loan system.

6.4 Introducing Proper Management of Industrial and Hazardous Waste

1) Instructions for Proper SWM in Business Establishments

The following administrative measures should be implemented in order to promote proper SWM of industrial and special waste.

a. Enlightenment of top managers of business establishments
b. Development of SWM institutions in factories that need SWM most urgently, and instruction on environmental auditing
c. Provision of guidelines for proper treatment methods
d. Strengthening systems for reporting on and permission to install treatment facilities
e. Offering lectures for developing SWM managers and engineers in business establishments
f. Promoting development of private treatment facilities for industrial and hazardous waste

2) Regarding High Priority Waste

The following measures are required:

a. Identification of waste and factories of high SWM priority
   Using the inventory on hazardous waste, the government should identify waste of high SWM priority as waste under intensive management. Priority in developing SWM institutions should be given to the factories that generate a relatively large amount of such waste.

b. Research on present situation of waste and factories of high SWM priority
Research on current generation of waste of high SWM priority, and present SWM of the waste

c. Technical instructions on management of waste of high SWM priority

3) Preparation of Guidelines for Special Waste Management and Instructions on Introducing Facilities

a. Preparation of Guidelines on Setting Targets for Special Waste Treatment

The government should prepare guidelines for special waste treatment at factories under intensive monitoring. When preparing the guidelines, the body should examine targets for the treatment in cooperation with factories and waste experts. By using the guidelines, the government should instruct factories similar to the monitored factories.

b. Preparation of National Plans for Developing Special Waste Treatment Facilities

With reference to the guidelines and information on special waste and its treatment; the government should seek preferable treatment facilities for special waste. The government should prepare and implement a development plan for special waste treatment facilities.

c. Instructions for Promoting Development of Treatment Facilities for Special Waste based on the Nation Plan

The government should instruct factories to introduce treatment facilities for special waste. The government should make arrangements for promoting the private sector to develop these facilities.

6.5 Promotion of Proper Infectious Waste Management

1) The government should instruct hospitals to strengthen their infectious waste management

The government should prepare guidelines for infectious waste management and instruct hospitals to conduct proper infectious management with due respect to the guidelines. Instructions to hospitals should include the following.

- Prepare internal standards for infectious waste management
- Create SWM managers specifically for infectious waste

The following measures should be taken by the government to strengthen SWM medical institutions.

1. Requiring hospitals to recognize the necessity for proper infectious waste management
2. Specifying large or well-known hospitals as hospitals of high SWM priority, and improving them to be a model hospitals in infectious waste management
3. Offering training courses to SWM managers of infectious waste based on those used for business establishments

2) The government should promote the development of infectious waste treatment facilities

Since it is not economically feasible to install a treatment facility for infectious waste in each hospital, the government should consider development of regional centers for infectious waste treatment and private treatment facilities. Steps that the government should take are as follows:

1. Conducting research on a national development plan for infectious waste treatment facilities
2. Selecting areas of high SWM priority and discussing measures to promote a pilot treatment facility based on the national development plan
3. Assisting development of private or regional treatment facilities
4. Staged development of treatment facilities nationwide based on the outcome of the pilot project

CHAPTER 7 EFFECTS GENERATED BY IMPLEMENTING THE SWM NATIONAL STRATEGIES

7.1 Cost

Development of treatment facilities can be practically initiated from the year 2000. Based on the assumption that wastes generated during 2000 and 2010 are disposed of at controlled landfills, it is roughly estimated that investment costs and operation costs will account for total 28 billion DH. This amount takes only a piece of share in Morocco's GNP, accounting for about 100 DH/year/person.

This cost can be regarded as inevitable in order to maintain sanitary living and sustainable economic development. It is, however, necessary to form a national consensus for introducing the additional cost for disposal, upon which almost nothing has been spent to date.

The cost is not expensive when compared to the disposal cost in European countries. The government should regard this cost as inevitable as it intends to introduce free trade with EU and to join in international trade under WTO rules.

Table 7.1-1 Estimated Investment and Operation Costs for SWM (2000 to 2010)

	Municipal Waste	Industrial Waste	Total
Accumulated amount of waste during 2000 and 2010	83,980,000 t/year	36,407,000 t/year	120,387,000 t/year
Investment cost	6.7 billion DH	7.3 billion DH	14.0 billion DH
Operation cost	6.7 billion DH	7.3 billion DH	12.0 billion DH
Total	12.4 billion DH	14.6 billion DH	28.0 billion DH

Note 1: Figures are roughly estimated.
Note 2: Investment and operation costs for municipal SWM are assumed to be 80 DH per capital.
Note 3: Investment and operation costs for industrial waste management are assumed to be twice as high as those for municipal SWM.

7.2 Benefits and Effects

Benefits and effects obtained from introducing controlled landfills are as follows.

- Moroccan citizens enjoy healthy, sanitary, and comfortable living.
- Water sources can be improved. Conservation of water resources can be achieved. Economic effects such as reducing costs of purification can be brought about.
- Maritime resources in the ocean can be conserved.
- "Clean and beautiful" Morocco can encourage tourism.
- Market for SWM can be formed to Increase the national per capita income.

- Domestic consultants and facility construction businesses can be developed, which will be able to explore businesses in other African countries.
- By meeting trading conditions at the international level, business opportunities will be facilitated
- By aiming at environmental protection, wasted resources will be decreased and competitive power of companies can be enhanced.

It is rather difficult to present benefits in monetary terms and to compare the benefits to disposal costs especially in the field of solid waste. Taking many benefits into account, it is expected that the benefits should certainly be larger than the costs.

The Moroccan government should learn from the experience of that European countries, the United States, and Japan in the field of SWM. These countries are now suffering the consequences of their past improper SWM. These countries have to pay more expensive costs for restoring the environment than if they had conducted proper SWM at the beginning. Morocco should not follow the same path.

In these countries, waste disposal costs have increased at high rates to the fact that these countries have taken preventive measures against environment pollution. In Japan per capita cost for municipal waste management is about 1,500 DH. Although it can not be denied that these countries can afford this expense, this fact should not be stressed excessively. It is an important fact that these countries have achieved greater economic efficiency while they took care of the SWM costs. By achieving more efficient use of resources, companies that have respected environmental protection have gained competitive power.

Morocco should learn that, in fact, these countries strengthened their economies by taking initiatives in paying social cost for environmental conservation. Instead of letting go problems in SWM, it is better for Morocco to tackle with the problem now so that the country's economy will enjoy sustainable development.

Guidelines for National Level Policies and Actions for Solid Waste Management

Part 2
Laws, Institutions, and Finance

Exchange Rate (as of July 1997)

1 Dirham = 0.115 US dollars = 13 yen

Abbreviation List

BMH	Municipal Health Service
CNE	National Council for Environment (Conseil National de l'Environement)
CRE	Regional Council for Environment (Conseil Régional de l'Environement)
DAHIR	Law, Decree, or other legal document signed by the King
DH	Dirham
EU	European Union, E.E.C
FEC	Fond D'Equipement Communal Communal Fund for Equipment
GDLC	General Department of the Local Government, MoI
HCS	Haul Container System
MoA	Ministry of Agriculture
MoC&I	Ministry of Commerce and Industry
MoE	Ministry of Environment
MoEM	Ministry of Energy and Mines
MoH	Ministry of Health
MoI	Ministry of Interior
MoPW	Ministry of Public Works
NP	National Promotion
ONEP	National Office for Drinking Water
SWM	Solid Waste Management
USE	Under Secretariat for Environment, MoI
Veh.	Vehicle

