

## **2.4 Sanitation and Environmental Conditions**

### **2.4.1 Environmental Conditions**

#### **1) Development Pressures on the Environment**

Main development pressures on the environment are:

- Demographic increase;
- Urbanization of land, specially on the coast line;
- Industrial and municipal plants;
- Traffic development;
- Intensification of agriculture;
- Tourism development sector.

#### **2) Environmental Sensitivity**

##### **a. Rivers**

Climate with alternance of a rainy season and drought is a condition of sensitivity of surface water to contaminants through the discharge of waste into the stream. Logging of sewage due to accumulation of solid waste can be a factor of flooding, and is a cause of water contamination with impact on wildlife. Dumping of waste into rivers is a source of contamination of water reservoirs. Sensitivity of surface water to waste discharge will increase as a result of the policy of water storage for meeting the increasing demand for water supply.

##### **b. Groundwater**

Sensitivity of groundwater has not been determined. There are areas which depend on superficial groundwater eventually sensitive to ground contamination.

##### **c. Coast Line Area**

The coast line area is very sensitive for several reasons: Concentration of upstream discharges, conflicts for land use, variety of natural resources (tourism, fishing, agriculture), urbanization and demographic concentration; The absence of control of emissions together with the lack of environmental protection are critical factors.

##### **d. Urban Areas**

Urban areas are extremely sensitive to man made nuisances because technical and juridical or regulatory measures for the protection of people against nuisances are very few, in spite of the concentration of population.

## **e. Health**

Part of the population (children and women in age of procreation) is particularly sensitive to environment change within the context of low awareness of environmental and health risks, and absence of proper management of nuisances and risks.

### **3) Quality of Environment**

#### **a. Air Quality**

There is no check of air quality. Main sources of air pollutants are industry and traffic, specially due to aging of the equipment and increasing traffic. Air pollution is due to traffic conditions in Rabat, to SO<sub>2</sub> industrial emissions in Safi, and to mixed sources in Casablanca, for example. Ministry of Health has set up an interministerial committee for air pollution control.

#### **b. Water Quality**

Domestic waste water is the main source of organic pollution of surface water. Industrial effluents are generally not treated before discharge and generate surface water contamination. Conditions of storage of industrial waste are not known but could be important sources of groundwater contamination. Waste landfills and clandestine waste deposits are sources of contamination of water by pathogen germs and toxic substances. Swimming water in coastal area can be contaminated and be a source of diseases. There is no evaluation of the water quality conditions, excepted for the Sebou river basin.

### **2.4.2 Sanitation Conditions**

#### **1) Housing Conditions**

In Morocco, 23% of the urban population was living in clandestine habitat in 1989, which includes shanty towns and spontaneous uncontrolled habitat. The shanty town population was estimated to reach 160,000 persons in 1992.

60% of urban households have 1 or 2 rooms only, and the average number of persons per room is 2,1. There are 10% of the households that are sharing their apartment.

In the Rabat Sale prefecture, the clandestine population was amounting 160,000 persons in 1982, which was more than 18% the total population, and 20% of the existint habitat. In 1992, about 5,500 households were living in shanty houses.

#### **2) Access to Potable Water**

In urban areas, 74% of households (1990) have access to potable water in their homes, and 16% to public fountains. The rate is 14% in rural areas (mainly public fountains and collective wells). Availability of bathroom or shower is 22,3% in urban areas against 5,4% in rural areas. 93,7% of urban households have toilets, decreasing to 36,5% for rural households. Use of public bath is however a current practice.

### **3) Illnesses**

Information has not been sufficiently collected for this section.

## **2.5 Social and Educational Aspects**

### **2.5.1 Social Groups in Urban Society**

Information about district communities, NGOs, women's groups, and school cooperatives have not been sufficiently collected at this stage. Activities of the school cooperative associations complete the standard education of children, generally by artistic activities, or gardening. These school associations are free to identify a study theme or an activity.

### **2.5.2 Place of Women in Society**

The role of women in household seems to be essential for daily waste handling, and depositing the waste bin for collection. Their role is also important in the education of children, and in quarter associations.

Illiteracy rate of women in 1991 was 68% in total, against 40% for men. In urban area, this rate is 49% against 24% for men. Literacy rate of women as household keepers in urban areas is 11,4% in 1991 against 57,4% for men. However, 61% of these literate women are between 25 and 44 years old. 66% of the housekeepers women have no any school degree.

### **2.5.3 Education levels**

The rate of children and youngs (5 to 19 years old) going to school in urban area was an average of 64,2% in 1982 (58,9% for girls). Schooling rate of 7-13 years old children at primary school was 81% in urban area and 41% in rural area (1991). The number of students in national institutes was about 9000 persons in 1994-95, while the number of university students was about 225,000 for the same period. Illiteracy rate in 1991 was 55% in total, but 37% in urban area and 72% in rural area. More data are needed to understand the situation of education in Morocco (% of the total of pupils and students).

### **2.5.4 School Education System**

General structure of the public school system was as follows in 1989-90: Primary school 58%, secondary school 37%, and university 5%.

There are 5 basic courses provided at secondary school (1st and 2nd cycles), which are history / geography, natural sciences, arab, french, and islamic education. These courses are completed by activities within associations or clubs.

### **2.5.5 Hygiene Education**

Hygiene at school is covering body hygiene, alimentary hygiene, and environmental hygiene. Teaching is integrated in the normal courses. Actions can be required upon decision of the school director. A typical action is the obligation for pupils to volunteer one day time per trimester for cleaning of the school and its neighbourhood.

### **2.5.6 Media Coverage**

Within the context of high illiteracy rate, television and radio are an important tool of communication countrywide. No data have been collected about the rate of households having television or the rate of population covered by the transmission system. It seems however that there are big social and geographical discrepancies.

It seems that equipment for video tapes is generally available at schools. It is not sure that associations have got such equipment. More information is needed to identify this point.

## **2.6. Government Structure**

As in any democracy, Morocco has a government structure divided into three branches: executive, legislative and judiciary. Morocco is a kingdom, the executive power belongs to the King and his Ministers. The Prime Minister is nominated by the King and is responsible before the King and the Parliament (articles 24 and 59 of the Constitution), Ministers are nominated also by the King on proposal of the Prime Minister. The Parliament votes the laws (article 44 of the Constitution), it receives its mandat from the Moroccan Nation and its members are elected by the citizens. The Parliament is the only national elected assembly. The Judiciary power is independant from the legislative power and executive power (article 90 of the constitution).

The government structure has a central component which is the central government, and a decentralised component composed of various levels of local governments. SWM involves all levels of the government structure, as will be shown in the present chapter.

### **2.6.1 Delegation and Local Government**

Morocco is one of the largest country in Africa, with a long history, and with a strong regional tradition. Consequently a centralised structure of government is not convenient. After the decolonization and a transitory period necessary for a new administration to be installed, decentralisation of government has been progressively established during the last 20 years. The first step was the 1963 law establishing the organisation of prefectures. The second step was the 1976 law on communes and urban communities at the local level. We will give a short description of the three local government levels : the communes, the prefecture or provincial assemblies, and the regions.

## **1) Commune**

### **a. Definition**

The basic administrative unit is the commune. The whole territory of Morocco is divided into 1,546 communes, of which 248 are urban communes and 1,298 are rural communes (according to information provided by MoI 16/02/96). Communes may be divided in douars. There are 38,000 douars in Morocco. Douars are social units but not administrative ones. The average area covered by a rural commune is 800 km<sup>2</sup>. This is much larger than a French commune, as the Moroccan territory is larger and has less communes (French communes number 32,000). Some rural communes are larger than Belgium.

The 1976 Law does not give a definition of the commune. It says there are urban and rural communes. There are no precise criteria to distinguish between urban and rural communes. Accordingly this distinction is decided by the central power which can create new communes by decree. We can say that urban communes are composed of urban centres and rural communes are rather composed of rural area where there are no major concentrations of population.

In terms of the electoral system, power and responsibility of local government, definition of competence, independence of resources, urban and rural communes are essentially equal. There are only two differences : urban planning legislation which applies only to urban communes and the power to levy urban taxes.

There is a transitional stage between urban and rural commune, namely the « delimited urban centre ». These centres are composed of a growing population, and are created by decree by the central government. Presently one hundred delimited urban centres are identified. Once delimited, these centres can have an urban plan and raise urban taxes.

### **b. Election of Commune Assembly and Executive Team**

Members of the commune assembly are directly elected by the electors of the commune and remain in office for 6 years. The commune assembly is composed of a minimum number of 11 members for communes with a population of less than 7,000 inhabitants to a maximum of 49 members for a commune with a population of more than 100,000 inhabitants. The commune assembly elects one president and a certain number of vice presidents (2 to 7 according to the commune population). The President and the Vice Presidents constitute the executive team which is in charge of the executive power of the commune.

### **c. Attributions of the Commune and its Executive Team**

The President of the executive team is responsible for all communal services : urban planning, streets lights, social office, cultural office, distribution of water, sewage, health office (B.M.H.), organisation of markets, education, information, and SWM. The President is the chef for all communal personnel. He recruits commune staff on the basis of special procedures and on terms and conditions similar for central government employees. Officers are also nominated according to this principle by the President.

The budget plan of the commune, and consequently the SWM budget, is voted by the assembly, which has also to give its agreement on the financial statement prepared by the President and the executive team. But according to Article 31 of the 1976 law for financial loans and before giving the guarantee of the commune administrative authority has to be obtained. Concerning public health expenditures the central government has to approve communal decisions, which means that the former is in a position to give guidelines to the latter for SWM.

Regarding SWM the commune is able to create and organize public services, mixed capital companies, public corporations, and give concessions. Article 30 of the 1976 law says that the executive team is able to commit the commune into mixed and/or inter-communal companies.

#### d. Urban Communities

We have seen that communes are able to organize inter-communal companies. In the September 30, 1976 Dahir the Urban Communities of Casablanca and Rabat were created. These Urban Communities can operate in 13 sectors, among which is « collection of household waste from a central point of loading settled by the Urban Community ». This is to say that the Urban Community is responsible for waste of the communes from the transfer station to the disposal site.

The Urban Community is ruled by an assembly, which is composed of the executive team of each commune of the Urban Community. This assembly elects a President who is assisted by an executive team composed of one vice president for each commune. The President can give any vice president a special responsibility, for example SWM.

The Urban Community has its own budget. This budget is financed by 50 % of the residential tax, others taxes recovered directly by the Urban Community like the wholesale market tax, and income from its properties.

Today there are 14 Urban Communities.

**Table 2.6-1 Urban Communities and Budget**

Urban Communities	Number of Communes	1995 Budget
Agadir	2	29 092 000 DH
Casablanca	22	383 005 000 DH
Fes	5	69 504 000 DH
Kenitra	2	31 208 700 DH
Marrakech	4	66 377 200 DH
Méknes	4	32 328 400 DH
Oujda	3	23 848 600 DH
Rabat	5	102 539 000 DH
Safi	3	34 838 400 DH
Salé	3	22 995 200 DH
Tanger	3	36 286 700 DH
Taza	2	9 551 600 DH
Temara	2	9 042 600 DH
Tetouan	2	28 334 700 DH

After the commune the next local government in the decentralised structure is prefecture or provincial assembly.

## **2) Prefecture or Provincial Assembly.**

The whole Moroccan territory is divided into 22 Prefectures and 43 Provinces. There is no major difference between the Prefecture and the Province. Prefectures are in urban areas, and Provinces also include rural areas. Following is the procedure for the election of prefecture and provincial assemblies election, and their responsibilities.

### **a. Prefecture and Provincial Assembly Elections**

The members of these assemblies are elected by two colleges. One is represented by the members of communal assemblies. The second is represented by professional organisations and associations such as: commerce and industry association, agriculture association, and artisan association. The number of members of these assemblies is decided according to the population of the prefecture or the province. The minimum number is 11 for less than 300,000 inhabitants, up to 31 members for 3,000,000 or more inhabitants.

### **b. Attribution and Responsibility**

A president is elected by the members of the assembly. He has to chair the discussions and decisions of the assembly, but he is not in charge of the executive, which is the responsibility of the central government representative, the Governor.

The main responsibility of the Prefecture and/or provincial assembly is to vote the budget of the prefecture and/or the province (1963 Dahir, and the royal decree March 18, 1966). The assembly may issue advice when it is consulted by ministries or on its own initiative through the Ministry of Interior

### **c. Income of Prefecture and Province**

90 % of the income is represented by TVA. The last 10 % is given by 4 taxes : driving license, hunting license, fishing license, and forest revenue.

## **3) Region**

The third level of local government is the Region. In 1971 7 Regions have been created. We will see the definition of the Region, its consultative assembly and the future status of this important decentralised level.

**Table 2.6-2 Description of Regions in Morocco**

Name of Region	Number of Prefectures	Number of Provinces
South	2	12
Tensift	3	5
Centre	8	6
North West	3	7
Centre North	3	5
Oriental	1	4
Centre South	2	4
<b>TOTAL</b>	<b>22</b>	<b>43</b>

**a. Definition**

In 1971, 7 economic Regions were created. But so far they have had no responsibility for local government. The modification introduced in 1992 gives more power to the Region, creating a regional assembly and a strong economic development program. In fact the objectives of the Regions is to develop decentralised centres and to narrow the economic gap between rich and poor regions.

**b. Regional Assembly**

One Region is composed by a number of some prefectures and provinces (see the table above). A region has a Regional Consultative Assembly comprised of representatives of each prefecture and province. Each prefecture and/or province sends his President and 5 members of its prefectural or provincial assembly to the regional one. The Presidency of the Regional Assembly revolves among presidents of participating prefectures and provinces, and change each year. The head office of the region is the prefecture or the provincial head office of the Governor currently in charge of the region. Accordingly the General Secretary of the region is the governor of the city where the head office of the region is located.

**c. Future Status of Regions**

The present evolution of the Region's status is a major aspect of the on going decentralisation program. The region is becoming an essential level of local government, as it is a basic element for local economic development.

Creation of this new structure will affect SWM, as only two CRE (Comités régionaux de l'Environnement) have been implemented until now. CRE will help the Ministry of Environment in its regional actions and information in this sector.

Involvement of local governments in SWM will be analysed in Section 5.1.1. Municipal Solid Waste Management, Institution and Organisation. However a summary of the present situation is presented in the following table :

**4) Involvement of Local Government in SWM**

The following table show types of SWM services and responsible bodies



**Table 2.6-3 SWM Services and Responsible Bodies**

Local Government	SWM	Comments
Commune	Waste Collection and Transport	There is no law giving obligation to the Commune to collect waste
Commune	Sweeping and Street Washing	ditto
Commune	Disposal	Environmental Control on Disposal belong to the Commune
Commune	Control on Establishments classified as potentially Hazardous, i.e. belonging to Classes 1 and 2 <sup>1</sup>	see section 5.1. Municipal Solid Waste Management
Commune	Health Regulations	ditto
Commune	Sewage	ditto
Commune	Administrative Police for Hygiene and Health	ditto
Urban Community	Transfer Stations and Disposal	ditto
prefecture/province /Wilaya	Hygiene and Health Control	see part 2.6.2. Administrative Structure
Ministry of Public Works	Control on Establishments classified as potentially Hazardous, i.e. belonging to Class 1 <sup>2</sup>	ditto

To have a complete view of the government structure we will now analyse the administrative organisation.

### 2.6.2. Deconcentration and Administrative Structure

The local administration represents at different levels the central government and the executive power. The following table gives the administrative structure according to geographical subdivisions.

<sup>1</sup> Establishment classified as potentially hazardous

<sup>2</sup> Establishment classified as potentially hazardous

**Table 2.6-4 Government Administration Structures**

	Administration Structure	Head of Administration Level
Kingdom of Morocco	Central Government and Ministries	His Majesty and the Prime Minister
Region		
	Wilaya	Wali
Prefecture/Province	Prefecture and Province Services	Governor
Commune		
	Urban District/Circle	Chef of District or Circle
	Arrondissement/Caïdat	Caïd and Chef of Arrondissement

This table needs some explanation concerning subdivisions of communes, function of prefectures and provinces, and the wilayas.

### 1) Commune

Urban communes are divided into urban districts, which are themselves divided into arrondissements. There are 83 urban districts and 392 arrondissements. Rural communes are divided into circles, which are also divided into caïdats. There are 159 circles and 505 caïdats. These subdivisions have an administrative scope that allows them to be closer to the citizens. In urban communes, districts or arrondissements can play a part as a subdivision for street sweeping and washing.

### 2) Prefectures and Provinces

Prefectures and provinces are the basic structure of the Moroccan administration. The Governor is the representative of the King at the provincial or prefectural level. He has delegated authority from the central government. He is head of all the services decentralised from the ministries of Rabat. As the representative of the Ministry of Interior he is the ruler of the communes, and he has overall control of their decisions.

### 3) Wilaya

The Wilaya is a group of prefectures co-ordinated by a Wali, who is the Governor of one of the Prefectures. There are 9 Wilayas concerning 9 urban agglomeration : Agadir, Casablanca, Fes, Laayoune, Marrackech, Meknes, Oujda, Rabat, Tetouan. Tanger is going to become a Wilaya.