Final Report
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Book 1-Part 2

THE STUDY ON THE NATIONAL GUIDELINES FOR SOLID WASTE MANAGEMENT FOR THE KINGDOM OF MOROCCO

INTRODUCTION

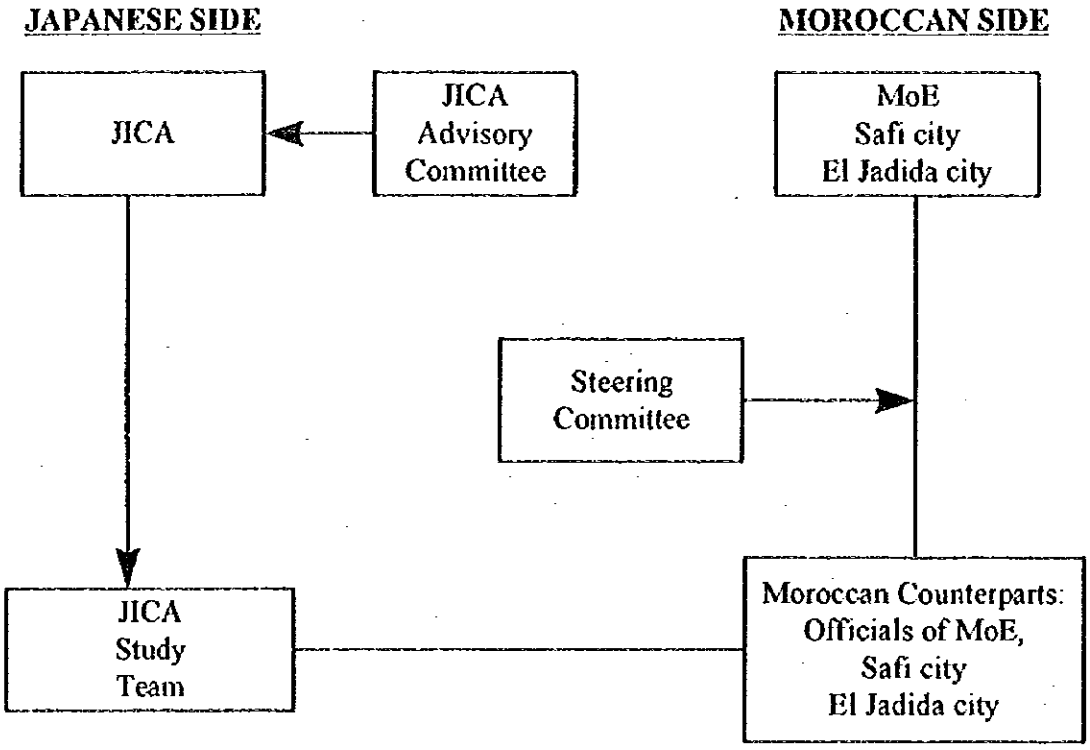
1. Objectives of the Study

The objective of the Study is to strengthen the capacity of solid waste management at both national and local levels. This study has been executed by Japan International Cooperation Agency (JICA) based on the request from the Government of Morocco. JICA commissioned the study to a joint venture comprising EX Corporation and Yachiyo Engineering Co., Ltd. The joint venture has organized a study team comprising of 11 specialists. The Study has been conducted jointly by Japanese consultants and their Moroccan counterparts.

The study period was about 18 months from January 1996 to July 1997. The Study is divided into two phases, the first phase being from the beginning up to September 1996, and the second phase being from October 1996 till the end. The objective of the first phase study is to formulate the guidelines and action plan for solid waste management at both national and local levels. The objective of the second phase is to apply the guidelines formulated and check their applicability. Two cities, i.e. Safi and El Jadida were selected for the second phase. The Study team in collaboration with the counterparts in Safi city have formulated a plan for improvement of solid waste management. In addition, we have implemented a public education campaign (demonstration project) aiming at strengthening citizens' understanding and cooperation concerning city cleansing. We have also formulated a plan for improvement of disposal of solid waste for El Jadida. It is expected that the plans will serve as a model for other local authorities in Morocco.

2. Study Organization

The study organization is shown in the figure below. This study has been conducted jointly by the Study Team led by Mr. Ohno and the Moroccan counterparts, i.e. officials of Ministry of Environment, Safi city and El Jadida city. A key counterpart agency on the Moroccan side is the Ministry of Environment. For the smooth execution of the study, the Moroccan side formed a steering committee comprising of representatives of the Ministry of Environment, Ministry of Interior, Ministry of Health, Ministry of Public Works, and Ministry of Commerce and Industry. Mrs. Layachi, Director, Department of Observation, Study and Coordination, Ministry of Environment served as chairman of the steering committee. On the Japanese side, an advisory committee was formed for the study. Dr. Masaru Tanaka, Director, Department of Waste Management Engineering, the National Institute of Health, served as chairman of the Advisory Committee.



MoE: Ministry of Environment

3. Reports

This study has produced the following reports:

1. Inception report
2. Progress report (1)
3. Interim report
4. Progress report (2)
5. Draft final report
6. Final report

The final report consists of the following Books:

Book 1 Guidelines for National Level Policies and Actions for Solid Waste Management
- Part 1 National Strategy
- Part 2 Laws, Institutions, and Finance
- Part 3 Industrial and Hazardous Waste
- Part 4 Infectious Waste

Book 2 Guidelines for Improvement of Solid Waste Management for Urban Communes and Communities
- Part 1 Management and Institutions
- Part 2 Technical Guidelines

Book 3 National Action Programs for Solid Waste Management

Book 4 Solid Waste Management Plans for Safi and El Jadida
- Part 1 Solid Waste Management Plan for Safi
- Part 2 Waste Disposal Plan for El Jadida

Book 5 Summary

Book 6 Supporting Report :
Current Conditions of Solid Waste Management in Morocco

Book 7 Data Book:
Appendices to Solid Waste Management Plan for Safi

Book 8 Japanese Summary

All the Book except for Book 8 has been prepared in English and French.

4. Guidelines for National Policies and Actions for Solid Waste Management (Book 1)

The Guidelines consists of the following four parts:

- Part 1 National Strategy
- Part 2 Laws, Institutions, and Finance
- Part 3 Industrial and Hazardous Waste
- Part 4 Infectious Waste

5. General Information on This Part

A legal framework of SWM has not yet been enacted and institutions for administration of SWM are insufficient in Morocco. This situation should be improved as soon as possible.

Our main consideration here is how to achieve this improvement.

The following questions emerge in our consideration.

1. What kind of SWM laws should be introduced?
2. What kind of institutions should the government establish for national administration of SWM?
3. What kind of policies should the government develop to improve SWM?

"Book 1-Part 2: Laws, Institutions, and Finance" provides the answers to these questions. This part, as well as other parts, have been produced by a joint team consisting of JICA consultants and staff of the Ministry of Environment.

The report was written for the readership of national government officials who are involved in the field of SWM and environment. The report has also been prepared to initiate discussion of national SWM policies.

The report is comprised of seven chapters.

Chapter 1 covers laws and regulations concerning SWM. In this chapter, the essential components of and requisites for SWM laws are discussed. Fundamental and general concepts of waste definition, management responsibility, disposal standards, duties, authorization of treatment facilities, institutions, competence, etc. are addressed.

Chapter 2 sets out the type of administrative system for SWM to be established. Officials will be most concerned with this chapter, which presents propositions for institutional reform based on an investigation of the present situation.

Chapter 3 addresses financial and economic aspects. This chapter has a different focus than the other chapters. It is beyond the sphere of the field of SWM alone because it should be a part of national fiscal and economic policy. In addition to the continued indirect financial support given to local governments, the chapter discusses economic policy instruments to encourage business establishments to take measures to control solid waste discharges.

Chapter 4 shows essential information systems for solid waste administration, introducing a municipal waste management information system, and an inventory system for industrial and hazardous waste. An inventory system for hazardous waste is a significant instrument to involve responsible persons and parties in proper SWM activities.

Chapter 5 sets out technical standards that the central government must legislate, such as disposal standards, facility standards, and operation standards. These standards are criteria to judge whether SWM activities are lawful or not. Therefore, the standards are of great importance in SWM.

Chapter 6 refers to human resource development and R&D. These matters should have a priority over other matters because human resources are one of the most

importance aspects of social infrastructure. This chapter shows what the central government should do in this field.

Chapter 7 deals with other policies for public education, privatization and information service, on which the government should put priorities.

CHAPTER 1 LAWS AND REGULATIONS

1.1 Introduction

Worldwide development in the last twenty years concerning prevention and management of solid waste has found expression in the legal sphere through a multitude of norms, standards, institutions and legislation. A legal framework for solid waste has been thus instituted on the basis of regional, national, and international rules.

This evolution has not yet been felt in Morocco. However, the acceptance of the Moroccan government of the terms of the Basel Convention on the regulation of cross-border special waste movements, as well as the efforts invested by the Ministry of Environment, to equip the country with a legal framework in proportion to the country's environmental priorities promise some changes in this field.

Such a legislative policy requires a special judicial apparatus concerning waste. This will have to be conceived as part of a total system of waste management, the components of which can be gradually arranged and placed.

Such a legal framework will fill in the actual legal gap by showing clear directions, by defining the means of action which will be developed in the shortest deadlines, and by allowing the political authority to put into place other inducements and actions according to an appropriate agenda.

The legislative policy which will thus be initiated should go together with the other actions carried out by the Ministry of Environment and other concerned departments, with a view to introduce and enforce measures intended to protect the environment and improve health.

This policy comes as a result of the considered constraints and issues to be solved as emphasized in Book 6.

Radioactive and mine wastes are not included in wastes referred in this chapter. Radioactive waste is different from municipal waste in its compositions and is usually regulated in a legal system separately formed. Mine waste (mining process waste) is assumed to be handled in a legal system that regulates mining activities.

This chapter also does not cover waste water from factories and sewage water. A proposed SWM law in this chapter covers all the waste except these four types of wastes. Legal control of waste may not be an appropriate approach to regulate the discharge and disposal of some waste such as night soil of domesticated animals. This chapter does not cover such case.

This chapter is to present basic concepts on which a law that controls export and import of waste should be formulated, following ideas of a Morocco's future SWM law and the Basel Convention.

A SWM law is to regulate rules of discharge and disposal of waste generated in

Morocco. This law should cover definitions of waste to be regulated by law; identification of legal responsibility for waste management; basic policies of waste management; methods of legally appropriate disposal; status of private SWM service contractors; administrative power to secure proper waste management; and penalties. Necessary considerations are presented on these rules in this chapter.

A law to control export and import of waste is to define domestic procedures to manage export and import of hazardous based on the Basel Convention.

1.2 Need for a Law on Waste Management in Morocco

The elaboration of specific legislation will allow SWM to act in harmony with a policy of environmental protection and health care.

The main strategic points for SWM should be:

- determination of precise objectives to be carried out gradually;
- establishment of an organization at the national level, able to ensure as soon as possible the coordination of different administrative activities with a view to managing planning and other actions in support of SWM; and
- establishment of regulations which clearly determine the powers and responsibilities of different actors in "the cleansing chain" as well as a system of supervision and sanctions.

We should underline here the provisions that should be elaborated at the national level and which should be extended to local authorities, and suggest means of accomplishing them.

In addition to the linkages between national rules and their local (communal) extension, the legislation should also constitute a reference if not a support, basis for the elaboration of accompanying institutional, financial, technical, and social measures.

1.3 The Main Components of Laws and Regulations Related to Solid Waste Management

These normative guidelines aim at proposing a "leading" international and judicial organization, indicating in a text of reference the basic rules which would support the evolution of a legal framework through a code or several legislative and statutory texts.

This is the reason why a standard model will be suggested presenting the operational rules and institutions of a Moroccan system concerning solid waste management, without having to go through the drafting details of laws and regulations and without being preoccupied with the number and form of actual measures.

The law will have to lay down the basic principles which cannot be formulated in statutory form, while the decrees which implement the law should be introduced gradually according to the actual conditions.

The law will have to establish in particular:

- General provisions such as the definition of concepts and the terminology relating to waste;
- Formulation of the basic duties concerning solid waste disposal, namely:

  - Principles for reduction of waste, and for resource recovery;
  - Rules for sorting of waste according to its nature;
  - Submission of special waste to a specific system;
  - Duties of public or private generators of waste;
  - Duties of communes;
  - The responsibility of local governments for preparing SWM plans
  - Responsibilities for waste treatment (ordinary, special);
  - Rules for setting up and operation of disposal sites (or classified treatment facilities);
  - Responsibility of manufacturers for SWM and legal definition of the conditions of manufacturing, distribution and recovery;
  - Organization of a national waste committee;
  - Cost recovery rules for residential, industrial and commercial waste generators;
  - Rules for supervision and control;
  - Duties of waste collection and treatment companies.
  - Restoring an environment when being damaged by illegal dumping
  - Penalties;

1.4 The Content of Solid Waste Management Laws and Regulations

1.4.1 General Provisions

It is recommended that the legal and institutional framework which governs solid waste management should be founded on a known basis with a clear designation of its objectives.

The general provisions of the basic text should consequently express the general philosophy of the system and provide a clear and correct interpretation mainly through the definition of concepts and designation of the field of application as well as the subjects to which the legal framework applies.

In fact, these general provisions play a didactic role by providing information about the justification, the usefulness and the purpose of the instituted system. But they also constitute for the authority in charge of its implementation and for all those who have to respect its imperative measures, an irreplaceable reference that facilitates the organization and consequently the respect and durability of the different rules it establishes.

1) The Objectives of the Planned Law

Any regulation concerning waste management should have as a first and essential target, the protection of human health and environment against harmful effects caused by waste collection, transport, management, storage and disposal.

Consequently, it is necessary to provide a regulation susceptible of anticipating any ecological difficulty. That is the reason why it is necessary to act upstream on the nature and quantity of waste which results from the manufacturing and distribution of products. Such an objective can be carried out through the introduction of the concept of waste recovery (by reuse, recycling). This should be the purpose of the SWM.

2) Terminology

a. The Basic Concept of "Waste"

It is convenient to be legally precise about the concept of "waste" by adopting a concise and complete legal definition. We can thus adopt the one we find in the draft law on the protection and improvement of the environment, subject to adapting it to solid waste, that is to say, "any gaseous, liquid or solid waste, resulting from a process of extraction, exploitation, transformation, consumption, use, control, treatment, whose quality does not allow its reuse within the process from which it is produced or, more generally, any item rejected or that its generator intends to abandon."

It must be underlined here that a certain adjustment of the terminology compared to the French texts, may be required, that is to say : " Is so called waste, in the sense of the present law, any residue resulting from a process of production, transformation or use, any substance, material, product or more generally any item abandoned or that its holder intends to leave. "Article One of the law N° 75-633 dated July 15th, 1975,"and of the European community, namely : "waste" is defined to mean : "any substance or object in the categories set out in Annex 1 which the holder discards or intends or is required to discard." "Article One of the Guideline N° 91/156/EEC" can facilitate through conceptual harmonization, the establishment of common programs of actions. It will facilitate the integration in the Moroccan system of SWM a set of legal frameworks, standards and techniques which have proved themselves through the experience of these countries.

It is advisable to note here that Appendix 1 cited in the Guideline N° 91/156/EEC, makes the definition somewhat general, by giving a list of 16 categories of waste (the most commonly known of them are Q1 : production or consumption waste, Q3 : outdated products, Q5 : contaminated or tainted material through voluntary activities.

b. Waste Disposal

It is also necessary to accompany this basic concept, with the "elimination" definition as a generic term covering the set of operations comprising SWM (collection, haulage, storage, classification, resource recovery and management) and aiming at reaching the objectives stated by the law.

It would also be useful to reconsider and define separately each of these operations. This can also be appended to the text.

c. Resource Recovery

Resource recovery is one of the pillars of a waste management system. Once defined, it is essential to present each of its components (reuse, sorting, recycling, incineration with recovery of energy ...etc...) and to suggest as an Appendix a precise list of different operations which offer the possibility of evaluation such as: recovery or regeneration of solvents, recycling or recovery of metals or metallic components.

d. Various Definitions and Exclusions

Before dealing with responsibilities, supervision and punitive sanctions, it is useful to give definitions of:

- "Producer": for instance, any person the activity of which has produced waste 'initial producer' and/or any person who has made pre-treatment, mixture or other operations leading to the change of nature or of compositions of this waste. cf. Article One of the Guideline n° 75/422/EEC.
- "Holder" for instance: waste producer or the person in possession of waste; cf. Article One of the Guideline n° 75/422/EEC).

Logically, it is advisable to complete this list by giving a definition of waste by categories. The objective is to list under the same name all the waste that can be subject to common treatment or to the same regulation.

Within the framework of these guidelines related to SWM, two separate categories of waste have been chosen :

- Municipal waste (or domestic waste) which originates from inhabitants as well as any other waste managed by the local communities, that is to say, household waste, bulky domestic waste, commercial and craft waste, non-infectious hospital waste, town refuse(spoil earth, rubble, leaves of trees.).

- Industrial waste, which comprises all refuse derived from production and transformation processes and which are by-products of industries such as chemicals, mechanics, metallurgy, and energy, and which includes packaging tainted in various ways, solvents, and rejects.).

Within these two large categories of waste, it would be advisable to create an additional division of waste according to their nature :

- Ordinary waste; the term "ordinary" requires definition of the common character of waste. Originally restricted to domestic waste produced daily from each inhabitant, this label is also applied to those components of industrial or commercial waste which are comparable to domestic waste insofar as they comprise the same main

components (paper, plastic, wood, metals, textiles, etc.), in spite of being totally different in proportion.