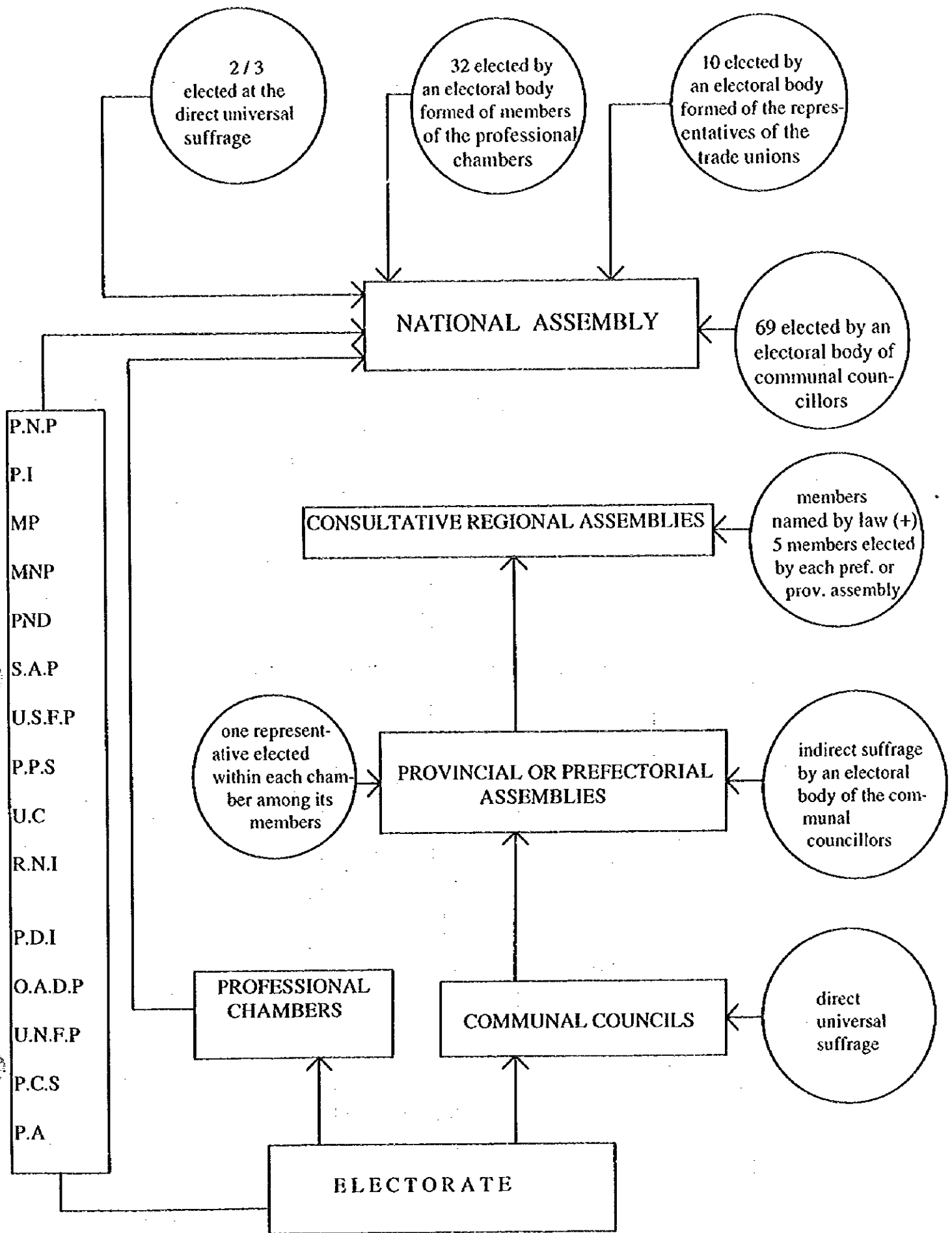


Figure 2.6-1 National and Other Assembly Systems

# ADMINISTRATIVE DIVISION OF THE KINGDOM

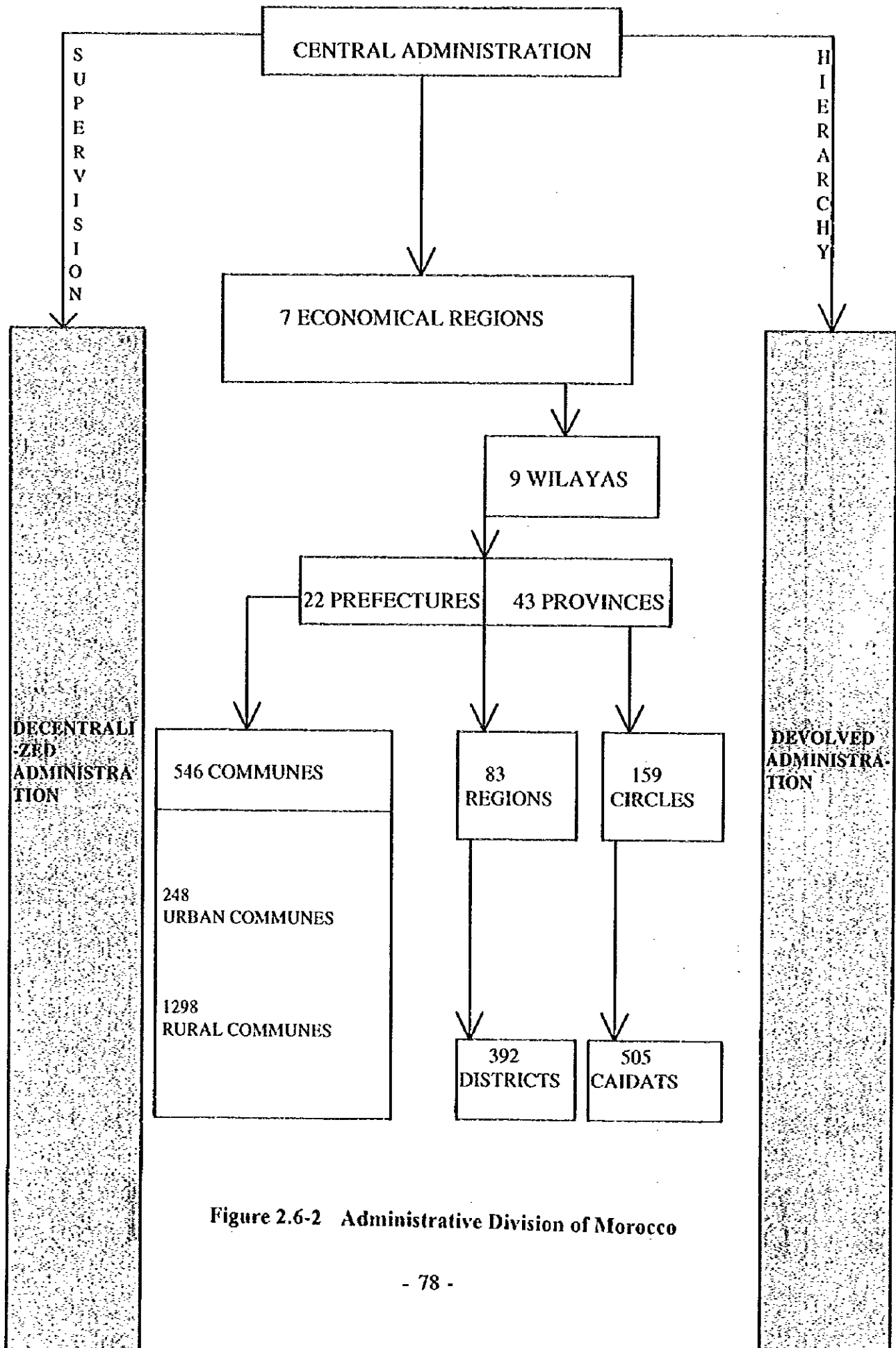


Figure 2.6-2 Administrative Division of Morocco

## **2.7. Legal System**

In this chapter we will explain the procedure for creation of laws and regulations, and will compare the scope of matters covered by laws and regulations.

### **2.7.1 Creation of Laws and Regulations**

Except for the procedures of the Parliament settled by an organic law, and by internal Parliamentary regulations, other phases of creation of legal texts and regulatory procedures are only ruled by use.

We will describe;

1. procedure to create laws,
2. procedure to create regulation, and
3. comments.

#### **1) Procedure to Create Laws**

The Prime Minister, other ministries, and the Parliament may all initiate laws (article 51 of the Constitution). In fact, legislative initiatives are often taken by one or several members of ministerial division. A first draft is written and sent to the General Secretary of Government with a note of explanation of the scope of the project.

This first draft is analyzed by the Legislative Service of this division. If there is no major juridical obstacle, it is presented to all the government members. On this occasion the different ministries and public bodies concerned are informed of the project. Their comments, if any, are sent to the General Secretary of Government who refers it, with his own comments, to the division in charge of the project.

With these new elements, the draft is rewritten according to the observations received. In parallel, the ministries directly involved in the project will open discussions to solve any difficulties which could arise.

One advanced or final version of the project is given to the members of the government by the same procedure. Once it is ready to be discussed in the Government's committee, the project is written down in the agenda of the future meetings. If approved it is written down in the agenda of Ministry's committee. Otherwise it is taken again since it is able to pass over this examination.

After approval of the Ministry's committee the text becomes a law project. As a law project it is submitted to the vote of the Parliament. The secretary of the Parliament submits it to a specialized commission. According to the working agenda of the Parliament and urgency given to the project by Government in agreement with the secretary of the Parliament, it is discussed and eventually modified, first by the commission then by the Parliament itself. The preparation in commission needs close collaboration with the division which has initiated the project.

When it has been voted, it is sent to His Majesty to be enacted within 30 days. It is then transmitted to the General Secretary of the Government, which is in charge of the procedure for publication in the « Bulletin Officiel ».

**Figure 2.7-1 Table Procedure to Create Laws**

Phases	Government Structure Involved	Document
Initiative of laws	Prime Minister/other Ministries/Parliament	first draft
Analysis	General Secretary of Government	first draft
Comments and discussion	Government Members	first draft
Examination	Government's Committee	advanced draft
Approval	Ministry's Committee	advanced draft
Discussion and amendments	Commission of the Parliament	law project
Vote	Parliament	law
Enactment	The King	law
Publication	General Secretary of Government « Bulletin Officiel »	law

## 2) Procedure to Create Regulations

Decree projects follow the same procedure up to the approval by Ministry's committee. They are then directly published in the « Bulletin Officiel » under the responsibility of the General Secretary of the Government.

## 3) Comments

Other minor texts, such as joint decrees and ministerial decrees, are directly prepared by the Ministers involved who sign them and then send them to the « Bulletin Officiel », care of the General Secretary of the government.

It should be noted that the General Secretary of the Government takes a major part in these procedures due to the weak juridical support in some ministerial divisions. He has also a basic coordination function. But apart from providing technical advice on texts which are submitted to him, he has no direct power.

The respective fields of laws and decrees are given by the constitution. We will now give in 2.7.2. a description of the range of topics covered by each of them.

### 2.7.2 Range of Topics Covered by Laws and by Regulations

As in the case of many democratic countries, laws are voted by the Parliament holder of the legislative power. Decrees are decided by the executive power, that is, ministries of the Government. We will now consider;

1. topics subject to laws, and
2. topics subject to regulations.

### **1) Topics Subject to Laws**

The range of topics covered by laws is given in article 45 of the constitution. Unless matters specifically allocated by other articles, the following matters are subject to laws.

- Individual and collective rights listed in the title of the constitution
- Determination of breaches and penalties applicable, criminal procedures, the civil procedures, and the creation of new categories of jurisdictions
- Status of magistrates
- General status of public service
- Electoral system of the assemblies and advisors for local governments
- Fundamental guarantees given to civil and military public employees
- System of civil and commercial responsibilities
- The creation of public establishments
- The nationalization of companies and the transfer of public companies to the private sector
- Fundamental objectives concerning economic, social and cultural actions

The financial law is also voted by the Parliament (article 49).

If a legislation on SWM is to be prepared, it will be in the form of a law.

### **2) Topics Subject to Regulations**

Matters other than those covered by laws or specially attributed to the King, are covered by regulations (article 46 of the Constitution). The prime Minister is in charge of the power of making regulation. He delegates this attribution to the ministers.

Decrees signed by the first Minister and undersigned by other ministers have to be decided in the Ministerial Committee chaired by the King.

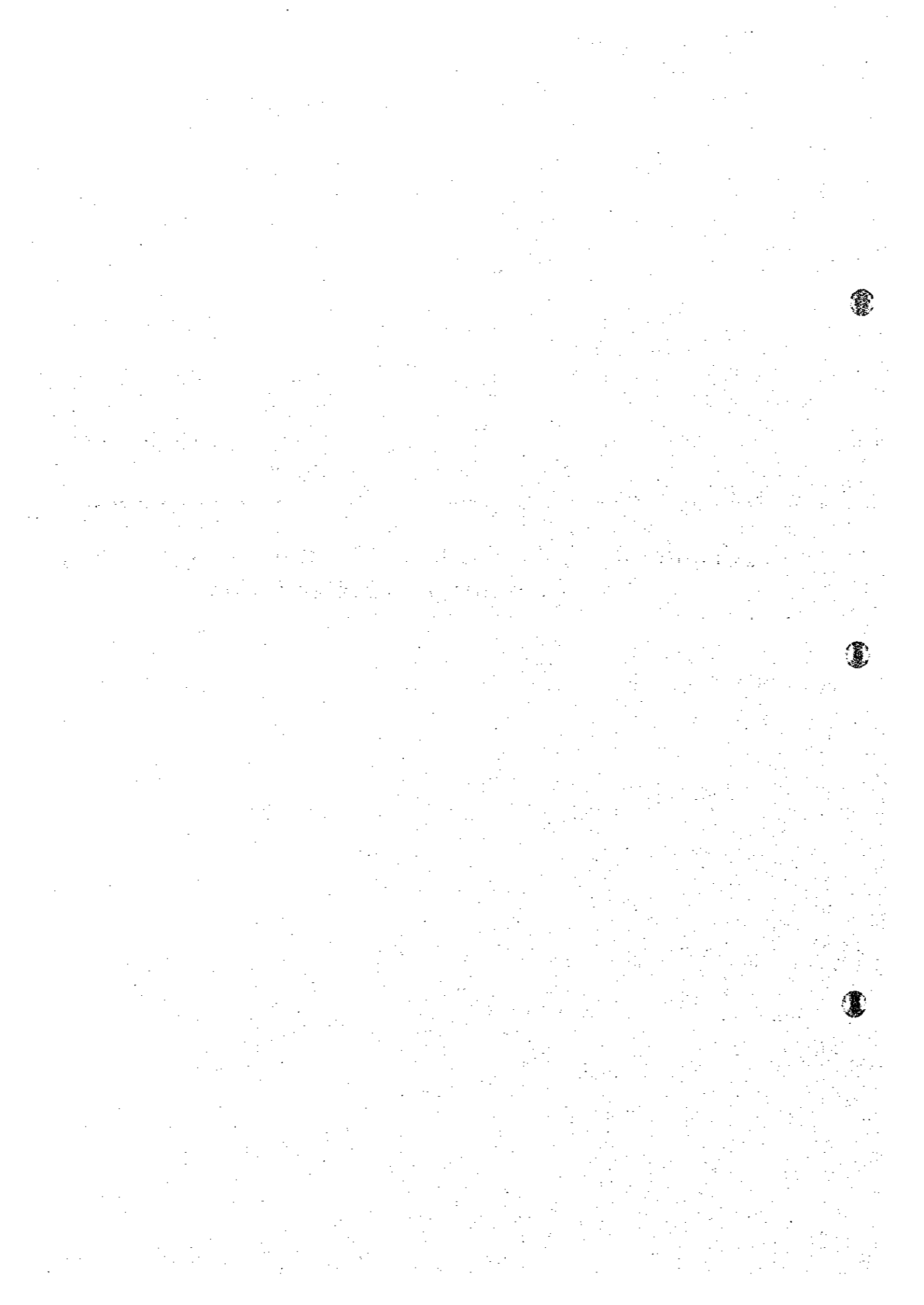
Ministers can delegate regulatory responsibilities to their subordinates. Administrative decisions are generally taken under decree form.

In section 4.2. Legislation Related to SWM, we will analyze the specific legislation related to SWM.





**Chapter 3    Solid Waste and Its Impact on  
Environment and Sanitation**



## CHAPTER 3    **SOLID WASTE AND ITS IMPACT ON ENVIRONMENT AND SANITATION**

### **3.1    Solid Waste Management Principles**

This section will present two main themes; the SWM principles and SWM impact to the environment and sanitation.

Setting SWM principles and acceptance of them by involved people are very important to develop an appropriate SWM. This importance, however, is not understood by many people involved in SWM in Morocco, and can not be overemphasized.

Diagnosis of the current SWM conditions should be carried out in view of the SWM principles.

In the discussion on SWM impact to the environment and sanitation, each activity component of SWM is commented from environmental and sanitation points of view. These comments are to be used when studying the future SWM and its respective components.

#### **3.1.1    The Fundamental Objectives of SWM**

Being defined as "anything useless generated by human or business activities," waste is kept away from humans willingly. And nobody pays attention to where the waste is hauled or what effect it may produce. The waste not properly disposed of may negatively affect the environment and human health. Therefore, in order to avoid such negative effects, SWM must be taken into consideration of everybody.

The first principle of SWM is **to maintain the sanitary living environment**. This is based on an idea that everybody should be in safe from a threat to their health. Socially weak people, such as the poor and those who have less chance of choosing a lifestyle, are not covered sufficiently with waste collection. A disposal site itself is often located near such people. Living without proper waste collection means that their health are threatened by the waste that is not collected.