- Inert waste; in general we can say that waste can be defined as inert when its polluting potential with regard to the environment is weak. We traditionally group in this category certain mineral waste (coming from the exploitation of mines and quarries), as well as those of buildings (remains of construction), and those produced by users (spoil earth and rubble).

- Hazardous waste; unlike the other categories, the latter is defined by exclusion. Indeed, all waste which should be treated by processes other than those used for ordinary waste are considered as hazardous. Hazardous waste are is primarily of industrial origin, and is considered toxic or dangerous , according to its degree of toxicity. In fact, it is more logical to reserve these names for a well-identified sub-category of hazardous waste, which in other respects is subject to a specific regulation (cf. § 1.4.2, the issue of dangerous hazardous waste).

It will be also necessary to provide for the exclusion from the application field the law of all waste which are covered by other special legislation and which are not taken into account in the present study, such as the gaseous effluents spread in the atmosphere, the waste resulting from the exploitation of quarries, dead bodies of animals and agricultural waste, waste water, radio-active waste, and marine waste.

Finally and with the intention of anticipating the future international norms concerning treatment and final storage one must foresee the need for a definition of final waste. In this regard, the first article of the French Law n° 92-646 of 13/07/92 states:
"Is ultimate in the sense of the present law, a waste resulting or not from waste management which is not liable to be treated the prevailing technical and economic standards, especially by extraction of the resource recovery part or by the reduction of its polluting or dangerous character".

1.4.2 Principles and Obligations Concerning Elimination of Waste

I) Principles of Disposal

a. Objectives

It is useful to declare in the statement of objectives or in the body of the text that the objectives of a regulation concerning waste elimination is represented by the protection of the environment as well as by the protection of the hygiene and of public healthiness. Such proclamation defines the legal position and encourages any producer or holder of waste liable to pollute or damage the environment to take all the necessary measures to their elimination so as to avoid the nuisances mentioned above.

b. The Issue of Hazardous Waste

Due to the impact of hazardous waste on environmental equilibrium (owing to its noxiousness and strong concentration), it is important to isolate this category and submit it to a special set of regulations. The importance of the protection of human

health and the environment as defined above is ample justification for this.

To this effect, it is necessary to create a specific judicial apparatus which combines perfectly with existing rules and practices concerning the classified disposal sites but also others.

As in the case of Guideline N° 91/689/EEC, a certain number of obligations may be stated such as :

- Submission of the principle of the activity to the system of preliminary authorization,
- Obligation to identify waste and keep records, imposed on all the actors within the waste disposal chain,
- Prohibition of mixing hazardous wastes with each other or with non hazardous waste,
- Obligation to inform the administration and the public,
- Elaboration of plans for hazardous waste management by public authorities

It goes without saying that the measures related to the treatment of these wastes will vary according to their nature and their adoption on the basis of an exhaustive list being an integral part of the regulation.

2) Reduction at Source, Recovery and Reuse of Waste

Reduction at source of waste as well as its recovery and reuse is a response to the priority given to upstream prevention and downstream resource recovery according to the concept of disposal as has been proposed. Consequently, regulations should formulate the mechanisms which should guarantee the achievement of these objectives and appointment of the persons in charge of enforcing them.

a. Obligations of Inhabitants and Companies

These regulations should be applied to any resource recovery holder, that to say, the users, the companies whatever the nature of their activity (industrial, commercial or crafts) and finally to all public or private entities (public administration, hospitals, etc.)

The fundamental obligations of these holders should be defined by first asking to industrial and commercial companies to reduce the quantity and the noxiousness of the material used in different stages of manufacturing processes. Then, for waste which can not be reduced at source (or any other waste produced by industrial activities), emphasis should be on its possible recovery and reuse:

- for similar uses to that for which they have been conceived;
- by resource recovery by means of its transformation into a consumption product, or any other finished product.

It must be noted here that households are not mentioned above since they actually produce very little resource recovery waste. However, household waste will become increasingly relevant in this respect in the future.

b. Labeling

Within the framework of the elaboration of measures meant on the one hand to establish a complete system of resource recovery and on the other hand to facilitate the sorting and the final treatment of all waste and more particularly packaging (which represents a considerable volume) the labeling of a product provides valuable services.

As the consumer plays a key role in waste management involving packaging, it is necessary that he is properly informed so that he adapts or modifies his behavior. It is up to the law to define obligations in this field especially by imposing the requirement to specify the nature (for instance the noxiousness of a finished product or packaging) and/or the recycling possibilities.

It is advisable to add here that such provisions are not necessarily appropriate to the present context, but they have the potential to permit progressive adaptation and development, in accordance with commercial and international exchanges.

c. The Obligation of Participation

This chapter, which deals with resource recovery, would not be complete, without discussion of the obligation of producers, importers and distributors of packaged products destined for households, to "contribute or to provide" for the disposal of their packaging. For that, the companies can of course themselves organize their collection, but they could especially after the manner of the French system called ECO-Emballage (ECO-Packaging), adhere to an organization approved by the public authorities to encourage resource recovery for used packaging.

The texts may fix the operating principle which would be: the establishment of a financial contribution system to this organization, which would require companies to label their product as a proof of their conformity with the regulations. These contributions would be downstream, reserved for the contracting local communities for the implementation or the development of systems of material recovery (through selective collection and sorting) and of energy recovery.

3) Obligations Concerning Waste Disposal

a. Obligations of Waste Holders

It is obvious that the obligation of solid waste disposal by their holders constitutes the key to regulation. In fact, any producer or holder of waste which, by its nature and the concentration of pollutants may represent an ecological threat, has to provide for its disposal according to the conditions provided for by law. This obligation will be carried out by proper means through delegation to a third party.

b. The Obligations of the Communes

This basic principle being established, it would be advisable to take an interest first in the communes which are the concerned public entities. The law should provide for the obligation of the communes to organize collection service within the limits of their

territory.

- Special statutory provisions may eventually plan the regrouping conditions (which could be in the form of inter-communal or associations, as exists for water supply), small rural centers and measures applicable to scattered housing, permitting rational action and profitability of the service (it must be understood that all users should contribute financially to this service).

It is on such a basis that a real waste disposal system may be progressively enforced.

Meanwhile, only the local communities which collect the cleansing tax (" taxe d'edilité "), are required to organize SWM. Other financing methods should be considered to improve the extent and range of their obligation.
The law should also specify the obligation of communes to totally manage their domestic waste, namely, not only collection, but also transport and treatment according to the conditions provided for by law (cf. Chapter concerning measures necessary to the equipment and the operation of a treatment unit).

In other respects, the commune can exercise its right of :

- delegating all or part of the collection service of domestic waste to a third party under whatever management style (public or quasi-public company, private company, concession, leasing, management contractor, etc.) the exercise of this activity being subject to approval conditions of the company and to standard specifications.
- Refusal to manage the waste which does not come under its responsibility such as industrial waste of whatever nature and infectious hospital waste as well as waste coming from other territories.
- Serving as a substitute for the producers or holders of industrial or infectious hospital waste, in case of failure of the latter to carry out waste disposal, and requiring payment for expenses incurred. Such a technique is used particularly in case of danger to public health, hygiene and security (dahir dated 1980, law on town planning).

If we assume that the commune organizes by itself the collection of industrial and hospital infectious waste (implying the existence of a system capable of treating industrial and infectious waste whatever its nature), it must be in a position to obtain payment for the service rendered.

- It must be emphasized that if domestic waste treatment is really an integral part of the communes' obligations, the elaboration of treatment plans may nevertheless be planned at the provincial level. In fact, an emerging tendency is taking shape in Great Britain, Italy and France at the level of the establishment of departmental plans. These plans aim to direct and coordinate all actions of the public authorities and private entities with a view to providing disposal of domestic waste as well as all other waste, which according to their nature may be treated in the same facilities as domestic waste.

c. Obligations of the Holders of Hazardous Waste

It is important to recall here that whatever waste disposal facilities are used by the company generating hazardous waste; either collectively (services and facilities which carry out waste disposal for several producers) or internally (i.e. waste disposal service run by the company itself), the law should lay down the principle that holders of hazardous waste are obliged to take charge of their waste disposal.

4) Treatment Systems

a. Waste Treatment

It is essential to clearly formulate obligations concerning treatment by requiring the use of methods, techniques or processes which do not harm the environment and which do not endanger human health.