The second principle of SWM is **to reduce pollution loads to the environment, and to prevent and to protect the environment from pollution**. It has been recognized in the past 20 to 30 years that maintaining sanitation is not enough for achieving human welfare. Namely, non-proper treatment of waste may negatively affect human health by polluting the environment; such environmental degradation may bring social inconvenience; and eventually it may disturb the sustainable development of the society. Moreover, the aggravated environment is a threat to maintaining the biodiversity.

Non-proper waste treatment may negatively affect human health indirectly by polluting underground water, rivers, and sea areas. The health risks increase through people's such activities such as drinking contaminated water; breathing in gasses generated when the waste is vaporized; and eating seafood in which hazardous waste has been accumulated and concentrated. In order for reducing such risks, the pollution loads to the environment must be minimized.

The third principle of SWM is to support the sustainable development. The environmental degradation caused by non-proper waste treatment limits the national economic growth and makes development not sustainable. Especially in Morocco, precious water resources are contaminated by the waste.

The SWM cost (needed to prevent health and environmental damage) is much less than the cost of damage (a cost needed to cure the damage). Environmental degradation prevents efficient use of resources, and keeps away financial resources that could be invested to the new development. In Morocco where fishery industry is very important, the nation's economy can be damaged seriously, if the sea areas are polluted.

These three principles are included in Agenda 21, to which Morocco has signed at the Earth Summit held in Rio de Janeiro in 1992. The ideas have been also taken into a report National Strategy for Environment Protection and Sustainable Development issued in May, 1995.

The above-explained principles will be well taken into consideration in the current study, especially when evaluating the current SWM conditions, and making recognition.

### **3.1.2 Points Considered for Evaluation SWM**

The following points are considered in the evaluation and diagnosis of SWM.

#### **1) Household Waste and Other Similar Waste**

##### **a. Storing Waste by Households**

In order for maintaining a household sanitation, it is necessary to remove waste before house flies' eggs are hatched (normally 7 days in the summer time), and to store the waste in containers that will not attract any cockroaches, rats, and other noxious creatures.

##### **b. Collection and Haulage**

From sanitation view points, the followings are to be done; waste collection at least once a week, non acceptance (collection) of waste not put in a container or waste left before or after the designated collection time especially if waste is placed on curbside.

Also the followings are to be taken into consideration; minimizing nuisance to neighboring areas, such as noise and emission gas; avoiding spilled water from waste bags or containers on the street; and preventing waste scattering during haulage.

##### **c. Treatment of Waste**

Although composting and incinerating waste are done for stabilizing (neutralizing) waste and are favorable from the environmental point of view, they may produce secondary impacts on the environment.

Recently, composting general household waste is not considered feasible because of mixed hazardous waste in the household waste. Heavy metals can be mixed into household waste, and no household waste is free from containing hazardous waste, such as dry batteries and thermometers. As an income level of the people in a given area increases, general household waste would contain increasing amount of hazardous substances. The substances from such waste may intervene crops to grow, and may accumulate in crops. Many attempts of composing have been in failure because of the mixed hazardous substances in the waste.

Also composting plant may annoy the neighboring area with bad smells and other nonsanitary effects. Even with an environmentally sound plant, operation of the plant would cause a fly problem and bad smells, which the Moroccan composting plants have already experienced.

Incineration of waste, while there are no incinerators in Morocco, may negatively affect the environment with combustion gas. The gas contains hazardous substances such as NO<sub>x</sub> and hydrogen chloride. Tiny amounts of hazardous gases such as dioxin are also generated in the incineration process. These hazardous substances generated by waste incineration have lead to a hot discussion on justifying incineration. If the gas is treated properly, the risks to which the gas exposes human health will be less than  $10^{-6}$ .

In the process of combustion, heavy metals in waste are usually concentrated in the fly ashes that are collected after ash treatment. Especially when the fly ashes contains lead, copper, and zinc, landfilling will call for extra attention.

Intermediate treatment facilities may cause nuisance to the neighboring areas. Noise, vibration, bad smells, etc. will be problematic. If collection trucks passes through the street along residential areas, the trucks may degrade the comfortable environment of the areas.

#### **d. Disposal**

Landfilling is the most widely introduced method to dispose of municipal waste. The followings are necessary for landfilling from sanitation points of view. First, landfilling sites should be located at least 500m away from residential areas. Second, cover soil should be applied regularly to prevent flies and smokes. Third, the site should be restricted to trespassing people and animals. In case that underground water is drunken near the site, or that leachate drains in near the water intake facility of tap water, the location of the site should be altered.

From the environmental points of view, leachate is the major pollution problem at landfilling sites. Leachate is generated from water contents of the waste or its dissolution. It may pollute the underground water and rivers. It contains a high density BOD and is colored in black. It should be well noticed that hazardous metals in the waste can leak in the leachate after the metals are oxidized by organic acids in the leachate. Heavy metals do not penetrate to the underground water because they are trapped in the soil after making reactions with cation within the soil.

Extra cautions must be given to underground water pollution, when waste oil or organic solution are disposed of. They can penetrate into even the clay layer, whose infiltration coefficient is low, and can pollute the underground water.

In order to avoid these pollution problems, a proper engineering must be employed for landfilling.

Methane gas, which is one of problematic greenhouse gasses, is generated at disposal sites after anaerobic decomposition of waste. This may cause gas explosions in basements of residential houses built afterwards on the postclosure sites. In order to avoid this kind of accidents, a proper engineering must be employed in SWM.

#### **e. Recycling**

Recycling is desirable for resource saving and for the global environment protection. SWM should be supportive to the recycling activity as long as it is feasible from the socio-economical view point.

#### **2) Industrial Waste and Waste to be Treated Specially**

Industrial waste brings the same kind of environmental and sanitation problems to SWM as municipal waste does. Among those problems, hazardous waste breaking into the environment should be notified strongly. Hazardous waste can take various ways to be in the environment; for example, the one from factories to rivers and underground water, and the one at disposal site into underground water, rivers, and soils.

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

#### **3) Hospital Waste**

Among hospital wastes, infectious waste contaminated with B type hepatitis and AIDS virus creates a sensitive issue. This kind of waste must be sterilized inside the hospitals before taken away, or treated properly at treatment facilities outside hospitals.

### **3.2 Current Waste Generation**

#### **3.2.1 Municipal Waste**

##### **1) Municipal Waste Amount**

The municipal waste is generated from homes, offices, schools, stores, roads sweeping, gardens, etc. and is classified into domestic, institutional, commercial, street sweeping, and yard wastes. Amount generated by each waste type is estimated using the unit generation rates for that type.

Unit generation rates may be obtained by recording the weight of collected wastes by type over a period of time and knowing the characteristics of the waste generators, such

as population, commercial floor space, etc. Waste volume collected may also be used but degree of accuracy will be less because of the changes in density of the waste.

Unfortunately in Morocco the waste is seldom classified by type and truck scales are hardly used at the disposal sites. Therefore all figures on unit generation rates described in past study reports are based on estimates of the collection vehicle fleets capacities and service coverage rates, and the experience of other cities. Many of these studies, conducted during the last 4 or 5 years were not clear as to the basis of their estimates, and figures varied greatly by population.

In order to produce an estimate for the waste amount at this time the figures in the reports prepared by the Ministry of Environment<sup>3.2-1</sup>, ICMA/USAID<sup>3.2-2</sup>, Ministry of Environment/Wilayat Rabat<sup>3.2-3</sup>, and World Bank<sup>3.2-4</sup> were studied and the waste amount for municipal solid waste generated by the urban population in 1995 was estimated as shown in Table 3.2-1. Both urban and rural populations were estimated for 1995, by using the figures for 1994 and adjusting with the growth rates of the 1982-1994 period, as shown in Chapter 2, section 2.3 of this report.

**Table 3.2-1 MSW Amount generated in 1995 by the Urban Population**

Number of Prefectures	Urban population in 1995	Unit generation rate (kg/cap/d)	Waste amount (ton/d)
<b>A. Prefectures with populations above 500,000</b>			
9	9,120,261	0.8	7,296
<b>B. Prefectures with populations of 100,000 to 500,000</b>			
17	3,828,029	0.7	2,680
<b>C. Prefectures with populations of less than 100,000</b>			
15	784,289	0.6	471
Total	13,732,579		10,446

The rural population, estimated at 12,742,866 in 1995 accounts for 48% of the total population. As the average monthly incomes earned by the rural workers is 0.55 of that earned by the urban workers<sup>3.2-5</sup>, the solid waste unit generation rates in such areas are expected to be less than that of urban areas by a similar ratio. The rate of 0.4 kg/cap/day was adopted and the waste amount produced by the rural population in 1995 is estimated to be 5,097 ton/day.

Therefore the total daily municipal solid waste generated in Morocco in 1995 is estimated at 15,543 tons (5,670 thousand tons annually).

## 2) Municipal Waste Composition

The following table 3.2-2 shows the composition of municipal solid waste as reported in three studies.

**Table 3.2-2 Municipal Solid Waste Composition**

Material	Unit: %		
	MOE study <sup>3.2.1</sup> Typical Moroccan waste	ICMA/USAID study <sup>3.2.2</sup> Meknes, Azrou and Sefrou	MOE/Wilaya Rabat <sup>3.2.3</sup> Rabat
Paper	18 - 20	15 - 25	13.9
Glass	-	3 - 5	0.4
Aluminum, metal	-	1 - 3	2.3
Textiles	-	1 - 3	3.2
Bones	-	1 - 3	-
Wood	-	2 - 3	1.0
Plastic	2	3 - 5	6.3
Organic matter (food waste)	65 - 70	50 - 70	71.8
Inert fines	-	5 - 7	-
Rubber/leather	-	1	1.0
Total	85 - 92	79 - 125	99.9

The estimates of these studies are close. Again it is not clear how these results were reached and to what degree analysis was conducted, or reference was made to existing studies. The Moroccan waste obviously contains a high degree of organic waste follows by plastic.

Past studies also agree that the moisture content falls between 65 to 70% and the bulk density is in the range of 0.4 t/m<sup>3</sup>. However both figures are rather high.

### 3.2.2 Industrial Waste

The industrial waste amount was estimated to be 800,000 tons per year in 1992<sup>3.2.6</sup>, broken down by industry as shown in the following Table 3.2-3. No detailed information as to the composition of the waste, or the process of breaking down the waste by industry type are available.

**Table 3.2-3 Industrial Waste Amount by Industry Classification**

Industry	Unit: Tons per year	
	Waste amount (tons)	Share of total (%)
1. Food industries	500,000	62.5%
2. Textiles and leather	35,000	4.4%
3. Chemicals and parachemicals	145,000	18.1%
4. Mechanical, mining and electric	100,000	12.5%
5. Others	20,000	2.5%
Total	800,000	100.0%

The estimated amount of 800,000 ton/year is very low when compared to the municipal waste amount generated. At present sludge generated in the industrial process is discharged directly into the sewage system or water bodies without any treatment. Therefore sludge is not included in the above figures which may explain the low amount



estimated.

Production of each of the above sectors for the years 1992 to 1994, in million Dirhams was obtained from the statistical year book for 1995. Taking broad assumptions that the waste generation will grow in the same rate as the growth in production, and that growth in 1995 will be the same as that for 1993/1994, industrial waste amount produced in 1995 may be roughly estimated as shown in Table 3.2-4.

**Table 3.2-4 Industrial Waste Amount Estimation in 1995**

Industry Type	Production (mill. DR)			Unit: Tons per year	
	1992	1993	1994	1994	1995
1. Food industries	37,951	40,481	42,827	564,200	596,900
2. Text. & Leather	20,411	20,667	21,838	37,500	39,600
3. Chemical & parachm.	35,719	37,690	39,319	159,600	166,500
4. Mech., Mining & Electric	20,506	18,517	19,960	97,300	104,900
5. Other	112	109	118	21,100	22,800
<b>Total</b>	<b>114,699</b>	<b>117,464</b>	<b>124,062</b>	<b>879,700</b>	<b>930,700</b>

Therefore the estimated industrial waste amount in 1995, of 930,700 tons increased by 1.16 times the amount of 1992. It is however necessary to note that a detailed data base is required in order to accurately estimate the industrial waste amounts generated and characteristics of that waste.

### 3.2.3 Hospital Waste

The hospital waste generated in Morocco has been estimated by the "National Committee for Hospital Waste" in a letter addressed to the Minister of Public Health in 1995.

The paper estimates the generated hospital waste as shown in Table 3.2-5.

**Table 3.2-5 Hospital Waste Amount**

Item	Unit	Amount
1. Average unit generation rate	Kg/bed/day	3.0
2. Number of beds	bed	35,000
3. Total annual generated waste	ton/year	38,325
4. Distribution of generated waste		
4.1. Domestic waste	(%)	55%
4.2. Contaminated & hazardous waste	(%)	45%

### List of Reports/Studies Referred to in this Section

- 3.2-1 National Strategy for Environment Protection and Sustainable Development, 1995/5, PNUD/UNESCO/Min. of Environment
- 3.2-2 Preliminary Assessment of SWM Systems in Meknes, Azrou and Sefrou, 1995/7, ICMA/USAID
- 3.2-3 Local Monograph of Rabat's Environment, 1995/10, Min. of

Environment/Wilaya Rabat

- 3.2-4 Draft Field Report; SWM in Fez, Morocco, 1995/6, World Bank
- 3.2-5 Kingdom of Morocco; Poverty, Adjustment and Growth, 1994, World Bank
- 3.2-6 Situation of Industrial Wastes, 1994/8, Min. of Commerce and Industry

### **3.3 Future Waste Generation and Target Waste Collection**

#### **3.3.1 Future Waste Generation**

##### **1) Municipal Waste**

The current municipal waste generation in 1995 is estimated to be approximately 15,500 ton/day, of which the urban waste is 10,400 ton/day and the rural waste is 5,100 ton/day. (see Section 3.2 for method of estimation.)

##### **a. Waste Generation Growth Rate**

It is projected that the municipal waste quantity will grow at 3 percent per year through the year 2020 assuming that annual 4 % economic growth would be maintained throughout the year.

Key factors affecting future municipal waste generation quantity are the increase in individual disposal income growth and the population growth. These 2 factors contribute to the economic growth of the nation. Therefore, the economic growth is the most important factor affecting waste generation quantity.

Municipal waste generation growth is normally smaller than the economic growth rate because the growth of non-material elements (services) is normally faster than the material elements growth.

This situation is obvious if we compare the per capita municipal waste generation of European countries which is about 1 kg/capita/day only, while the corresponding quantity in typical developing countries is 0.5 kg/capita/day although the per capita income difference between the Europe and typical developing countries is 10 times or more.

**Remark:** Municipal waste is waste collected under the responsibility of municipality. It includes not only household waste but also some commercial, market and other waste.

The Japanese experience between 1965 and 1985 shows that the annual average municipal waste generation growth was 3 %/year, which is about 70 % of the annual average economic growth (4.3 %/year). In general, this coefficient would be larger when the income level of the nation is lower.

For this Study, the coefficient of 0.75 is assumed, i.e. annual average municipal waste generation growth is assumed to be 3 %, which is 75 % of the annual average economic growth of 4 % assumed for this Study.

## **b. Urban and Rural Waste**

For this Study, it is assumed that the current rural waste generation quantity is 5,100 ton/day, and throughout the period, the rural waste will grow at an average of 2.5 %/year, 75 % of the assumed economic growth of 3.33 %/year in rural area. The economic growth of 3.33 % was assumed considering that 1) the average annual growth rate of rural population during the same period is 1.44 %/year according to the projection shown in *Demographic Studies - Population and Employment* issued by Ministry of Economic and Social Affairs in 1992, 2) however, actual growth will be less than the projection as a result of unregistered migration from rural to urban areas, and 3) there will be per capita income growth of about 2 %.

It is important to note that many rural areas will become urban areas as a result of population growth, then the whole population in former rural areas will be re-recorded as urban population.

The future municipal waste generation quantity in urban areas is then estimated by deducting the rural waste from the whole municipal waste generation quantity in Morocco. Over the 25 years from 1995 to 2020, it is projected that the municipal waste in urban areas will increase by 2.2 times with an annual average growth rate of about 3.3 %. Projection of daily municipal waste generation during the period 1995 - 2020 is shown in Table 3.3-1 and Fig. 3.3-1.

## **2) Industrial Waste**

### **a. Factors Affecting Increases of Industrial Waste Generation**

There are 2 important factors affecting industrial waste generation quantity that need to be managed, i.e.

1. economic growth
2. enforcement of a law concerning industrial waste and accompanying changes in definition of industrial waste

In Japan, the current industrial waste generation quantity is 400 million ton per year, 8 times larger than the current municipal waste generation quantity of 50 million per year. In France, industrial waste generation is 56 million ton/year, 2.3 times larger than the municipal waste generation of 24 million ton/year.

In Morocco, the current industrial waste generation is estimated to be 0.93 million ton/year, which is about 16 % of the estimated municipal waste generation of 5.67 million ton/year.

The Moroccan industrial solid waste of 0.93 million ton/year is mainly solid waste generated from manufacturing. In Japan, large part of the industrial solid waste are sewage sludge (generated from effluent treatment), demolition waste (generated as result of building demolition and construction). These waste are specified as industrial waste by law.

It is anticipated that that a similar situation may occur in Morocco as a result of further industrialization and enforcement of a law concerning industrial waste management.

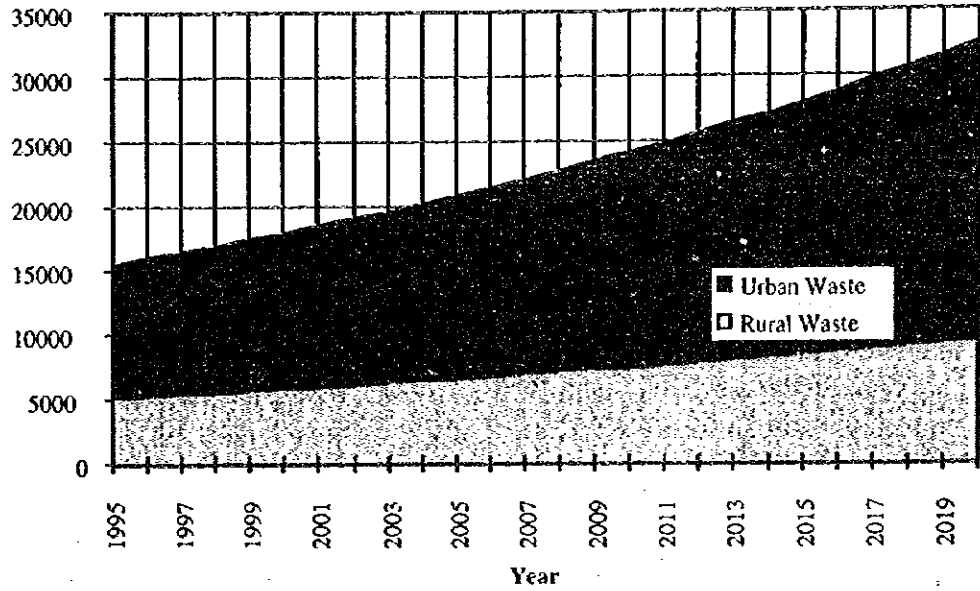
As a result, for this Study, the following scenario was assumed, i.e. the industrial waste will grow at the same rate as the economic growth (4 %/year) during the period 1995 - 2000, and will grow at 20 %/year during 2000 - 2010 as a result of enforcement of a law concerning industrial waste management and accompanying changes in definition of industrial waste. After 2010, it is assumed the industrial waste growth rate will be again same as the economic growth rate (4 %). As a result of this scenario, industrial waste generation in 2020 will be 10.4 million ton/year (28,400 ton/day), which is about 11 times larger than the current quantity of 0.93 million ton/year (2,600 ton/day). The projected industrial waste generation quantity of 28,400 ton/day in 2020 is still smaller than the municipal waste generation quantity of 32,500 ton/day of the same year. See Table 3.3-1 and Fig. 3.3-2.

**Table 3.3-1 Future Solid Waste Generation 1995 - 2020**

Unit: ton/day

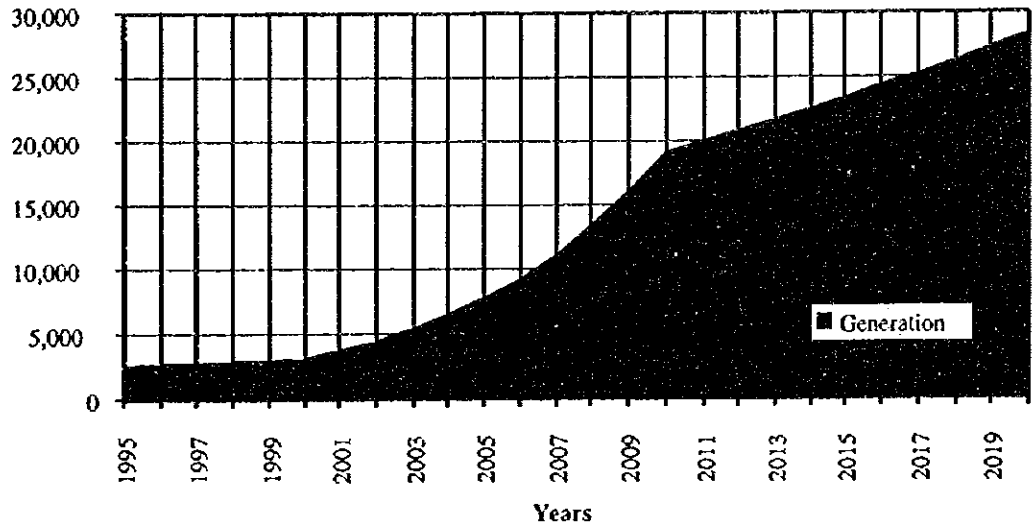
Year	Municipal Waste (Waste collected under the responsibility of communes)			Industrial Waste d	Total e (= a+d)
	Total Waste a (= b+c)	Urban Waste b (= a-c)	Rural Waste c		
1995	15,500	10,400	5,100	2,550	18,050
1996	15,965	10,738	5,228	2,652	18,617
1997	16,444	11,086	5,358	2,758	19,202
1998	16,937	11,445	5,492	2,868	19,806
1999	17,445	11,816	5,629	2,983	20,429
2000	17,969	12,199	5,770	3,102	21,071
2001	18,508	12,593	5,914	3,223	22,231
2002	19,063	13,001	6,062	4,468	23,531
2003	19,635	13,421	6,214	5,361	24,996
2004	20,224	13,855	6,369	6,433	26,657
2005	20,831	14,302	6,528	7,720	28,551
2006	21,456	14,764	6,692	9,264	30,720
2007	22,099	15,240	6,859	11,117	33,216
2008	22,762	15,732	7,030	13,340	36,102
2009	23,445	16,239	7,206	16,008	39,453
2010	24,148	16,762	7,386	19,210	43,358
2011	24,873	17,302	7,571	19,978	44,851
2012	25,619	17,859	7,760	20,777	46,396
2013	26,388	18,433	7,954	21,608	47,996
2014	27,179	19,026	8,153	22,473	49,652
2015	27,995	19,638	8,357	23,371	51,366
2016	28,835	20,269	8,566	24,306	53,141
2017	29,700	20,920	8,780	25,279	54,978
2018	30,591	21,591	9,000	26,290	56,880
2019	31,508	22,284	9,225	27,341	58,850
2020	32,454	22,998	9,455	28,435	60,889

**Municipal Waste Generation Projection  
1995 - 2020**



**Fig. 3.3-1 Municipal Waste Generation Projection 1995 - 2020**

**Industrial Waste Generation Projection  
1995 - 2020**



**Fig. 3.3-2 Industrial Waste Generation Projection 1995 - 2020**

### **3.3.2 Target Waste Collection**

#### **1) Municipal Waste**

It is assumed that 85 % of municipal waste generated in urban areas is collected at present; and in rural area, waste collection rate would be around 10 %.

In urban area, uncollected waste or illegal dumping is a source of the environmental pollution and eye sore, and may pose health risks. Solid waste dumped into drainage often block it, and may cause floods and unsanitary situation.

Although the rapid increases of urban waste is anticipated as a result of urbanization and industrialization, it is proposed that urban communes should collect 100 % of waste by the year 2020, a quarter century from now. Proposed targets of municipal waste collection in urban areas are 90 % in 2000, 95 % in 2005, and 100 % in 2020. See Table 3.3-2 and Fig. 3.3-3.

It is rather difficult to set target waste collection rates for rural areas. In principle, in future, rural communes should collect 100 % of waste generated from rural centers. It is also proposed that they should provide waste collection service for other (non-center) rural areas once a week. As a result, the rural communes would collect 50 % of generated waste by the year 2020. Proposed targets of waste collection in rural areas are 15 % in 2000, 20 % in 2005 and 50 % in 2020. See Fig. 3.3-4. Because some rural waste can be used for agriculture, 100 % collection of rural waste is not necessary.

Waste collected for recycling is included in the definition of the above collection.

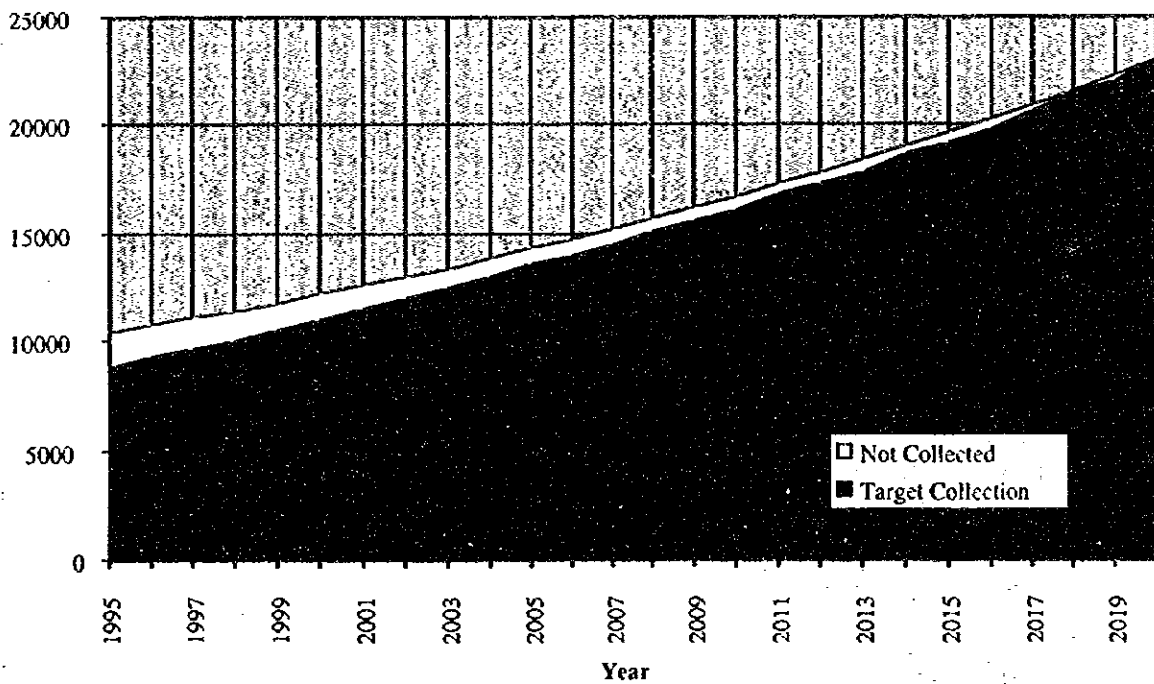
**Table 3.3-2 Target Municipal Waste Collection including Recycling 1995 - 2020**

Unit: ton/day

Year	Urban Waste			Rural Waste			Total Municipal Waste	
	Generation a (g-d)	Target Collection Rate b	Collection Quantity c (axb)	Generation d	Target Collection Rate e	Collection Quantity f (dxe)	Generation g (b+e)	Collection Quantity h (d+g)
1995	10,400	85%	8,840	5,100	10%	510	15,500	9,350
1996	10,738	86%	9,234	5,228	11%	575	15,965	9,809
1997	11,086	87%	9,645	5,358	12%	643	16,444	10,288
1998	11,445	88%	10,072	5,492	13%	714	16,937	10,786
1999	11,816	89%	10,516	5,629	14%	788	17,445	11,304
2000	12,199	90%	10,979	5,770	15%	866	17,969	11,844
2001	12,593	91%	11,460	5,914	16%	946	18,508	12,406
2002	13,001	92%	11,961	6,062	17%	1,031	19,063	12,991
2003	13,421	93%	12,482	6,214	18%	1,118	19,635	13,600
2004	13,855	94%	13,023	6,369	19%	1,210	20,224	14,234
2005	14,302	95%	13,587	6,528	20%	1,306	20,831	14,893
2006	14,764	95%	14,026	6,692	22%	1,472	21,456	15,498
2007	15,240	95%	14,478	6,859	24%	1,646	22,099	16,124
2008	15,732	96%	15,103	7,030	26%	1,828	22,762	16,930
2009	16,239	96%	15,589	7,206	28%	2,018	23,445	17,607
2010	16,762	96%	16,092	7,386	30%	2,216	24,148	18,308
2011	17,302	97%	16,783	7,571	32%	2,423	24,873	19,206

2012	17,859	97%	17,323	7,760	34%	2,638	25,619	19,962
2013	18,433	97%	17,880	7,954	36%	2,864	26,388	20,744
2014	19,026	98%	18,646	8,153	38%	3,098	27,179	21,744
2015	19,638	98%	19,245	8,357	40%	3,343	27,995	22,588
2016	20,269	98%	19,863	8,566	42%	3,598	28,835	23,461
2017	20,920	99%	20,710	8,780	44%	3,863	29,700	24,574
2018	21,591	99%	21,375	9,000	46%	4,140	30,591	25,515
2019	22,284	99%	22,061	9,225	48%	4,428	31,508	26,489
2020	22,998	100%	22,998	9,455	50%	4,728	32,454	27,726

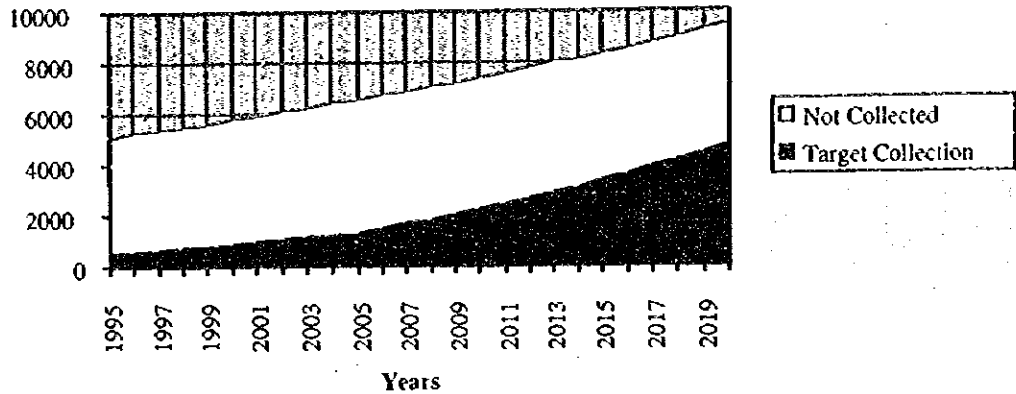
**Target Urban Waste Collection 1995 -2020**



**Fig. 3.3-3 Target Municipal Waste Collection in Urban Area 1995 - 2020**



**Target Rural Waste Collection  
1995 - 2020**



**Fig. 3.3-4 Target Rural Waste Collection in Urban Area 1995 -2020**

**2) Industrial Waste**

At present, it is estimated that only 27 % of the industrial waste is disposed of legally according to the study report *National Strategy for Environment Protection and Sustainable Development*. (Definition of legal disposal needs clarification.)

Industrial waste contains toxic waste which are harmful to the health and environment. Upon the enactment of the industrial and hazardous waste law, toxic industrial waste should be disposed of properly by methods specified by the law. It is also desirable that 100 % of waste of all types specified as industrial waste by the law should be legally disposed of within 10 years after the law enactment.

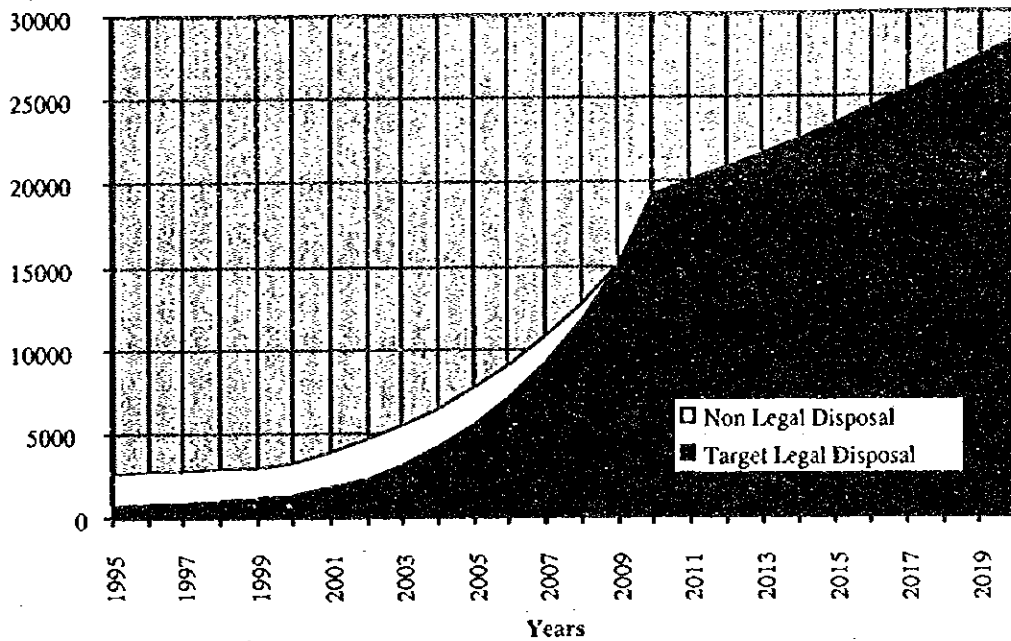
According to the above principle, proposed targets are set at 40 % in 2000, 60 % in 2005, and 100 % in 2010. As explained before, the industrial waste will increase rapidly during the period 2000 - 2010 if the enforcement of the new industrial waste law begins in 2000. The industrial enterprises will have to prepare themselves for large expenditures for disposal of industrial waste. Recycling of industrial waste is included in the target legal disposal.