Such systems, admissible or to which we can have recourse may include pre-treatment - such as crushing, discharge on or in the ground - such as waste dumping, incineration and composting.

b. Definition of Classified Facilities for Waste Treatment

As to the definition of the classified facilities, the law should fix the principle, such as "...any waste disposal service should comprise appropriate waste treatment using of the most appropriate methods and technologies to guarantee a high level of environmental and public health protection..." Cf. article 5 of the Guideline n° 91/156/EEC, that is to say made in a facility realized and run according to rules related to treatment facilities (establishments) Cf. in the section 1.4.5 "implementing and authorization of waste treatment facilities".

c. Delegated Treatment of Hazardous Waste

The administration should fix by decree the conditions under which hazardous waste disposal can be carried out. Because of the degree of noxiousness of this category of waste as well as of the special conditions for its treatment or storage, it is desirable that management is delegated to a company, after being approved by the administration (or having the qualification for such approval). This being the case, it would be desirable that the administration base itself on a provincial or regional authority to which is conferred by decree powers concerning operational, authorization (or qualification) of treatment units of hazardous waste (according to criteria fixed by the Ministry of Environment).

d. Designation of Selective Criteria for Setting up Hazardous Waste Treatment Facilities

It is the responsibility of the national government to fix selective criteria which will permit the establishment of treatment units according to the nature of waste whose list will established by decree. Following the French example of establishing national plans, the national government may on the one hand define the needs of specific

treatment according to the local industrial fabric, and on the other hand make a list of the sites which are geologically favorable to the setting up of treatment centers.

In fact, the degree of noxiousness of hazardous waste can be such that only perfect control of treatment premises will guarantee that disposal will not have adverse consequences on the environment.

We can suppose, finally, that planning of treatment facility requirements will generate the interest of the private sub-contractors.

e. Exceptional Measures of Treatment Outside the Classified Facilities

Certain types of waste may be exempted from treatment within the classified facilities, insofar as they can be used, or recovered in agriculture, as manure, sewage, and eventually activated sludge. In view of the sanitary risks, it is advisable to elaborate a legal framework which will establish standards of acceptance for this type of waste.

f. Treatment Criteria

By order of law, the administrative authority should be endowed with the power to define the main criteria for treatment, notably the technical norms and standards of facilities according to the nature of waste. The application of texts in the field would then be registered within the prerogatives of local authorities (such as the Province and the Prefecture) or of the management of regional agencies (whose proposed role is defined in the § 1.4.3).

g. The Responsibility of Waste Holder in Case of Delegation of Treatment to a Third Party

This question is of fundamental legal interest.

The obligation to dispose of industrial by its producer can be efficient only if the system of responsibility does not permit an easy exemption to this rule.

The question can be considered from the penal and civil point of view.

The rules of general penal law, through the principle of the status of offense and penalties prohibit penalization of any person other than the offender. Part of the actions contravening industrial waste may thus involve the responsibility of a person other than the contractor, such as the salary-earner, or contractual company in charge of waste disposal.

However, if we consider holding the contractor responsible for waste disposal by means of a specific incrimination, such penalties will be without influence in consideration of the legal actions to which he can be subject ex-officio.

It therefore suggests that penal responsibility should apply not only to the waste producer during the total waste disposal process, but also the company's manager in case of a heavy offense through negligence or of an intentional offense.

He would not be able to be exonerated from this responsibility unless he can transfer this obligation to a public or approved entity, according to the terms provided for by the regulation.

The waste producer's civil responsibility can obviously be held within these limits. One cannot however define it according to the hypotheses of disrespect of the regulations in force, the administrative authorization being in no case a cause of exemption of the author of a prejudice caused to a third.

It therefore suggest that within the framework of law the company remains responsible for the waste it produces and that it cannot be exempted because of conventional devolution of this obligation to a third person which would not have the ability according to the law in force.

h. Information Related to Treatment

Following the initiative of the Ministry of Environment, a committee of information should be established to watch over the collection, the dispatching and the exploitation of information related to treatment, according to the main objectives which would be fixed by law.

The activities of this committee should be reflected at the local level. Particular texts may improve this framework at the local level.

5) The Responsibility of Manufacturers

a. Principle of Production

It is important to face up to the companies' obligations in the field of waste reduction and recovery by legally stating the basic principle of managing the products' life cycle, even the extension of this cycle and recycling. That is to say, the development and use of new technologies, the producers' responsibility towards used products, depositing systems, and the creation and promotion of markets for recycled products.
The statement of such principle constitutes the starting point of a systematic and global approach toward solid waste management.

b. Restriction at the Level of Distribution

The basic principle of production needs to be strengthened by establishing regulations on the obligation of complying with the modes of use of certain materials, or managing the nature of packaging to be used for distribution.

c. Recovery

Recovery is organized within the contemporary laws as a component of the obligation of waste disposal which mainly relates to industrial waste producers and if necessary on other waste holders.

It constitutes therefore a type of action of the administrative authority which organizes waste management styles.

But waste recovery also constitutes an activity, at present uncontrolled in Morocco, which permits waste recovery, to transform a part of it and to re-use another part as it is for different production and services, such as packaging, and handicrafts.

The progress of these activities, like the conditions for re-using the recovered waste occasionally escapes any control. Several users probably have no idea of the origin of these products which thus constitute a threat to public health. use of packaging in food channels and, handling of toxic or polluted materials.

It is therefore useful to provide in law for the subordination of any organized waste recovery to administrative control and the prohibition of re-use within the conditions which generate risks to public health.

1.4.3 Creation of a Waste Commission and Management Regional Agencies

1) Creation of a National Commission of Waste

It would be desirable to create a commission constituted of different concerned administrative authorities, to establish cooperation and coordination of actions in the respect of the prerogatives of each part. This commission may be in charge of arousing, promoting, coordinating, facilitating and if necessary implementing any operation having as its object:

- prevention and control of the atmospheric pollution;
- limitation of waste production, disposal, and resource recovery;
- saving in energy and raw materials;
- development of clean and economically efficient technologies.

The committee should also play a role to prevent water pollution caused by waste discharge into rivers or by waste water and leachate from waste disposal sites.

The composition of this commission, its competencies (orientation, incentives to technological research and development, demonstration and distribution of applicable techniques, assistance, studies, international cooperation and arbitration) as well as the rules related to its operation and its financing may be fixed by decree.

It is advisable to provide for regional representation of this commission and to specify its role within a local entity such as the regional agency management.

2) Establishment of a Regional Management Agency

The national legal guidelines related to SWM at the level of law as well as its application in the field, provide for an important legal framework. Neither the central authorities, nor the municipalities, can or should operate this legal framework alone. Consequently, the State should depend on a regional body such as the regional

management agency, to whom it will delegate certain powers.

Being placed under the authority of the Governor of the Province, this agency may exercise tasks in various environmental fields, such as atmospheric pollution, coastal pollution, studies of impact on the environment, prevention of technological risks, etc. A decree may fix its actions in the field of solid waste especially at the level of the classified facilities for treatment (delivery of building authorization, control of treatment facilities, and various administrative provisions).

1.4.4 Monitoring SWM

Since this is established for water authorities, classified establishments and work inspection, among others, it would be desirable to provide a body of inspectors, and to clearly define its duties and prerogatives by vesting it in particular with the right to enter at any time into the sites subject to its control.

This supervision may be effective, after classifying the sites, establishments or locations that can potentially cause harm to the environment and the establishment of a monitoring plan comprising control methods.

It is advisable to emphasize here that the classification criteria will be defined by law and that the classification as well as the monitoring plan will be subject to the approval of the Ministry of Environment in coordination with the various concerned authorities.

1.4.5 Establishment of Waste Treatment Facilities

1) Authorization of Waste Treatment Facilities

The conditions for conferring authorization to set up and/or to run establishments of waste treatment will be fixed by reference to fundamental options of law related particularly to the obligation to subject different waste categories to treatment and the conditions of their disposal. Waste treatment facilities must have permission based on Water Law from Water Authority when discharging their waste water to rivers.

Financial provisions will be inserted in the law to manage the payment of taxes and fees to operate this service, and providing, for instance, ecological security of the site at the end of operation, monitoring during operation, and possible interventions in case of accidents or pollution.