**Table 3.3-3 Target Legal Disposal of Industrial Waste including Recycling 1995 - 2020**

Unit: ton/day

Year	Generation	Target Legal Disposal Rate	Legal Disposal Quantity
1995	2,550	27%	689
1996	2,652	29%	769
1997	2,758	31%	855
1998	2,868	34%	975
1999	2,983	37%	1,104
2000	3,102	40%	1,241
2001	3,723	46%	1,713
2002	4,468	52%	2,323
2003	5,361	58%	3,109
2004	6,433	64%	4,117
2005	7,720	70%	5,404
2006	9,264	76%	7,041
2007	11,117	82%	9,116
2008	13,340	88%	11,739
2009	16,008	94%	15,048
2010	19,210	100%	19,210
2011	19,978	100%	19,978
2012	20,777	100%	20,777
2013	21,608	100%	21,608
2014	22,473	100%	22,473
2015	23,371	100%	23,371
2016	24,306	100%	24,306
2017	25,279	100%	25,279
2018	26,290	100%	26,290
2019	27,341	100%	27,341
2020	28,435	100%	28,435

**Target Legal Disposal of Industrial Waste  
1995 - 2020**



**Fig. 3.3-5 Target Legal Disposal of Industrial Waste 1995 - 2020**

**3.4 Environmental and Sanitary Risks Associated with the Future Waste Generation**

**3.4.1 Urbanization and Sanitation Problems**

Urban population in Morocco has been growing continuously. It is projected to increase its share in her total population. As urbanization proceeds and urban population increases, waste generation will increase. Environmental sanitation must be maintained by removing the waste. Halting this effort means degradation of urban sanitation.

Municipality must increase SWM staff and equipment to handle this increasing amount of waste. Financial burdens will become heavier to fulfill this requirements. Due to increasing traffic jam and distant location of disposal sites, collection efficiency will decrease and this will make the burdens heavier especially in a large cities.

New disposal sites must be constructed in order to handle the increasing amount of waste. Construction cost of a disposal site will increase as a result of applying environmentally sound disposal methods. With Morocco's constrained budget, and increases of municipal waste, it will be an issue to maintain environmental sanitation for urban residents by providing regular collection service and developing sanitary disposal. (Environmental impact by disposal sites will be analyzed deeply in the interim report.)

### 3.4.2 Economic Growth and Environmental Problems

Waste generation will increase by economic growth and increasing consumption. This also means also more production , which leads to generation of more industrial waste will be generated.

Morocco is expected to open its market wider in the future, and development of manufacturing industry is projected. Labor intensive industry would be developed since the country is near the European market. Market in Morocco itself is fairly large, so European companies will possibly look for locating their factories in Morocco once the Moroccan consumption level is pulled up by economic growth.

Food, textile, and chemical industry related to phosphorus fertilizer hold more than 55% of the market share of Morocco's whole manufacturing industries. Industries related to metal and machinery will increase their share.

As the manufacturing activities grows in Morocco, they generates air pollutants, waste water, and solid waste containing various types of pollutants.

Local resident's health as well as their favorable living environment can be threatened by air pollution (SO<sub>x</sub> and particulate). Some damage has been already reported in Mohamedia.

The air pollution is a great danger to human health since people breathe in the pollution matters. In order to prevent air pollution, air pollutants should be properly treated at its generation source.

Pollution matters in waste effluent are discharged into rivers and underground water. The polluted underground water is drunken both with and without purification. The more pollution is done to water resources, the more cost it will take to supply tap water. Also, as a result of pollution in rivers and sea water, fish and shellfish, especially for a dining purpose, is problematic when heavy metals are accumulated in them.

Industrial waste brings negative impact to the environment in two ways. It can cause pollution due to not proper handling, and also due to not proper treatment at disposal sites. The latter may pollute water resources and damage ecosystem.

More pollutants will be discharged into the environment as economy becomes active, and threats to human and animals are aggravated. (Environmental impact by the various pollutants will be analyzed deeply in the interim report.)

### **3.4.3 Water resources and Solid Waste**

Many water resources are located in the west side of Atlas Mountains in Morocco. Surface water of rivers and underground water are water resources for tap water in the area.

It is especially necessary to pay attention to the discharge of liquid and solid waste. Extra attention should be given to waste disposal sites that may pollute underground water resources since it is very difficult to clean the resources.

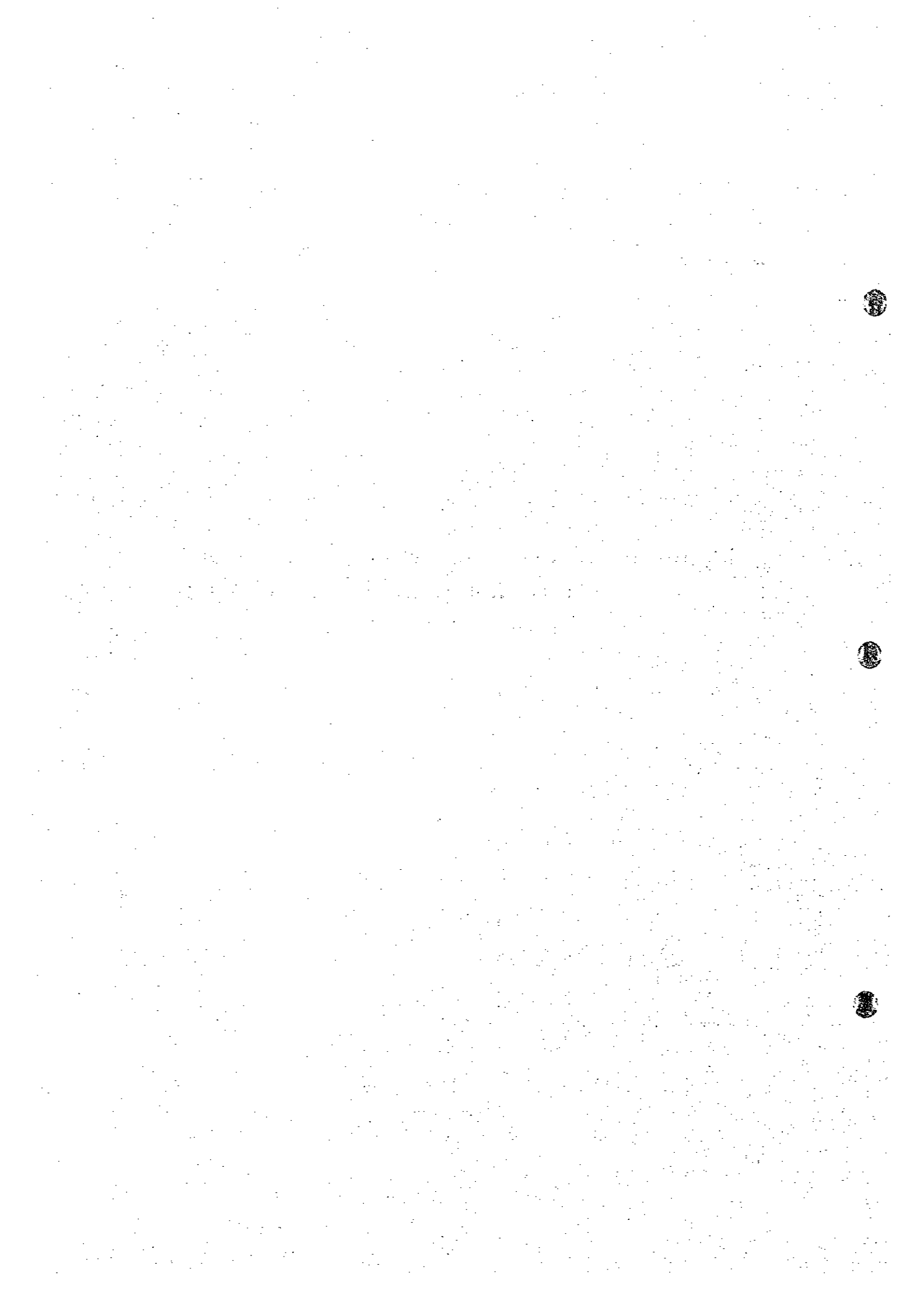
### **3.4.4 Environmental Control and Social Effect**

A report National Strategy for Environment Protection and Sustainable Development shows that benefits gained from preventing the environmental impact is larger than the actual social damages.

It is very difficult to analyze how much the benefits will be when limiting the scope of analysis only in environmental impact by waste. This is because it is difficult to measure the amount of social damages caused by generated waste. Therefore, qualitative analysis will be conducted to present the social damages that cost resulting from not taking preventive measures. (This analysis will be elaborated in the interim report.)



**Chapter 4 Central Government Policy and  
Activities Related to Solid Waste  
Management**





## CHAPTER 4 CENTRAL GOVERNMENT POLICY AND ACTIVITIES RELATED TO SOLID WASTE MANAGEMENT

### 4.1. Institutional Framework and Responsibility

Environment is one of the major components of the Moroccan Government's policy. The first step was the creation by the decree of May 28 1974 of the "Comité National pour l'Environnement" (National Committee for Environment), which in 1980 became the National Council for Environment (hereafter CNE). At the same time, "Comité régionaux de l'environnement" (regional Committees for Environment) or CRE, were also created.

Later in August 1992, the Under Secretariat of the Environment (USE), reporting directly to the Minister of the Interior, was established. In December 1995 the use became a full, autonomous Ministry, with its own budget.

The Government has provided strong support to environmental protection, with not only the Ministry of Environment (MoE) being involved, in this action but also sector ministries. In this chapter we will present the different actors involved in environmental policy : MoE, CNE and CRE, ministries involved in sectoral environmental actions : Ministry of Agriculture, Ministry of Health, Ministry of Interior, Ministry of Commerce and Industry, Ministry of Energy and Mines, Ministry of Public Works, as well as other governmental bodies, the FEC and National Promotion. We will analyse their organisation, functions and responsibility, and the human resources available to implement environmental policy.

#### 4.1.1. Institutional Framework of Environment

Since USE became the MoE, this Ministry has become the main institutional instrument of Moroccan environment policy. We will present :

1. MOE activities and responsibilities,
2. MOE organization,
3. CNE,
- 4) CRE and Wilaya.

##### 1) MoE Activities and Responsibilities

The Dahir August 11 1992 gives assignments of MoE, which is in charge of setting up environmental policy, including coordination with other ministries involved in environmental activities and implementation. This includes :

- enforcement of the institutional and legal framework for environmental protection ;
- protection of natural resources to avoid waste or degradation adversely affecting sustainable development ;
- setting up appropriate instruments for permanent monitoring and control of environment conditions ;
- carry out impact studies and give advise on development projets involved in environment ;

- prevent and take action against any form of pollution and nuisance which could affect public health ;
- implement controls according to the present legislation, and provide advice to public and private entities on environmental legal requirement ;
- improve living conditions of urban and rural populations ;
- integrate an environmental dimension in all development programs, particularly those concerning education, training, research and information ;
- develop regional and international activities in the field of environment protection.

## 2) MoE Organisation

To be in a position to fulfill all these objectives MoE has set up a central organisation with 3 directorates and a financial division :

the directorate of « observation », studies and coordination;  
 the directorate of regulation and control;  
 the directorate of communication and training;  
 the administrative and financial division.

### a. Directorate of « Observation », Studies and Co-ordination.

This directorate monitors the environmental situation of all concerned bodies. It is in charge of :

- undertaking with concerned departments research and other studies on the environment linked to the national policy of sustainable development, and keep those departments informed of results and actions taken for their implementation;
- promotion and co-ordination of all actions aimed at the protection of natural resources, prevention of pollution and nuisances, and general improvement of living conditions,
- elaboration of proposals regarding main objectives and strategies of environmental policy and to initiate and follow implementation of pilot projects at the national, regional and local level;
- finding solutions to problems which could affect the environment through global information, analysis and diagnosis;
- collection and dissemination of environmental information;
- following up on interministerial coordination of environmental protection;
- participation in the creation and implementation of emergency plans, and implementation of actions in case of catastrophes;
- promotion, with concerned ministerial departments of international projects of cooperation in the environmental field, and ensuring coordination with the competent ministries.

The Directorate is composed of 3 divisions :

- Division of coordination and external relations, including one person as secretary of CNE, international cooperation, and emergency planning;

- Division of « observation » and studies, including ;

- \* the National Laboratory of Studies and Control of Pollution and Nuisances (NL) has not yet presented any standard related to solid waste,
- \* the « Observatoire National de l'Environnement du Maroc » ONEM (Morocco National Observatory of Environment), is in charge of national environmental studies, production and dissemination of information, and the establishment and implementation of the information and data system,
- \* service of documentation,
- \* service of general and impact studies;

- Division of projects planning and implementation, with two services, one for planning, the other service for the implementation of development projects.

This division is acting as counterpart for the current JICA Study, and this division is involved in developing SWM Guidelines.

#### **b. The Directorate of Regulation and Control**

This direction contributes to reinforcement of the institutional and legal framework. It follows up with departments and bodies concerned with implementation and enforcement of laws and regulations concerning the protection and improvement of environment quality. It is in charge of :

- ensuring with departments and other agencies concerned, the application and implementation of international conventions and integration of these into national legislation and regulations;
- initiating emission standard and controls for establishments and as necessary, up dating and revising them;
- controlling the application of legislation and regulations in the field of environment and to regular inspections with the concerned ministries;
- collection of information concerning environmental pollution and proposals for measures to get rid of them; and following up in disputes on environmental matters;
- assistance to public or private entities willing to take legal action in order to protect the environment, or which are confronted with pollution damage.

#### **c. The Directorate of Communication and Training**

This directorate ensures popularization of technical procedures and the appropriate technologies used for the protection of environment. It is in charge of :

- sensibilizing the public through information campaigns and other means;
- integrating environmental concepts in the programmes of education, training and information;
- ensuring and carrying out training and improvement of staff concerned with environmental matters.

#### **d. Administrative and Financial Division**

It is in charge of personnel and equipment, it has to prepare and execute the budget, to establish the investment program and to do the book keeping.

MoE organization is presented in the table of the organization chart of MoE.

#### **3) CNE**

We saw that the National Council for Environment (CNE) was created in 1980 (decree 2-79-347 of May 12 1980), but prior to 1992 it had only held one session. Another decree of 2-93-1011 January 20 1995 modified its organisation and gave it new responsibilities, namely, to work for protection and improvement of environment; to realise the objectives of sustainable development; and to give advice on the general environmental policy.

CNE is composed of members of all ministries. It holds sessions twice a year, and has to present an annual report on the environment situation in the country. To prepare this report it has four committees, i.e. : juridical, strategical, rehabilitation of Sebou basin, international and implementation.

His Majesty has written a letter to underline how important is the new organisation of CNE and its basic function in national environmental policy. The permanent secretariat of CNE is under the MoE.

#### **4) CRE and Wilaya**

As a decentralized body of CNE, a Regional Committee for Environment (CRE) has been created in each Wilaya and will be in a position to work during 1996. They do not have any actual administrative power.

For the moment, its main tasks are to implement a research on Morocco's current environmental status at the level of the Wilaya, and to make an annual report for MoE and CNE. This report is entitled « The Monograph of the Present Condition of Environment in Morocco ». As CNE, they are composed of 5 commissions.

The Wilaya could create Provincial Center for Environment (CPE) on their own responsibility.

A Regional Committee for Environment (CRE) has been created in each Wilaya and will be in a position to work during 1996. They have to identify environmental problems at the level of the wilaya or the province, and to make an annual report.

MoE, CNE, and CRE are the cornerstone of environmental institutional framework in Morocco. Other Ministries are of course also involved, mainly at the technical level in planning and implementation of SWM.

#### **4.1.2. Organisation and functions of ministries involved in SWM**

A number of ministries are concerned with one or several aspects of environment in general, and SWM in particular. Accordingly they are present in CNE and they participate in environmental decisions, giving advice and information. In this presentation of the main actors in the institutional SWM framework we will only describe: Ministry of Agriculture (MoA); Ministry of Health (MoH); Ministry of Interior (MoI); Ministry of Commerce and Industry (MoC & I); Ministry of Energy and Mines (MoE&M), Ministry of Public Works (MoPW), and National Promotion.

##### **1) Ministry of Interior**

MoI is involved in SWM at three different levels : as the ruler of all local governments decisions and actions, as controller of local government budget and financial commitments and as technical advisor and supporter of these local governments in their day to day solid waste activities.

We have already seen in section 2.6. « Government Structure » how local representatives of MoI have to follow up decisions of communes, and prefectures or provincial assemblies. Section 4.4. explains local government funding and how they raise loans for SWM equipments under MoI control. The FEC « Fonds d'Équipement communal » as we will see in 4.4.5. is able to provide funds for these investments.

Inside MoI these activities are followed by « La Direction Generale des Collectivités locales » or DGCL (the Directorate General of Local governments), Directorate of Local Government Finance and Directorate of water and Sewage (see organisation chart of DGCL).

Directorate of water and sewage (DEA : Direction de l'eau et de l'assainissement), whose Director is Mr. KAWNI has a SWM department under the responsibility of Mr. ZAKARI. This department advises communes on formulation of projects and preparation of tender documents. Until now the Directorate has not issued technical or/and operational standards on SWM. But on February 7 1995 the Minister itself Mr Driss BASRI has written a letter to walis and governors on SWM. According to the 1976 law giving the central government control over sanitary matters, this letter asked for organisation of cleansing campaigns and to prepare a SWM general plan for the future. Monthly reports were requested by the Ministry for the execution of these campaigns.