The legal measures will determine the procedures to apply for authorization (constitution of application document, the constituent documents, the clauses of public inquiry, the content of the study of impact, etc.), technical and administrative examination of the application as well as the adoption of the authorization order and if necessary of the specifications relating to it.

2) Supervision of Operations

When the operation of a waste treatment facility is carried out without respect to the

laws or norms and standards in force, it should be placed under supervision from the moment that an environmental risk happens.

The law should allocate to the administrative authority or to the regional agency, according to the degree of urgency, the power to order the suspension of the facility's activity, leaving it to the authorities in charge of delivering the operation's authorization to order its permanent closure.

3) The Status of Existing Facilities

It is important to emphasize the big legal gap which actually surrounds waste treatment facilities. Although one of the priority objectives of establishing a SWM system, i.e. conformity with standards by the existing facilities, it will be necessary to proceed in stages. Incentive measures which may facilitate the gradual improvement of facilities during a transitory period limited in time may constitute an intermediary stage, on the right track of strict and general enforcement of the law.

4) The Obligation of Declaration

An information obligation must be inserted in the law obliging any holder of industrial waste that may cause nuisances during treatment to provide certain information to the communes likely to be affected as well as to the administrative authorities in charge of information related to treatment.

These holders of hazardous waste should therefore keep records particularly indicating the quantities, nature, origin, means of transport and the method used to treat this waste.

5) Collection and Transport Authorization

Regulations should define quite clearly that only authorized companies can carry out subcontracting of waste collection and transport. It is advisable to add that specific authorization criteria should be defined in the case of hazardous waste.

1.4.6 Operators

1) The Appointment and Qualification of Operators

Considering that SWM aims at protecting the environment and at rendering responsible those who are in charge of collection, transport, treatment of waste, it is necessary to precisely fix the obligations and the conditions for appointing different service providers in this field.

2) The Obligations of the Companies' Managers

Concerning the operators subject to the obligation to disposal safely of hazardous waste (including reduction of industrial waste, recycling or recovery) and the specialized companies, the law should provide for a system of assumed responsibility whenever the expected result cannot be reached.

This will encourage managers to appoint qualified staff to monitor disposal activities, to control the representatives, to propose to partners and shareholders measures necessary to the good functioning of SWM and to carry out scrupulously the different operations provided for by law.

In the most serious cases, the personal responsibility of the company's manager may be held as penal and/or civil.

3) The Operation Report

To follow up strictly the operation with a view to controlling the actions of holders or sub-contractors, measures should be taken to establish a formula which will include the depositing of different disposal operations carried out, as well as the keeping of a register mentioning : the origin and nature of waste, the name of the transporter, the weight of the waste (for lack of volume), the date and hour at which waste arrives on the site, and finally the name of the waste producer, if the wastes are other than municipal.

This operation report should be presented at the immediate request of any concerned administration and, also sent each year to the regulatory authorities.

1.4.7 Packaging Waste

Although on different occasions packaging waste has been taken into account within the general measures concerning either recovery, or waste re-use, it seems to us necessary to tackle this subject separately.

The waste coming from packaging is mainly produced by industrial activity because municipal wastes are particularly organic. Yet, households' consumption will increase year by year, leading to a parallel increase in packaging waste. To this will be added the production of commercial and craft packaging waste which, thanks to SWM improvement, will be isolated and collected separately.

It is therefore necessary to anticipate this phenomenon, by providing specific regulations for this kind of waste, whose main objective will be the reduction of generated volumes and resource recovery.

The provisions which may be stated in a decree would lead to the intervention of a succession of holders, that is to say companies, households, and those responsible for resource recovery. The respective obligations of each of these actors and the procedures with which they should comply should be clear, this being indispensable for effective control.

1.4.8 SWM Plan

In order to implement collection and disposal of waste, local governments should formulate a SWM plan. Communes and communities should be obliged to identify waste that they should collect among those generated in their jurisdictions; to specify treatment methods; and to plan disposal sites.

At the provincial or economic regional levels communes and communities must prepare a plan to regulate management of special waste, which they will not collect an dispose of. They should be authorized to organize optimal SWM institutions for this plan. It is not appropriate to leave special waste management to the Moroccan market since the country does not have a sufficiently large market for the SWM, is unable to maintain fair market, and will take a long time to establish its legal system to control the market.

For a mean time, Denmark's experience will be a good example for Morocco. Local governments should be authorized to appoint service providers that can offer special waste treatment to special waste generators.

1.4.9 Illegal Dumping, Post-closure Management, and Public Funds

Communes should be authorized to take necessary counter-measures against illegal dumping of waste. Costs incurred for counter-measures can be collected from illegal dumping conductors. When the costs can not be collected communes should be allowed to use public funds.

Disposal sites need continuous management even after they are closed. The responsibility for the management should belong to owner (establishment) of the disposal site. Some owners may purposely an bankrupt their management establishments so that they can avoid their management cost. Post-closure management, therefore, can be done by a public organization (this method is seen in Netherlands).

1.4.10 Conclusion

In order to take into account the actual context of SWM in Morocco, environmental objectives, and political choices of the government, it is recommended that an agenda of rules be adopted according to the degree of emergency of the issues to be solved.

Three stages can be defined:

Stage 1: Institution of minimal measures for immediate enforcement in the following fields, with the attribution of extensive powers to local authorities to complete them:

- Obligation of waste collection in the urban agglomerations;
- Regulation of public disposal sites;
- Regulation of storage and treatment of solid waste;
- Regulation of hazardous waste;
- Regulation of industrial waste (obligatory measures and incentive measures)
- Regulation of minimum information.

Stage 2: It will cover;

- Harmonization of the proposed texts with the laws on water, atmospheric and environmental protection;
- The introduction of complex rules such as sorting and resource recovery, and their sector-related and territorial extension.

Stage 3: Handling the waste remaining after all feasible measures in stages 1 and 2 have been taken.

If we consider that the first stage constitutes the real starting point of a law on SWM, it essentially concerns the greatest waste producers, and those who generate waste whose nature and concentration are susceptible of causing risks for the environment and for human health. In consideration of the present situation, these enforcement laws and decrees fill a legal gap by bringing concrete and immediate solutions to the most crucial problems.

As for the second stage, harmonization of a law on solid waste with the existing texts on environment which will prove themselves in the course of time, will bring about a new light on SWM. In fact, it is the beginning of a global approach where each actor in the cleansing chain is responsible for the task he should carry out on the environmental scene. The progressive introduction and enforcement of the texts related to resource recovery will certainly involve the user, the commune, the industrialist and workers in the field of waste.

Stage three is the ultimate global approach when all actors are effectively involved in SWM to the extent possible : an unavoidable minimal amount of waste remains to be handled.

1.5 Laws and Regulations Controlling Export and Import (Movements) of Hazardous Waste related to Basel Convention

1.5.1 Introduction

Basel Convention was established based on the recognition that there had been no international rules for environmental pollution caused by transboundary movements of hazardous waste. In such context, some environmental pollution occurred, eventually bringing the necessity of international rules into the light: those pollution were caused with hazardous waste shipped by industrial countries to developing countries where concerned regulations were not well established. One of the most notorious case is "Case Coco." In 1988 hazardous waste with PCB was transported and dumped near the Port Coco.

The necessity of worldwide commitment was recognized for dealing with environmental pollution resulting from export and import of hazardous waste. International rules for this matter were prepared mainly by the UNEP, and "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and

Their Disposal" was established in 1989.

The number of ratification countries has reached 105 and Morocco ratified the Convention in 1995. After its ratification, Morocco has started considering a domestic legislation for controlling export and import of hazardous waste. Morocco is already in the process of examining a legal system for hazardous waste through a project related to an environmental law system with the help of the World Bank.

This section 1.5.1 will present some ideas to help examining the development of domestic legislation and regulations for export and import of hazardous waste.

1.5.2 Outline of Basel Convention

Basel Convention consists of 29 clauses. Main article are as follows.

Article 1 Scope of the Convention
Article 2 Definitions
Article 3 National Definitions of Hazardous Wastes
Article 4 General Obligations
Article 5 Designation of Competent Authorities and Focal Point
Article 6 Transboundary Movement between Parties
Article 7 Transboundary Movement from a Party through States which are not Parties
Article 8 Duty to Re-import
Article 9 Illegal Traffic
Article 13 Transmission of Information

What the Convention controls is very clear and covers almost every necessary aspects of the matter except one point: criteria of hazardousness have not yet met international agreement.
There are four important points of the Convention.