##### **2) Ministry of Health**

Through the example of the MoI letter, it is clear that Moroccan authorities pay major attention to sanitary conditions. The Ministry of Public Health is in charge of the coordination of the objectives and actions necessary to improve the level of health in the country. It has to ensure at the national level the best allocation of resources in the field of prevention, curative cares and assistance. According to these objectives its actions in the environmental field are to avoid pollution which could affect public health. This target is illustrated by the health organization which covers all national territory.

**Table 4.1-1 National health organization**

Level	Geographical Area	Health Organization
3 <sup>rd</sup> level	Morocco	Ministry of Health and National Health Comiteec
2 <sup>nd</sup> level	Prefecture/Province/Wilaya	Chief Doctor director of province/prefecture health office
1 <sup>st</sup> level	Urban Community	Doctor chief of municipal health office
1 <sup>st</sup> level	Urban Commune	Doctor chief of communal health office
1 <sup>st</sup> level	Rural Commune	Doctor chief of rural health center

**a. At the First Level**

The chief of the Communal Health Office is a doctor. He was formerly appointed by the the MoH. Because of decentralisation he is now appointed by the President of the commune, but paid by the MoH out of the budget of the commune. He has a multisectoral responsibility : education, public awarness, prevention and care. He is responsible for environmental education about : waste disposal, pollution, water and sewage (where and how to place a well). He is assisted by itinerant male nurses who take care of a geographical area of the commune.

**b. At the Second Level**

The Chief Doctor, is director of the province/prefecture health office, represents MoH at the province/prefecture level.

**c. At the Third Level**

The MoH is composed of the General Inspection and the General secretary, and 5 directorates : Directorate of hospitals and ambulatory care, Directorate of population, Directorate of finance, Directorate of human resources, and Directorate of epidemic disease.

**d. National Guidelines**

MoH issues national guidelines to inform personnel in decentralized offices. There is also a training center for epidemic disease at the level of the Directorate to prepare trainers for information campains. In part 6 we will descibe the management of hospital waste in Morocco.

**3) Ministry of Commerce, Industry and Manual Industries**

In this Ministry the department in charge of SWM, or to be more precise industrial waste, is the Planning Department. In this Department an Environment Protection Service (section) was formally established in 1987, although it only began to operate in 1991. It is composed of Mr. Mohammed BENAYADA, responsible of this service, and Mr. Jamal MORCHADI.

The objective of the Environment Protection Service is to protect the environment against industrial pollution. This section makes studies and provides technical support for industry to protect environment. They have no legal section. The first study done by them is the « Pollution control of Sebou river », which proved that this basin was the most polluted in Morocco. Swedish consultants were used.

There is an UNIDO financed project for « Industrial & Environmental Development Strategy ». This project is to propagate appropriate preventive measures to factories to avoid pollution. It includes training, education, and technical workshops. It is coordinated by a Steering Committee. The head of Planning Department of MoC&I is the Committee President. The Committee is composed of members of ministries (MoE, MoPW) and industrial associations (from fiber manufacturers, chemical industry, agro industry, cement, sugar, and leather). A seminar with participants of more than 100 managers from industry will take place this year.

Until now there is no environmental tax, subsidies or other economic incentives for promotion, recycling, or waste reduction. A committee, chaired by MoE, has been organised to prepare « Fund for Industrial Pollution Control ». It will provide low interest loan. 20 factories are so far targeted.

#### 4) Ministry of Public Works

This Ministry is one of the main technical ministries. It is in charge of water resources and water quality control. Although there is a service named « Environment service », the environmental matters are actually followed by the Directorate of Research and Planning of Water Resources, through its Water Quality division (see organisation charte).

This division's objectives and activities are following :

- a. hydrogeological water resource survey for both ground and surface water;
- b. water resources assessment and development plan;
- c. water quality monitoring (900 monitoring points, 50,000 samples analysed each years in 8 laboratories); there is no central laboratory. The French Afnor norm of analysis is used;
- d. studies of the localisation of dams;
- e. supply of drinking water, and industrial and agricultural supply;
- f. water demand forecasts;
- g. monitoring of conditions of water supply for users;
- h. environment impact assessment on basis of World Bank EIA guidelines;
- i. identification of sources of water pollution.

MoPW participates in practical environmental protection operations as follow:

- a. following up on the « Etat de la Qualité des Ressources en Eau dans la Region Hydraulique du Souss Massa Années 1993-1994 »;
- b. site selection for the future landfill of Urban Community of Casablanca and Rabat;
- c. pilot sewage treatment plant in Boujjaad in Sebou basin in cooperation with France.

There is a Legal Section in charge of actions against persons or companies responsible for pollution. Five actions are on-going, but they have not had a juridical conclusion until now because the new law on water is not yet enforced.

Ministry of Public Work will be taking a very important role as a supervising ministry concerning industrial waste dumped into the water environment, such as rivers, lakes, and ponds, as well as concerning setting up industrial waste dumping sites. Water Law (Law N° 10-95 of August 16 1995) rules that "Basin Authority" will do supervision over SWM. The authority is established in accordance with the article 20 of the law.

#### **5) Ministry of Agriculture**

MoA did have a discussion on whether it should set up an environmental section. The minister decided to use existing existing sections instead of creating a new one. He uses two of its directorates to participate in environmental activities. One is the Directorate of General Inspection of Agriculture, and the other is Directorate of Land Organisation. The first has 7 branches in the country and conducts all land inspections. The latter has two divisions, namely the Division of Soil Conservation, the Division of Land Improvement, which is responsible for renewal energy such as compost, methanation, and bio-gas. The Land Improvement section deals with technical matters (see organisation chart).

The ministry has no full-time workers exclusively for environmental work. For some projects case by case a certain number of engineers can be asked to follow environmental matters. It has no action plans but has made some individual actions on methanation, composting (Tanger project), and bio-gas.

Until 1991 nation-wide education campaigns for national environmental protection had been conducted with leaflets, training sessions, radio programmes, with technical assistance from UNDP and ONUDI. The education campaign has not been active since then. The ministry has recently found it necessary to launch another campaign to focus on environmental protection, but it has not been implemented. There are no on-going actions with NGO's.

#### **6) Ministry of Energy and Mines**

The Ministry of Energy and Mines (MoE&M) is in charge of elaboration and implementation of governmental policy in the field of energy, mines and geology. The Ministry is divided into Directorates. The Directorate of Energy has 6 divisions, one of which is the Division of Development and Energy control. This division is composed of 3 services :

- service of renewable energy,
- service of energy saving,
- service of technological promotion.

This last service has existed 1,5 years ago and is in charge of environmental matters. It is composed of 3 ingeneers. Its objectives are 2 :



- to collect information data on non polluting technologies,
- desalination of water.

MoE&M is in charge of power stations and plants producing phosphate (OCP), but it is not giving guidelines on environment protection to them.

## 7) The National Promotion

The National Promotion (NP) has been created to fight against under-employment mainly in rural areas. Since 1977 NP has extended its operations to urban centers. As one of its objectives is to improve the quality of life of the population, it makes an important contribution to SWM. Part of the manpower used in SWM are from NP.

Since the decree April 18 1985 Mol is in charge of the NP. Its annual action plan is approved by the « Conseil supérieur de la Promotion nationale et du plan » CSPNP (Superior committee for the National Promotion and Plan). At the provincial level PN is implemented by provincial delegates and by a provincial committee under the presidency of the governor.

### 4.1.3. Human Resources

#### 1) Human Resources of Related Institutions

During the analysis of the institutions involved in SWM we described the human resources available for environment management (professional personal only). These resources are summarized in the following table :

**Table 4.1-2 Number of Persons in SWM related Organizations**

Institutional Body	Administrative Subdivision Concerned	Number of Persons Employed
MoE	Directorate of observation, studies and co-ordination.	66
	Directorate of regulation and control.	16
	Directorate of communication and permanent training.	9
	Administrative and financial division	6
CNE	-	1 permanent secretary see MoE
CRE	-	no permanent personnel
Mol	Directorate of water and sewage	14
MoH	Directorate of Hospitals and Ambulatory care	no personnel full time
MoC&I	Planning Department/Environment Protection Service	2

MoPW	Water quality division	9
MoA	Directorate of General Inspection and Directorate of Land Organisation	no personnel full time
MoE&M	Service of technological promotion	3

## 2) Human Resources Development

It is obvious that educated graduates are abundant at the national level. There are, however, only limited numbers of environmental engineers specially educated on tackling of air and water pollution and also on the treatment of solid waste. This situation is inevitable while national administrative needs for the environment is not full-grown. In the coming years, human resources development will become a very important issue when the nation plans to intensively implement environmental policies.

It is widely noticed that human resources at the local level is not developed well enough. Although the power over public services has been transferred to communes after the decentralization law of 1976, there remains the lack of human resources to deliver designed services. Ministry of Interior administers the human resources development at local level. A World Bank assisted program is proceeding for developing human resources in financial policy field. Human resources development in this field is the most urgent for communes.

Ministry of Interior sends graduated engineers to prefectures and Wilaya for advising engineering issues in local governments. Nevertheless, some specialized issues are beyond the knowledge and ability of each one of missioned engineers, since the issues are so various.

Ministry of Interior has set up and administers technical high schools that provide with civil, hydraulic, electric, and planting engineering courses. Local governments send their own technicians there to receive two years of training in their own fields.

Ministry of Public Works has set up the LPEE (Laboratione Public d'Etudes et d'Essais) and gives training seminars concerning the environment and sanitation to engineers.

### 4.1.4 Issues

Criticizing the nation's current SWM in institutional aspects is not very much meaningful since administering solid waste management at the central government level has not yet taken an established form. It; however; will be an advantage here to understand institutional issues by pointing out that the current institutional arrangement is not sufficient. It should be improved in order to establish the SWM administration

The central government's tasks for SWM administration in general are listed as follows; developing laws, regulations, and standards abiding by laws; enforcing laws; supervision ordered by the laws, setting goals and implementing policies for the goals; instruction

and technical assistance to enterprises and local governments; financial aids; and technical development assistance.

It is going to be an upcoming issue to renew the current administrative system while aiming at accomplishing the tasks above. As long as there are no SWM laws, discussion over the system can not be proceeded in a practical way. Yet, institutional items that are expected to be taken care of for establishing SWM administration can be listed as follows.

**a. Clarifying Responsibilities for SWM and Coordinating Powers of Concerned Ministries**

Since there is no specific law concerning SWM, responsibilities for solid waste central government level are shared by concerned ministries. Demarcation when sharing the responsibilities is not clear. Concerned ministries are currently responsible for the following tasks.

- Ministry of Interior, as an supervising ministry of local governments, is responsible for supervising their SWM.
- Ministry of Environment is responsible for supervising the conservation and protection of the environment, and for making the favorable living environment maintained.
- Ministry of Public Health is responsible for supervising hospital management, hospital waste, local sanitation, and for education on waste issues and sanitation.
- Ministry of Public Works is responsible for managing water resources.
- Ministry of Commerce and Industry is responsible for administering enterprises.
- Ministry of Agriculture is responsible for supervising conservation of lands and forest resources.

Unclear demarcation when sharing the administrative power is inevitable due to the absence of clear goals in the nation level SWM. When the central government plan to pursue SWM goals intensively, aiming to maintain the favorable living environment and to conserve the environment, it is essential to define a main ministry and to clarify the sharing of the administrative power as necessary.

**b. Institutional Development for Creating Administrative Information System and Statistics concerning SWM**

When the central government plans to implement a national level SWM, it is essential for the nation to have basic data on the current SWM of local governments and enterprises; to set up a data reporting system; to analyze the data; and to create statistic documents based on the data.

Making a data base concerning especially generating sources of hazardous waste is essential for managing such waste.

Ministries and agencies at the central level are expected to prepare institutional arrangement that can accomplish the tasks above.

**c. Institutional Development for Creating and Diffusing National Plan and Technical Guideline concerning SWM**

The central government will obviously have to prepare technical guidelines for creating national plans and programs; providing standards for regulation levels; and instructing local governments and enterprises. In order to accomplish the tasks above, it will be essential to establish and strengthen a planing unit that rules a nationwide SWM within a ministry and an agency at the central level.

**d. Establishment and Strengthening of Supervising Organization at the Local Level.**

Supervising local SWM by central ministries and agencies only is a hard task, and tackling SWM related issues is unrealistic unless advancing a local government's supervising function. Also, an administrative body at the local level is less efficient than the one at the central level. There are no established routes or lines between national and local administrative bodies especially in the field of environment.

At the central ministry and agency level, this point has been recognized, and Water Law of 1995 refers "Basin Authority" to be set up as a regulatory agency. When the nation plans to create respective laws concerning environment, such as law on solid waste, it will be essential to examine establishment of such a regulatory agency.

**e. Developing Organization for Education and training concerning the Environment and SWM**

It will be essential to employ graduated engineers specialized in the environment and solid waste fields and to train the SWM related officials and the local government staffs as SWM specialists in order to improve the nationwide SWM.

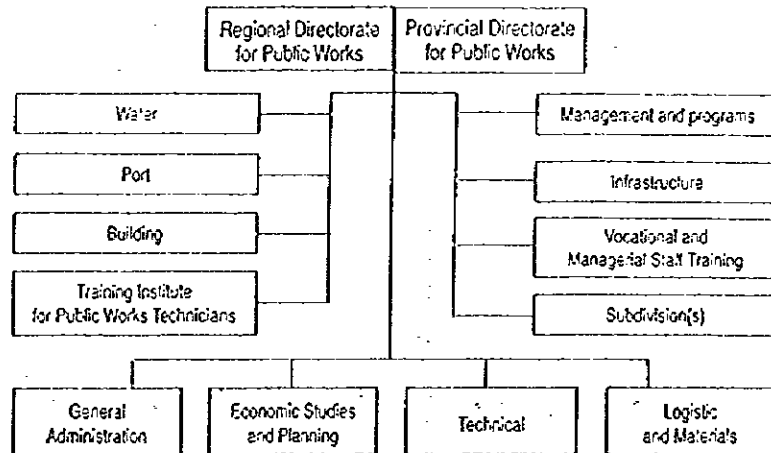
There are no training centers that can produce practically-skilled SWM specialists and engineers. Occasional seminars can offer only written knowledge that may not be practical, and are not enough for producing specialists. Training centers that can offer practical knowledge will increase their importance.

This kind of training centers are generally located in developed countries. For example, in Japan the National Public Health Organization gives educational opportunities to SWM staffs from local governments. Environmental Training Center, which is under Japan Environmental Agency, is a body that produces officials specialized in the environment. As an example in developing countries, environmental training centers has been started in Thailand and Indonesia.

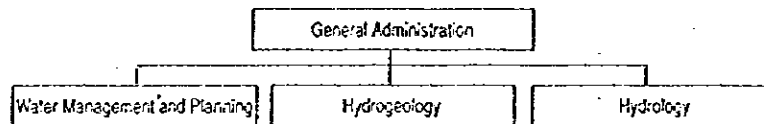
Elaborating a system for drafting laws and also special systems for establishing SWM of hospital waste and industrial and hazardous waste will be needed at the national level. Discussion on these types of waste will be made in the other sections.

In tackling air pollution and water pollution as well as SWM, the central government will face the needs for institutional development mentioned so far. Therefore, the central government have to examine institutional development, while taking the whole pollution issues into account.

Organization chart of a Regional Directorate for Public Works and a Provincial Directorate for Public Works



Organization chart of a Regional Directorate of Hydraulics



## Management tools

### Control panels

The Ministry set up in 1985 a system of control panels designed to collect data in order to be able to follow up and guide all the activities of the Department. These control panels cover various areas of activities : accounting, personnel affairs, Training, Public Estate, Regulation and legal texts, programs (important sites), Vocational Training.