1. A Party of export of hazardous wastes and other wastes are required to issue an prior notice to a Party of import or transit. A Party of import must consent to the import.
2. A Party shall no permit hazardous wastes or other waste to be exported to a non-Party or to be imported from non-Party.
3. Illegal exporters of hazardous waste are obliged to re-import the waste to the Party of export.
4. During the exporting process, hazardous waste must be accompanied with documents informing on the waste.

Hazardous wastes to be controlled by the Convention are defined in Attachment I of the Convention and their properties are defined as hazardous in Attachment III. Attachment I defines 18 types of hazardous wastes such as medical wastes; wastes from production of organic solutions; and wastes regarded hazardous by its generation process. The attachment also defines 27 types of hazardous wastes by its contents, which are beryllium, hexavalent chromium compound, arsenic, arsenic compound,

cadmium, cadmium compound, etc. The waste that the Attachment I refers to includes even recyclable waste. Also, it is possible to define more types of hazardous waste by a domestic law of each country.

Basel Convention controls non-hazardous waste as well: specifically they are collected household waste and its incineration residue.

The Convention hold a very solid principle about the responsibility of states of export. They are not allowed to permit export of hazardous waste when adequate treatment is not provided in states of import. Moreover, states of export must inform states of import on the waste and obtain a consent prior to the export. Information required here must include items mentioned in Attachment VA.

Transboundary movements of hazardous waste must be accompanied with a document on exported wastes (transfer manifest) from a Party of export to a Party of import. Attachment VB mentions information to be included in a transfer manifest.

In case exported waste breaches the contract between an exporter and an importer or is handled illegally, the state of export can order the exporter to re-import the waste. If the exporter is unable to do so, the state of export must re-import the waste.

1.5.3 Necessary National Legislation

1) Factors to be defined by national legislation

As Morocco accepted the Basel Convention, she should have a national legislation regulating procedures of importing hazardous waste. Basic procedures are mentioned in the Basel Convention, and Morocco's relevant legislation, based on the Convention, can sufficiently regulate the procedures. There are, however, some elements to be added in a national legislation.

- Procedures for export
- Procedures for import
- Documents on export, import, and movements
- Issuing arrangement orders

2) Recommended Legal Framework

It is recommended to prepare a legislation regulating the following factors in order to control export and import of hazardous waste based on the Basel Convention.

- Objectives
- Definition
- Permission of export
- Permission of import
- Transfer manifest
- Arrangement orders
- Other (report, auditing, inspection, and complaint)

- Penalties
- Focal point

Points of each factor are as follows.

a) Objectives and Definition

Objectives of controlling hazardous wastes and definition of hazardous wastes are clearly addressed in the Convention. Morocco's national legislation only needs to follow the definition of hazardous waste mentioned in the Convention unless certain hazardous wastes exceptionally seen in Morocco needs to be added.

b) Permission of Export

It is necessary to consider two factors in procedures of permitting export of hazardous waste. One is methods for permitting the export of hazardous waste, and the other concerns how to assure the prevention of environmental pollution. The Ministry of Trade controls the export and import in Morocco by the Trade Control Law. According to this law, the ministry is authorized to permit the export of hazardous wastes.

Taking into account the prevention of environmental pollution at a state of import, the Ministry of Environment, which is a competent authority for environment, should be authorized to certify whether the prevention is proper.

Export of hazardous waste should be permitted by the following procedures.

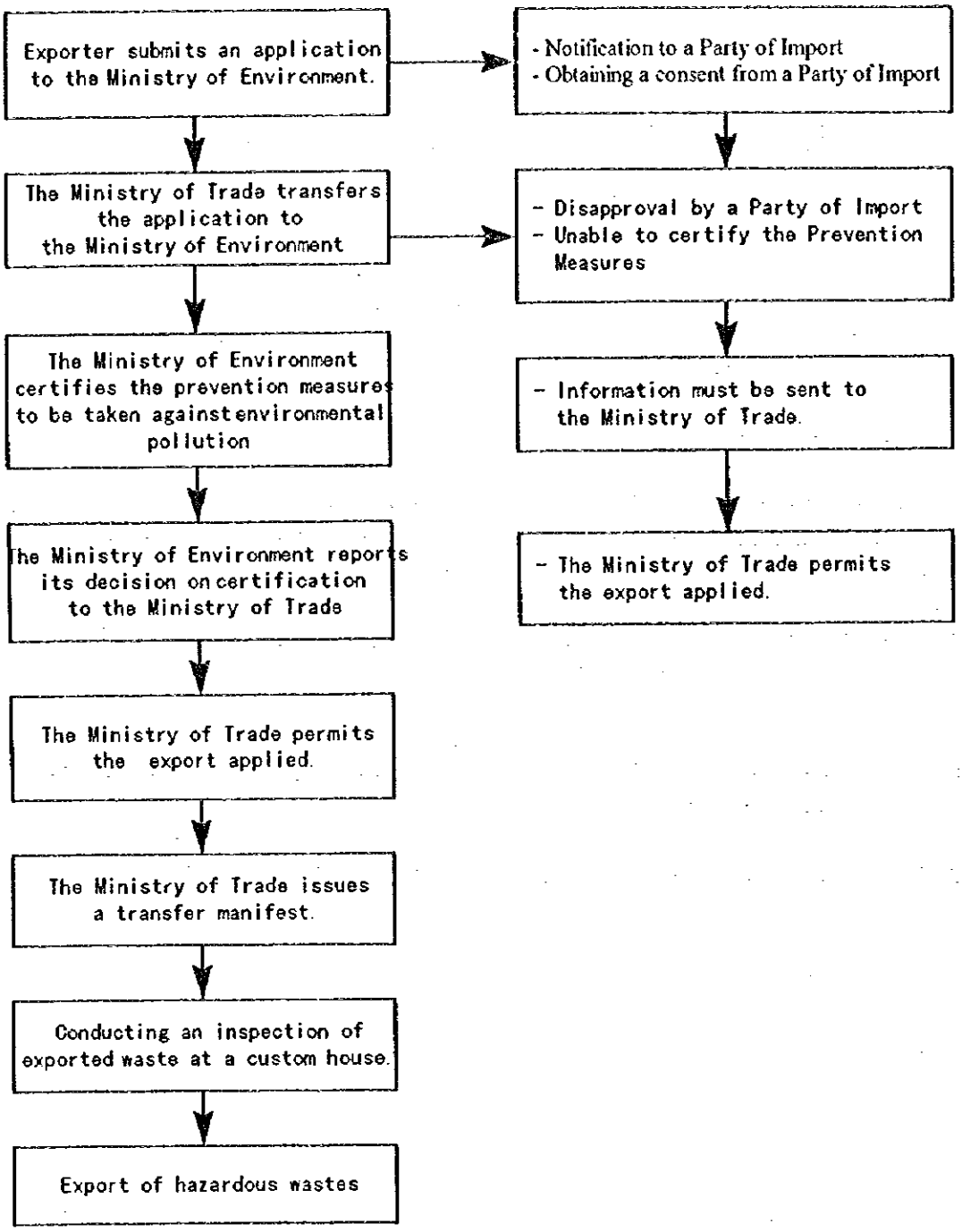


Figure 1.5-1 Procedures for Issuing Permission of Export

The government should prepare an application form for export of hazardous waste and a transfer manifest form.

The Ministry of Environment should inform a party of import on hazardous waste to be exported as required in Attachment VA. The ministry also should demand a Party of import for confirmation of adequate disposal of imported waste, which is addressed in the contract made between an exporter and a disposer.

Permission of export of hazardous waste should be issued through well-established procedures. In permitting the export, it is necessary to confirm the disposal methods

to be applied is legal in a Party of import and to check whether the methods follow the Technical Guidelines for Adequate Treatment of Waste.

A transfer manifest must convey the information addressed in Attachment VB. The Basel Convention does not require a government to regulate a transfer manifest. It is, however, desirable that a government issue transfer manifests to legally control movements of hazardous waste.

c) Permission of Import

Based on a legal interpretation, import of hazardous waste is controlled by laws and regulations concerning trade and foreign exchange control. This means that the minister for the Ministry of Trade is authorized for permitting the import of hazardous waste.

According to an interpretation of the law concerning the Ministry of Environment, the minister is responsible for confirming that imported hazardous waste can be properly disposed of.

Import of hazardous waste should be permitted by the following procedures as show in the next page.

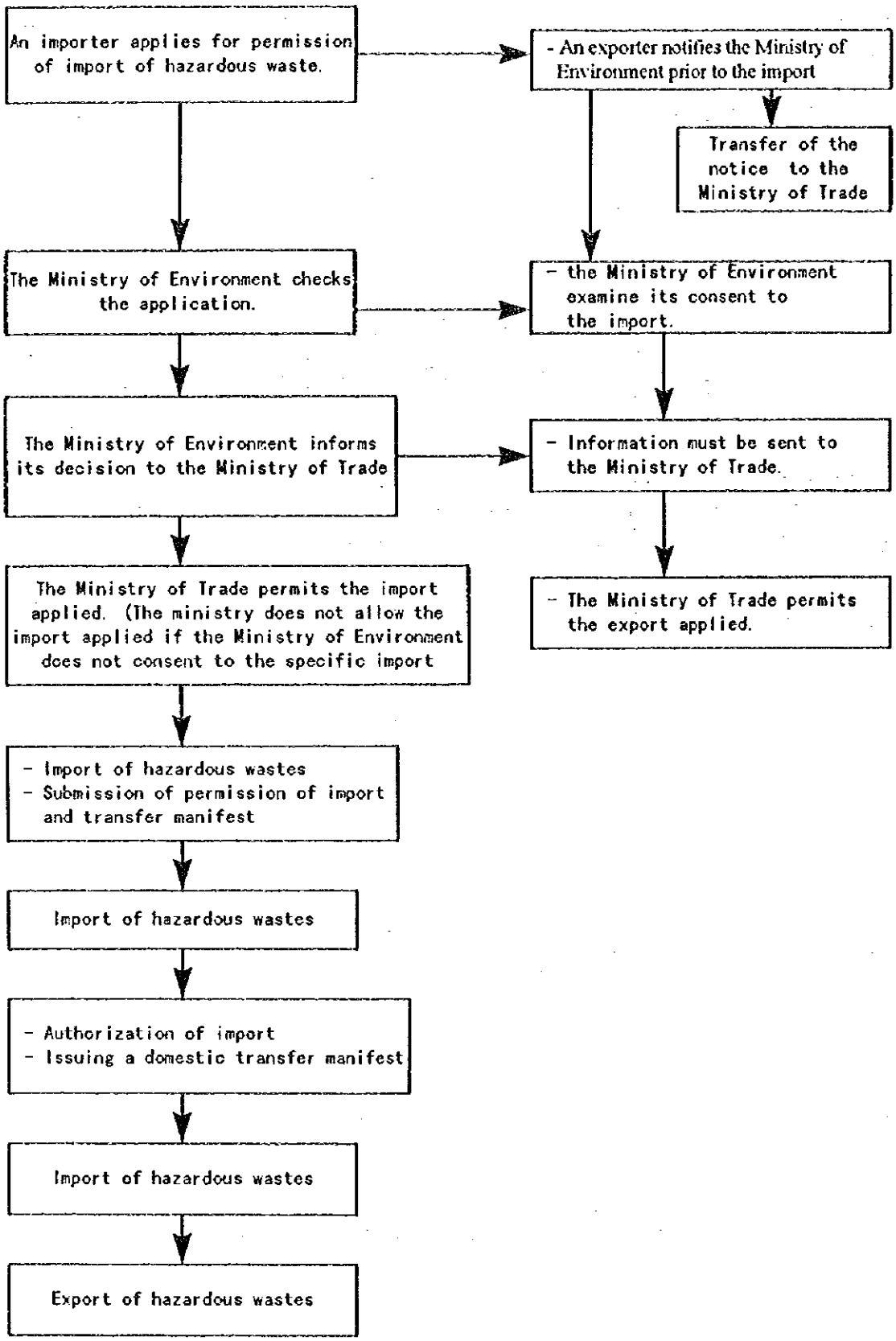


Figure 1.5-2 Procedures for Issuing Permission of Import

As authorized by a Morocco's domestic legislation, the Ministry of Trade permits the import of hazardous waste. The ministry, however, should take into consideration the

results of import examination made by the Ministry of Environment since this ministry is a competent agency as mentioned in the Basel Convention .

Before the import examination by the Ministry of Environment, it is necessary that a permission is issued for a Party of export. It is only after this permission when a Party of export permit export of hazardous waste. Therefore, it can be confirmed that the Ministry of Trade weighs the decision of the Ministry of Environment when an application for import is accompanied with a permission of export.

Import of hazardous waste can be permitted when:

- the waste is exported by only Parties to the Basel Convention;
- a contract on adequate treatment of hazardous waste is agreed between an exporter and a disposer;
- an application must meet the MoE's requirements for permitting export of hazardous waste (an application must be accompanied with a permission of import by a Party of import); and
- requirements of Basel Convention must be met.

Some consideration should be given to the methods of issuing a transfer manifest. There are basically two ways. One way is to issue transfer manifests separately in a Party of import and export. This way enables domestic movements and disposal of hazardous waste to be properly done. The other way is to issue a transfer manifest only once in a Party of export and to keep it accompanied with exported wastes all until their disposal.

The largest problem here is that there are no legislation for solid waste in Morocco. National legislation is supposed to provide the basis for handling an export notice from a Party of export. Law on Solid Waste recommended in section 2) will be necessary to enforce a law for controlling transboundary movements of hazardous wastes.

d) Transfer Manifest

Attachment VB addresses information that a transfer manifest must conveys. It is necessary to legally obligate a transfer manifest accompanying hazardous wastes exported.

A transfer manifest should convey information, for example;

- Permission from Parties of export and import,
- Details of movements, and
- Prior notification and reporting

It is necessary to legally obligate notification of completion. Disposers must submit notification of completion to the Ministry of Environment when hazardous wastes are disposed of as agreed in the contract. The Ministry of Environment should check and transfer the notification to a Party of export based on the Convention Article 6.9.

e) Arrangement Order

It is necessary to prepare regulations concerning administrative orders in accordance with the Convention Article 8 (Duties to Re-import) and 9 (Illegal Traffic). An administrative orders will be made when exported hazardous wastes can not be disposed of in a manner agreed between an exporter and a disposer; or methods of transport and disposal differ from the ones permitted beforehand. It is necessary to prepare procedures for enforcing arrangement orders.

f) Other

There are some items to be regulated: for example, reporting, auditing, inspection, petition of objection, and penalties.

In order to control the movements of hazardous wastes, the government should be legally authorized to obligate submission of necessary information from exporters, transporters, disposers, and hazardous waste generators. The government should be also able to collect such information.

Disposers can employ an auditing agency to conduct environmental auditing of their disposal. The government should be legally authorized to carry out on-site inspection at offices and work sites of exporters, disposers, and importers in order to confirm proper implementation of disposal. It is possible to authorize the government with the on-site inspection with a domestic law in Morocco.

Petition of objection is a counter action for an arrangement order, and procedures of appealing the petition should be defined by law.
Penalties for a violation of law should be set up in accordance with Morocco's domestic conditions.

It may not be necessary to legally define focal points. The Convention refers to the Ministry of Environment as a "competent" agency.

3) Basel Convention and National Legislation in Morocco

A domestic law on solid waste should be prepared immediately since hazardous wastes imported should be treated and disposed of in accordance with Morocco's national legislation.

A Party to the Basel Convention shall not permit the export of hazardous waste to Morocco unless she sets up a law on solid waste. Also Morocco can not consent to the export of hazardous wastes without the law.

Morocco still does not have an established system for treating hazardous waste. There are no treatment facilities for hazardous wastes, and proper treatment of hazardous waste is not provided yet. Therefore, as the Convention rules, it is impossible for a Party to permit the export of hazardous waste to Morocco.

Since import of waste for a recycling purpose is not considered as the one for a waste

treatment purpose, such import can be regulated with a law on transboundary movements of hazardous waste.

An increase is expected in the number of application for import of non-hazardous waste. The Basel Convention regulates some types of non-hazardous wastes: namely, municipal wastes and its incineration residue. In the absence of a law on solid waste, a Party will legally be restricted to permit and condent to the export of hazardous waste as explained in the case of hazardous waste export. Legitimate export of these types of wastes can be admitted when a concerned law is established in Morocco.

Some types of waste regulated by the Basel Convention, for example, used tires and scraps, should be excluded from regulations by a law on transboundary movements of hazardous wastes. The government, however, should leave a law on solid waste, which will be introduced, able to control the import of waste that is not regulated by the Convention