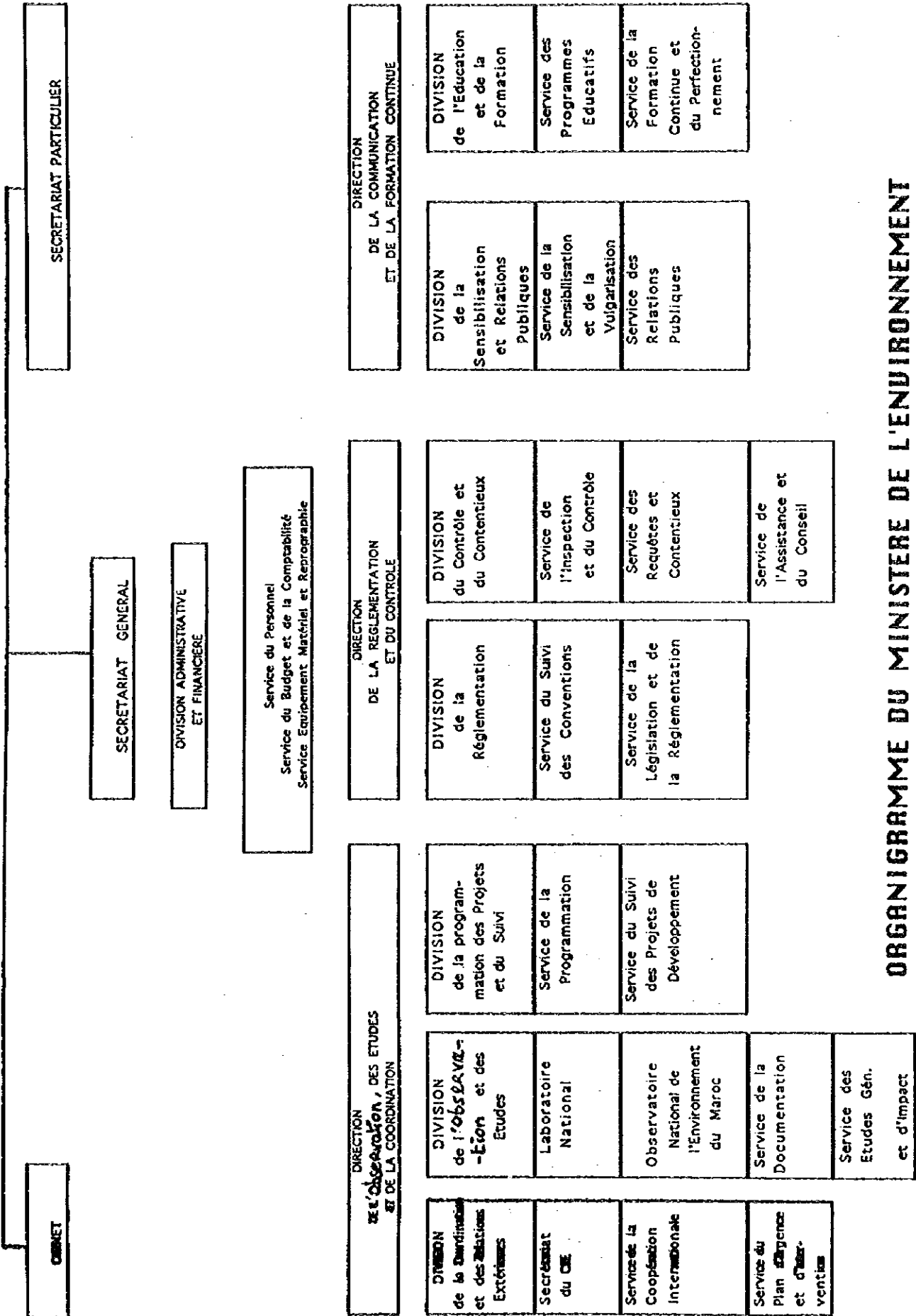
Measures to improve this system are being considered.

### Information

In spite of its separate structures, each with its own activity, the Department's organization is, in fact, based on dense exchanges of information between services and staff members. Were it not for this steady flow of information which is the result of internal and external communication, the Ministry's structures would be seriously ineffective.

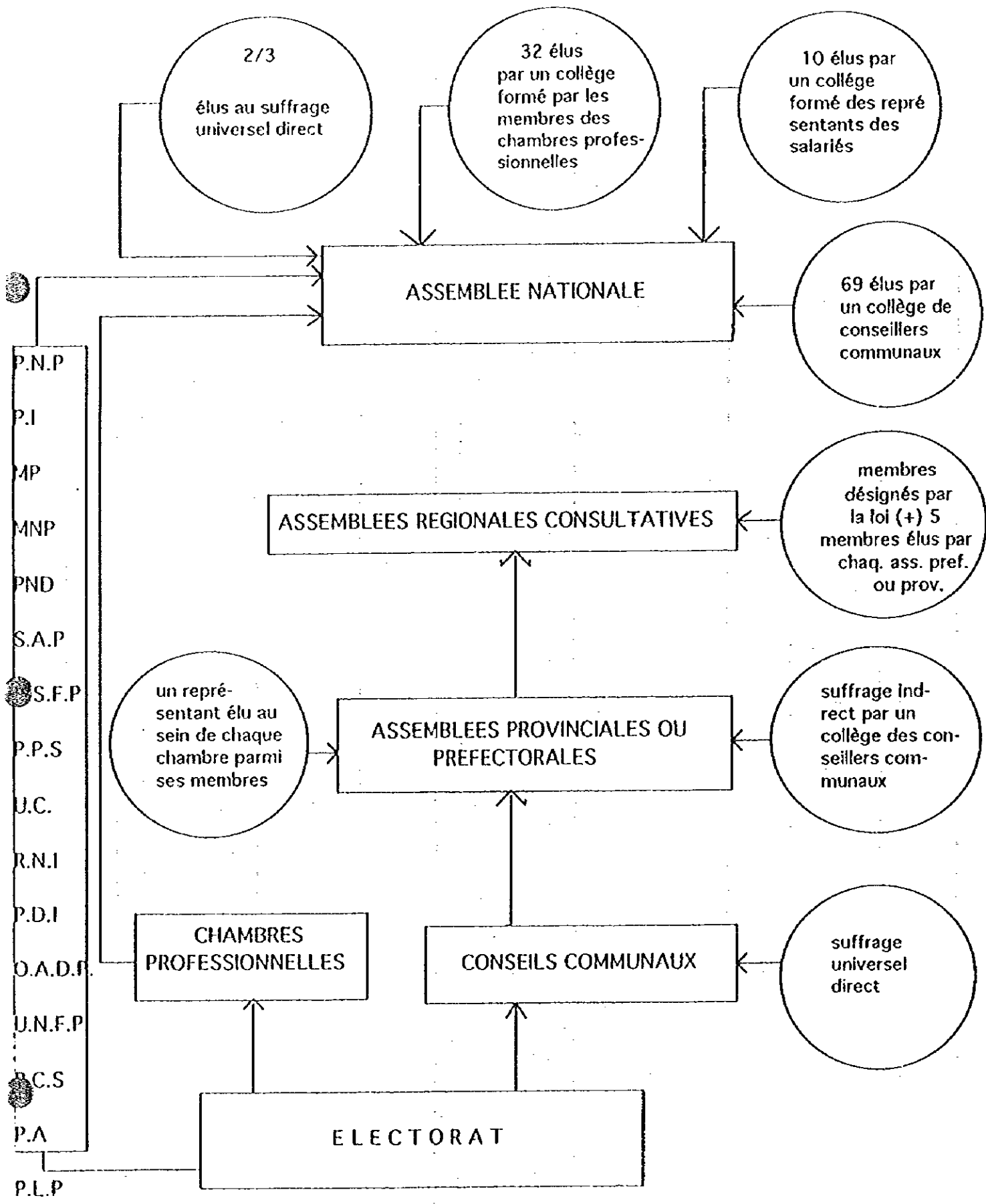
The Ministry has used and developed well-established methods of communication and information. In this respect, it has given proof of imagination and continuous effort and made good use of the lessons of experience in the field of organization and personnel moti-

# LE MINISTRE



## ORGANIGRAMME DU MINISTRE DE L'ENVIRONNEMENT

Fig. 4.1-2 Organization Chart of the Ministry of Environment



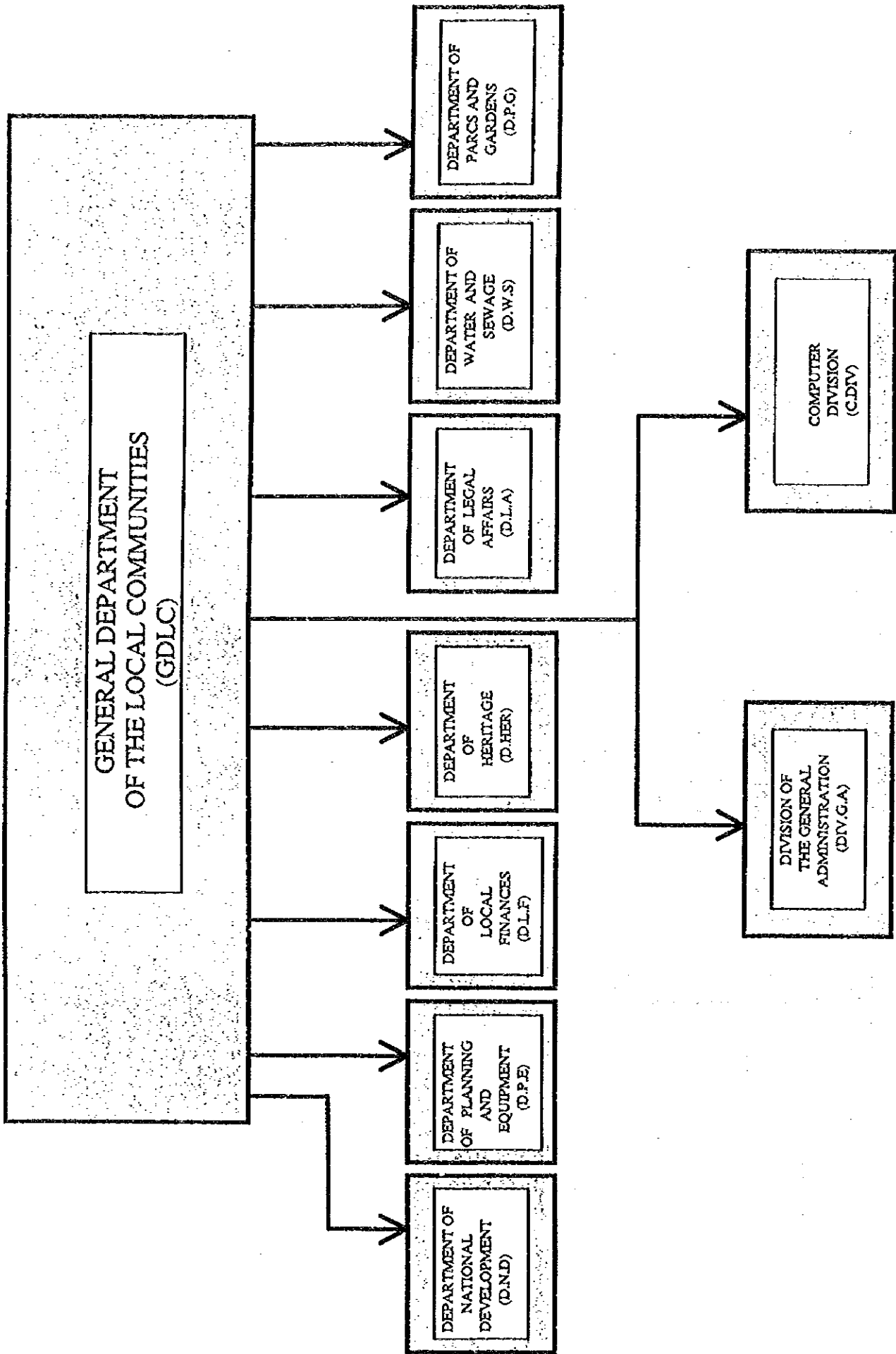
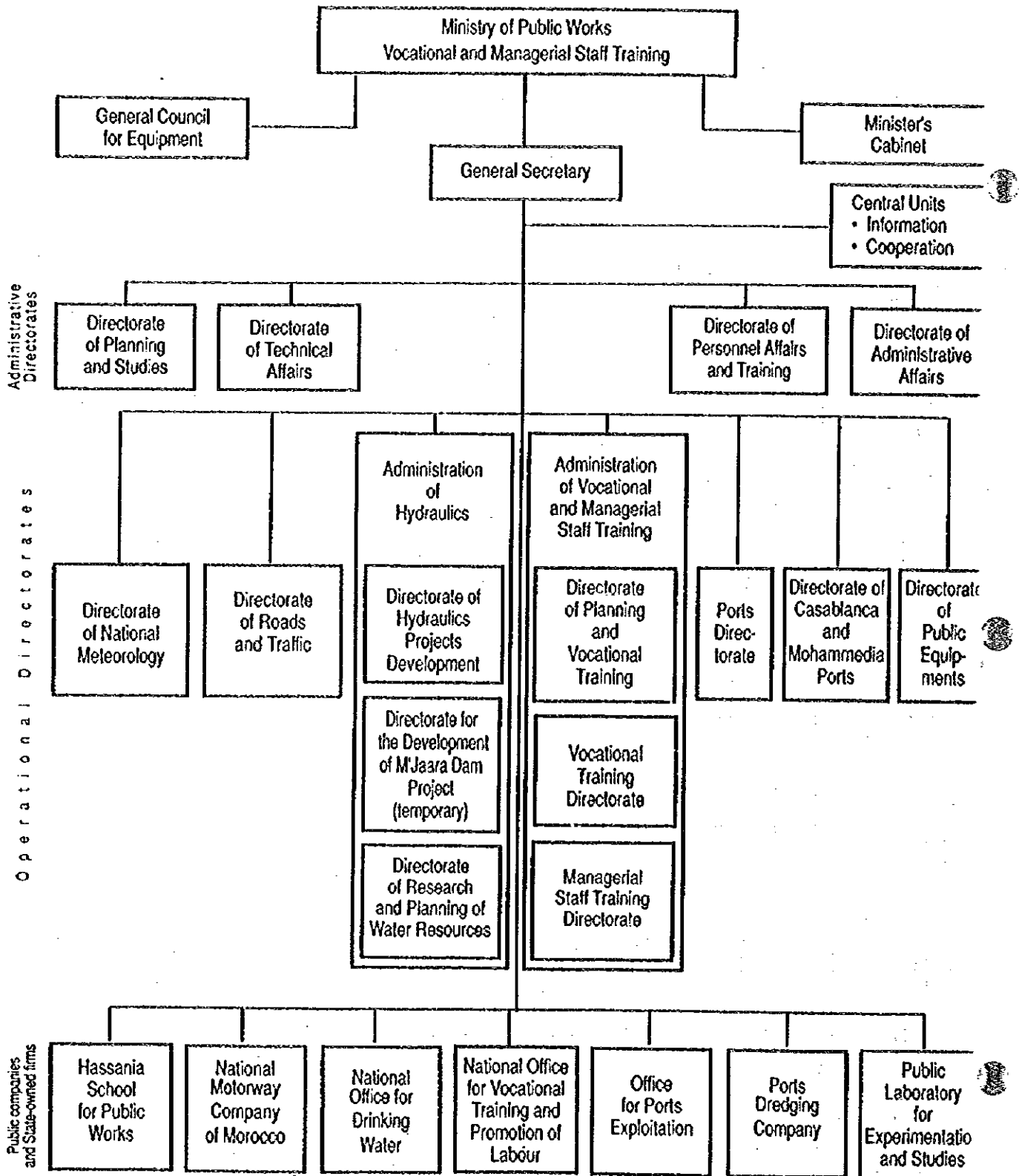


Fig. 4.1-3 Organization Chart of Local Communities





**Fig. 4.1-5 Organization Chart of a Regional Directorate for Public Works and a Provincial Directorate for Public Works**



ONBP : National Office for Drinking Water  
 ODEP : Office for Ports Exploitation  
 OFPPT : National Office for Vocational Training and Promotion of Labour.



## **4.2. Legislation Related to SWM**

The law on environment is still in its infancy in Morocco. In spite of the creation of the Council for National Environment (CNE) in 1980, the Under Secretariat of the Environment (USE) in 1992, and the MoE in 1995 (see 4.1. Institutional Framework and Responsibility), the basic legislative texts concerning this subject remain in a project stage. There is only a few fiscal provisions which explicitly confirm the existence of environmental objectives except in the recent law on water which aims to fight against pollution and to ensure sustainable development of resources.

The normative gap is partly filled up with a multitude of provisions to which it may have recourse with a view to protect the environment, even though their objectives are much limited : preservation of property, of hygiene and public safety, planning of territory...etc.

In the current legal system of Morocco, no more than being of a concern for the environmental legislation, solid waste is not the subject of a specific regulation. The measures which rule them must be reconstituted from various rules, institutions and statutes.

In this part we will present:

- 4.2.1. Legal Framework and Responsibility Related to SWM
- 4.2.2. Laws and Law Project Related to Environment and SWM
- 4.2.3. Technical Standards Related to SWM

### **4.2.1. Legal Framework and Responsibility Related to SWM**

There are no laws in Morocco which stipulate that the local governments are responsible for solid waste management. The 1976 local government law says that the local governments are responsible for provision of the public services. However, the law does not have definition of the public services. The 1976 local government law however stipulates that the urban communities of Casablanca and Rabat are responsible for solid waste management. (There were only these 2 urban communities at that time.)

Before giving analysis of what are the laws and law project related to environment and SWM, we will present the 1914 law which is used to authorize the creation of establishments classified as potentially hazardous in a first part, and in a second part respective responsibility related to SWM, namely:

1. Regulation of Insanitary, Inconvenient or Hazardous Establishments
2. The Regulations on the Responsibilities Related to the Issue on Waste

#### **1) Regulation of Insanitary, Inconvenient or Hazardous Establishments**

In this fragmented legal system, the law related to insanitary, inconvenient or hazardous establishments is of primary importance insofar as it gives explicit

answers to the questions related to safety measures, control and penalty to industrial polluters

Although this law is aimed to the specific field of industry, it is nevertheless the starting point of an environmental legislation. It could represent by extending a framework for the elaboration of texts on disposal sites.

The law dated August 25th, 1914 places the establishments which present insanitary, inconvenient or hazardous causes under the control and the supervision of the administrative authority. To that effect, it provides for their classification into three categories according to the risks they represent.

The requirements needed before starting a new activity come under the competence of the Ministry of Public Works for the establishments of class 1, and of the local authority for the establishments of class 2.

The establishment of class 3 requires a simple notification.

There will not be made a description of the administrative procedure, nevertheless it is noticed that the requirement for authorization of starting a new activity includes a note precisising the method and conditions of disposal and utilization or treatment of residual waste.

In other respects, Article 8 shows that at the end of an inquiry done by the local authority or prescribed by an order of the Minister of Public Works according to the case, the permission may be rejected "in the interest of security, of hygiene or of public convenience or subordinate to a change of the chosen site and the planned measures."

Special prescriptions in Article 10 can be made obligatory because they are intended to reduce the causes of unhealthiness and to dismiss water pollution, "In general, all the hygienic and security measures which should be observed during the construction of buildings or the exploitation of industries."

In order to complete this presentation, it is necessary to tackle the system of control and repression which provides inspection actions done by the police officers (coming from the criminal investigation department or by authorized agents from the Ministry of Public works).

This system is quite false because the corps of inspectors is in fact reduced to two engineers attached to the department of technical affairs.

The officials entitled to carry out this inspection have the right to get into the establishments at any time of their operation and to make, within these establishments, any observation which they consider necessary.

This situation becomes worse because of the infrequency of control and the almost non existence of financial penalties. In fact, Article 15 punishes violation to this law with a fee which has not been re-evaluated since 1937, such as a maximum of 1000

francs and 5000 francs in the event of a second (the equivalent of 10 and 50 Dhs today).

Of course, the establishment could be closed down, but since the penalty has too many serious consequences, violation of the law is hardly ever punished.

## **2) Regulations on the Responsibilities Related to the Issue on Waste**

As there is no special law on environment, the responsibility due to endangering the environment can be based only upon general rules of civil, administrative or penal responsibility.

Thus, no « ecological » or « environmental » damage, but only moral or material injury for which reparations may be required.

It must be noted however that the dahir/law which forms the law of obligations and contracts, retains an interesting application of the rules of civil responsibility for acknowledging to those who live near the polluting establishments an action against the owners of these.

### **a. Responsibility of the Establishments for Abnormal Neighborhood Disturbance**

Article 91 of the D.O.C (Law of Obligations and Contracts) provides that "the neighbors may take action against insanitary or inconvenient establishments to ask for, either the discontinuance of these establishments, or the adoption of the necessary changes to remove the inconveniences from which they complain ; the authorization of the competent authorities is unable to face up to this action."

As for Article 92, it provides a substantial limit to this action, and consequently to the responsibility of the owners of the so-called establishments by declaring that "however, the neighbors do not have good reasons to ask for the discontinuance of the damages which are derived from the ordinary obligations of neighborhood such as the smoke coming out of chimneys and other inconveniences which cannot be avoided and which do not go beyond the ordinary measure."

### **b. Recourse to Other Rules of Civil Responsibility**

**The Contractual Responsibility:** It is retained when the damage caused to the victim results from the non-performance or the bad execution of a contract previously concluded with the victim.

Concerning solid waste, this responsibility may be held by the industrial establishments or against them in their relations with all their partners : suppliers, customers, private contractors.

It may also be referred to when the public service is ensured within the framework of the contractual relations between the service operator and the user as the actual tendency found in sewage.

### **c. Penal Responsibility**

Since the ecological damage does not constitute an offense provided for and penalized by the law, the penal responsibility of those who endanger the environment can be sued only on the basis of the general accusations of the penal code or of the specific texts such as those related to water, forests, the regulation of work, the classified establishments...etc.

In the case of solid waste, we have noted that the penal code only retains second-class contravention (200 DH fine) against those who throw refuse on the public space as well as other insanitary things or else those who neglect to sweep the public space when they are under the obligation to do it (Art. 608 paragraphs 32 and 33 of the C.P.U).

A first-class contravention (fine or/and imprisonment from 1 to 15 days) is retained against those who put or leave on the public space unnecessary materials or whatever things which prevent or reduce the access and safety of the passers by (Art. 608 paragraph 10 of the C.P.U).

Penalties which closely concern solid waste are presented under the items 4.2.1 and 2 the law on Water of the procedures related to water protection, and neither of the item of the classified establishments 4.7.6 and 1 regulation of insanitary, inconvenient, and hazardous establishment. The most severe penalties which are provided for by the law are the closing of the establishment, the fines and the repairing of the damage.

### **4) Administrative Responsibility**

The basic principle is provided by Article 79 and 80 of the D.O.C (Law of Obligations and Contracts) which respectively state:

-Art. 79 : « the State and the municipalities are individually responsible for the damages directly caused by the functioning of their administrations and by the acts of negligence during the service coming from their agents

-Art. 80 : the agents of the State and the municipalities are individually responsible for the damages caused by their fraud or by the gross misconduct in the exercise of their duties

The State and the municipalities can be sued for these damages only in case of the insolvency of the public employee responsible. »

We have seen in this first section the existing legal framework, enforcement, and related responsibility. We will analyze now laws and law project related to environment and SWM

#### 4.2.2. Laws and Law Project Related to Environment and SWM

We will analyze first law project on « protection et mise en valeur de l'environnement » (environmental protection and valorization) as it is the future frame law for environment. Then we will present the law on water and the general regulations related to sewage as they give some information of what could be the content of a future SWM law ; and other project of laws in the environmental sector:

1. Project of law on environmental protection and valorization
2. The law on water
3. General regulations related to sewage
4. Other project of laws in the environmental sector

##### 1) Project of Law on Environmental Protection and Valorization

This project of law is under preparation since several years ago. It has not been presented to the Parliament. The topics presented in this project are very fundamental, namely:

- Title I : Human Establishments
- Title II : Natural Resources and Protection of Nature
- Title III : Pollution and Nuisances
- Title IV : Instruments for Environmental Operations
- Title V : Procedure Rules

This law is the basic law of the environment. Specific laws must be prepared for each media (Examples: air, water, solid waste) of the environment.

The draft environment law (Article 9) defines the meanings of "environments" are also provided in the draft law. According to the definitions, the norms are targets, while standards must be legally observed.

Article 9 of the law also defines waste. According to the definition, waste is "Any gaseous, liquid, or solid waste, resulting from the process of extraction, exploitation, production, consumption, utilization, control, treatment, whose quality does not permit to reuse it within the scope of the procedure where it is issued or, more generally, any deserted movable or whose owner intend to desert."

Pollution are defined as "Any direct or indirect contamination or modification of the environment provoked by any act susceptible to entail an embarrassment or danger or the health, the healthiness, or the well being of people or an attack or damage to the natural surrounding or of the goods.

Part 3 chapter 1 concerns with waste. This chapter consists of 3 articles. Articles 66 and 67 give a large ground based on which a specific law on solid waste should be prepared. Article 66 says that "Waste should be the object of a reduction effort in the source and of an adequate treatment, in order to eliminate or reduce its harmful and infectious effect for the health of man, for the natural resources, for the fauna, for the flora, or for the quality of the environment in general.



Article 67 says that In order to implement the article 67 above, legislative and prescribed provisions fixed the conditions where should be carried out notably, the operations of collection, stocking, haulage, importation, and exportation, recovery, reuse, recycling or any other form of treatment as well as the final elimination of waste so as t avoid, particularly, the overproduction of waste, the wasting of recoverable remnants and the pollution of the environment in general.

## 2) The Law on Water

In this legal system, the law on water is also of prior importance for two reasons : first, it attends to fight against water pollution, and second, it contains measures directly concerning solid waste.

In fact, the discharge or the burying of solid waste may hamper or contaminate water streams or underground water.

In chapter VI which particularly deals with the fight against water pollution, Article 52 states that "no pouring out, outflow, direct or indirect dump in surface or underground water susceptible of altering its physical characteristics, including thermal, or radioactive, chemical, biological or bacteriological characteristics can be made without prior permission given by the basin's office."

Article 54 confirms for its part the prohibition:

- 1-"To discharge waste water or solid waste in dried rivers, in the wells, watering places and public washhouses, canals or galleries for impounding water (....)
- 2-To carry out any manuring or burying of effluents and any waste discharge susceptible of polluting through percolation underground water or through streaming surface water (....)
- 6-To throw dead bodies of animals in waterways, lakes, ponds, marshes and to bury them near wells, springs and public watering places
- 7-To discharge inside the urban areas, the delimited centers and the rural agglomerations endowed with a developmental plan, any liquid waste, or any material harmful to public health outside the places meant for this purpose or in ways contrary to those laid down by the regulation in force "

A careful reading of paragraphs 1, 2, 6 and 7 of Article 54 reveals that their far-reaching consequences go beyond the protection of water resources and incites, in fact, all the local administrations to organize solid waste collection, or at least the disposal sites presenting conditions for the preservation of environment.

We can anticipate here the premises of an obligation for the communes to provide their agglomerations with public services on both liquid and solid waste, with eventually appropriate means of waste treatment.

As for penalties, it is provided in the Article 118 that any violation of the Article 52 entails one month to one year of imprisonment and a fine of 1200 DH to 5000 DH or one or the other of those two penalties.

### **3) General Regulations Related to Sewage**

At the institutional level, the issue of solid waste is closely linked to sewage in the urban areas. Yet, it is now experimenting considerable transformations which specially affect sewage, but which are necessarily related to solid waste. For these two reasons, the study of the legal and institutional aspects of sewage necessarily contributes to examine the problems of the sub-sector of solid waste and may incite to consider solutions to be retained, all the more since these texts indicate the community as being the main actor.

The regulations related to sewage are based on many texts seeking various objectives, but nevertheless providing them with some legal support.

#### **a. Measures Provided by Law on Sewage**

In order to establish the enforcement field of these texts, we have found the law dated on June 17th, 1992 which retakes and improves the rules of planning contained in the law dated 1953. As a matter of fact, the entire territory is concerned about this new legislation which is actually applied to;

- the Urban Communes
- the delimited Centers (parts of rural communes defined by law)
- the peripheral zones of the Urban Communes (15 Km around the municipal area) and of the delimited centers (their area is fixed by the texts which institute them)
- the urban groupings (their area is fixed by law)

The legal scope thus defined is subject to the entire legislation on town planning. There are also rules related to the protection of the public property, through basic texts found in the law dated July 1st, 1914 defining the public property likely to be protected. In complement the law dated October 19th, 1921 confirms the belonging of roads and water works to the state.

#### **b. Sewage through Measures for the Hygiene and Security of Communities**

It is useful to take into consideration the main texts which rule public hygiene and health in great urban centers;

- the law dated December 8th, 1915 related to sanitary measures for the protection of public hygiene and health in the cities
- the law dated July 30th, 1918 which confers the pachas and the caids special authorities to ensure the protection of hygiene and health in the cities

The last text reinforces the plan of action provided, by permitting the administration to have recourse to procedures for immediate execution.

Indeed, it has to be pointed out that even if conditions of execution require a report on sanitary along with a heavy procedure, there is still a possibility to order the execution of measures without any objection and within a well limited period.

### **c. Legal Communal Competence Regarding Sewage**

As has been examined, the law on sewage is presented mainly as a series of sector-related provisions which aim at space planning, safeguarding the natural properties and protecting the public property. It is normal in these conditions that its implementation should be ensured simultaneously by the various administrative authorities which exercise particular competence in all these fields.

These various administrative bodies are in fact different communal divisions. All together they are in charge of the sewage network they have authority by law to build and operate this network.

We will thus examine successively the role of the local communities, the mode of enforcement in the management of public service for sewage and the financial aspect of the matter.

#### **\*Communal Competence Related to Sewage**

The communal charter dated September 30th, 1976 lists in Articles 30 to 36 the allocations of the communal council and fixes through Articles 37 to 58 the competencies of its president and those of the local authorities (see 2.6.1. Delegation and Local Government). In this law, sewage is not mentioned. Nevertheless, we can read in Article 30 that the communal council;

- "-2- defines the economic and social development plan of the Commune (...) and to that effect;
  - a) it fixes, within the limits of the proper means of the Commune and of those put at its disposal, the equipment program of the community (...).
- 4- decides on the creation and the organization of the communal public services and their management, either by way of direct public company or autonomous public company, or by concession.
- 5- examines the equipment or the development projects of the Commune (...)."

Consequently, these competencies include sewage since it has not been allocated by the law to another administrative authority.

In other respects, the communal charter mentions the role of the Urban Commune of Casablanca and Rabat which appears in the terms of Article 59, that is to say:

- Sewage, with the exception of particular junction works to the network
- Domestic waste collection from a central point of collection fixed by the community
- Domestic waste treatment

Ever since, all the big cities have been transformed into Wilayas gathering several communes and have been endowed with an Urban Community which is responsible for the coordination and the management of the affairs or the services already mentioned.

It must be observed however that if this competence is not contested to the communes, they are not given so far the obligation of creating and running sewage services. Subject to financial measures which impose on the local communities to provide for in their budget maintenance of public works ; these are not by no means obliged to organize a public service for sewage. A fortiori, the law in force does not impose on them particular conditions for liquid or solid waste collection and even less for treatment.

#### **\*Management of the Sewage Public Service**

Traditionally, the sewage public service has been run by the municipalities under direct state control. The workers of the municipal technical services have often been called for to ensure, on the one hand, solid waste collection and street sweeping and on the other, the maintenance of sewage network. Unfortunately, this style of organization reproduced in the rural communes has met many obstacles : dispersion of housing, lack of administrative management, lack of basic equipment and the slenderness of the resources of the population and the Communes.

#### **\*Financial Aspects of Sewage**

It mainly covers the fiscal system of local communities as well as the price scale of the service (tarification).

The local communities' fiscal system is run by the law dated November 21st, 1989. In Article 1 of this text we can read : "Independently from the product of their estate, patrimony and remuneration for services, the local communities and their organization are authorized to collect income taxes and taxes provided for by the current law." Then follows the enumeration of those which may be collected to the benefit of the urban and rural communes, such as : the "tax d'édilité" and the contribution of the residents in the equipment and planning expenses, which obviously seem to be directly related to sewage.

The first cited tax (tax d'édilite) is imposed on the buildings which are situated within the urban areas and the delimited centers on the base of 10 % of their rental value. It also affects the constructions built on their peripheral zones with a rate limited to 6 %.

As for the second tax, it includes a contribution to the various costs related to the planning of the urban public space, roadways, pavements, roadside gutters, sewers...etc.

It must be underlined that the communes are not obliged to allocate the product of each tax to the activity or service which it finances.

Moreover, the "tax d'édilité" for example covers as a rule, all the works of "édilité" (road maintenance, waste collection, street sweeping, road improvement works, discharge of liquid waste, drainage, hygiene...etc.) and not only sewage.

Besides the taxes provided for by the law, the local communities may pay for the services rendered to private individuals as it is stipulated in Article 1 of the 1989 law. It may for instance include the renting of communal buildings (shops, furnaces, car parks, community hall...etc.) or any other industrial or commercial activity (urban transport, water and electricity supply, catering...etc.) The remuneration of these services is paid on a fixed rate basis which may be national or local (subject to the approval of the supervising authorities). It takes the shape of an indirect tax, in the case of a management through direct local controlled service.

The same activity could be financed either by taxes created by the law, or a contribution paid by users according to the service they have got.

#### **4) Other Projects of Laws in the Environmental Sector**

There are two projects of laws in the environmental sector : one is for protection of soil and the other is for the protection against air pollution.

(1) The project of law on protection of soil is under preparation in the MoA. As writing has not yet been finalized, we have not been yet in a position to get a draft of this project.

(2) Protection against air pollution.

This project of law « Project de loi relatif à la lutte contre la pollution de l'atmosphère » is interesting as it gives definitions, penalties and standards of pollution.

As it should be necessary for solid waste, this project of law gives a definition of the main words and concepts named in this law, such as : atmosphere, air, environment, issue, vehicle, pollution.

In chapter V, articles from 10 to 17 are listed fines and penalties applied to those who pollute the atmosphere.

In the appendix of the project of regulations for implementation of this project, we can find a definition of limited value for issues in the atmosphere which is very interesting as standard in this sector are still under discussion as we will see in the next chapter.

#### **4.2.3 Technical Standards Related to SWM**

We have seen in the case of the law on air pollution that a technical support is needed to give precise definition of maximum quantities of toxic elements to be registered in a certain quantity of air. We will see first the present legislation on standards and then the procedure used to prepare future environmental standards.

## 1) Present Legislation on Standards

The existing legislation is founded on quality standards for industry more than on limited value for environment, for example the law dated July 30th, 1970 and the decree dated October 8th, 1970 have organized special regulations for the industrial normalization in order to improve the quality and to increase the productivity.

The procedure for homologation of a standard protection as Moroccan standard is decided by one or several concerned ministries, according to the advice of the « Conseil Interministériel de la Qualité et de la Productivité » CSIQP (Inter-ministerial Council for Quality and Productivity).

These advises are prepared by technical committee for standard preparation working for the "service de normalization industrielle Marocaine" or SNIMA (Moroccan Service for Industrial Standards).

On the other hand, the environmental standards are not yet ruled by specific legal regulations. Only the decree dated May 24th, 1994 related to the attributions of the environmental department, recalls the issue of the environmental normalization on two occasions:

- By generally affirming that the department in charge of the regulation and control contributes to the reinforcement of the institutional and the legal framework and attends in collaboration with the concerned establishments and parties to the enforcement of the norms and the regulations related to the protection and the improvement of the quality of the environment
- By specifying that this department initiates projects related to the norms of the discharges and the easements for the facilities and ensures their actualization and their revision

Since there is no practice in this field, it is difficult to state to what extent the procedure of the environmental normalization should be autonomous or more or less integrated into the procedures of normalization (such as they have been ruled by the 1970 texts).

On the other hand, the decree dated January 20th, 1995 related to the reorganization of the organism responsible for the protection of the environment declares in Article 2, that the National Council for the Environment contributes to defining the State's policy on the subject and to that purpose it is entitled particularly;

- to study and propose to the government all the means susceptible of contributing to the protection of the environment, and
- to propose the elaboration of appropriate legislative or statutory texts.