2) Procedure Used to Prepare Future Environmental Standards

The procedure used for industrial standards through SNIMA has been followed by MoE to prepare environmental standards.

The institutional body used for standards preparation is the National Laboratory of Studies and Control (see 4.1.1. Institutional Framework, MoE Activities and Responsibilities).

The N.L.S.C has created 4 thematic groups : brackish water, marine water, space, air and soil (including toxic and hazardous waste). Each working group itself is divided into sub-groups.

For air, there are 4 ambient quality standards in stage of finalization, and sectoral emission norms for cement factories, refineries, vehicles, and others (list is not actually imitative). Air quality norms for cement factories are the most advanced proportions. Those for dust have been already adopted by the sector. Others related to gas emissions and heavy metals, are benefiting from the cooperation of the national association of cement factories, which has financed a study of sampling and analysis of air and evaluation of the quality effects on air.

A general emission standard is under preparation, for water, and a sectoral emission norms for sugar refineries and for east factories.

For toxic and hazardous waste, MoC&I has asked to MoE to take the decision how to handle the activity of the soil section, which is in charge of waste related standards. There has been a MoE seminar to set the procedure of normalization.

The evaluation of norms is made through a hierarchical set of bodies : the National Council of Environment (CNE) at the top. Then through the commission for the prevention of pollution and nuisance, which has the sub-committee of norms and standards. This sub-committee is composed of representatives of all relevant ministries. The procedure for setting up standards is to get consensus between involved committees and professional associations.

4.3 Policy, Plans and Programs Related to Solid Waste Management

Apart from general allocation of responsibilities for solid waste and other forms of environmental degradation to central government ministries, in particular the newly created Environment Ministry, there is little specific recognition of the solid waste problem at the central government level. Indeed, within the Ministry of [3]Environment itself, there is no unit with specific responsibility for solid waste; only two people have this responsibility, along with other duties.

4.3.1 The 1995 National Strategy Report

The most systematic effort to identify priorities and plans for solid waste at the central level is contained in the publication National Strategy for Protection of the Environment and Sustainable Development, prepared in 1995 for the Ministry of Environment by the Observatoire National de l'Environnement du Maroc (ONEM), with the support of UNDP and UNESCO. This section briefly summarizes aspects of this document relating to solid waste strategy, and reviews the way in which its proposals are being followed up by the government.

1) Approach

The ONEM report considers the existing status of the environment, and future targets, both mid-term (year 2005) and long-term (2020). It also estimates the cost of achieving those targets. Population growth, specifically in urban areas, is taken into account, along with the assumption that average annual rates of overall economic and industrial growth of 4 percent will be maintained over the period.

The report defines an appropriate environmental strategy in a cost-benefit framework. The economic costs of inadequate collection and disposal of solid waste are estimated primarily in terms of the pollution of water resources, but they also include the impact on human health as well as the lost opportunities that would otherwise have been gained by recycling. These estimates are recognized in the report as being very approximate; more importantly they also tend to reflect total, rather than incremental damage costs, and as such are less valuable for future planning purposes, in which incremental costs and benefits ought ideally to be compared.

2) Targets

In light of projected damage costs (for the period ending in 2020 for water pollution and waste together, these are estimated at 6 percent of GDP, while for waste alone - excluding its impact upon water resources - the estimate is 0.32 per cent), the report establishes certain targets for improving solid waste management in Morocco. The annual cost of meeting these targets, which are set out below, is estimated in the report at 0.40 percent of GDP, i.e. 0.30 percent for municipal waste and 0.10 percent for industrial waste. As in the case of damage costs, the costs of meeting the various targets are also recognized as being extremely tentative.

a. Municipal Waste Targets

In light of expected income growth, and thus of additional solid waste generated, i.e. increasing from the current 0.8 kg/person to 1 kg/person, the targets are as follows:

(1) Increase the rate of collection from 85 percent in 1992 to 90 percent in 2005 and 95 percent in 2020. In addition, improve the quality of collection by standardization of containers.
(2) Increase the rate of recycling of paper, plastics and organic materials from 2 percent in 1992 to 5 percent in 2005 and 10 percent in 2020.

(3) Reduce the percentage of waste dumped in illegal[4] disposal sites from 51 percent in 1992 to 25 percent in 2005 and zero in 2020.

b. Industrial Waste Targets

By improved production techniques, reduction in the use of toxic substances, and resource recycling and recovery, the targets are as follows:

(1) Reduce production of the predicted amount of industrial waste in 2005 and 2020 by 15 percent and 30 percent respectively.
(2) Increase rate of recycling from 23 percent in 1992 to 35 percent in 2005 and 46 percent in 2020.
(3) Treat or eliminate 20 percent of the waste in 2005 and 40 percent in 2020.
(4) Reduce the percentage of waste dumped illegally from 73 percent in 1992 to 25 percent in 2005 and zero in 2020.

3) Reforms Required

The ONEM report contains general principles regarding the kind of reforms required to meet the above targets, rather than detailed recommendations. These are applicable to all environmental issues, and are as follows:

(1) Reinforcement of the institutional, administrative, and judicial framework
(2) Use of economic and financial instruments (polluter pays principle) for the reduction and control of pollution
(3) Establishment of a National Information System on environment
(4) Promotion of environmental education and awareness activities

4.3.2 Follow-Up to ONEM Strategy Report

The ONEM study is an extremely important input into the National Action Plan for Environment (PANE), which will result from the on-going work of the National Council on the Environment, comprised of key government ministries, governors, NGOs, and private enterprises, and chaired by the Minister of Environment. The general strategy, including physical targets, established in the ONEM report was accepted by the Council at its first meeting in June 1995. Since much refinement of details, including costs and specific recommendations were still required, the report became in effect a terms of reference for the work commissioned by the Council. The second meeting of the Council, in June 1996, will consider reports by 5 Commissions, each comprised of various ministries - these Commissions are on human establishments (largely revolving around human health, with solid waste being an important part); law and international relations; measures against pollution and nuisances; protection of natural resources and response to natural disasters; and culture, information and education. In each case reports will be prepared by the key ministries involved, the process being coordinated by the Ministry of Environment. Resulting from the work of the Council, a National Environmental Action Plan will be produced in June 1997; this action plan will in principle be consistent with the general strategy set out in the ONEM report.

[4] Definition of what constitutes "legal" dumping, as used in the report, requires some clarification.

4.3.3 World Bank Study

An important input to the National Council on the Environment's work in developing a national strategy for the environment will be the results of a study financed by the World Bank. This study, being carried out by a Swiss consulting firm, is extremely comprehensive, and will take two years to complete.

The study is aimed generally at strengthening the administrative and technical capacity of the Ministry of Environment, and clarifying responsibilities and relationships between the various central and local bodies involved in environmental matters, specific attention is paid to restructuring the National Council on Environment itself. The study is also intended to enhance and update the legal and regulatory framework; design an enforcement and compliance system; promote educational and awareness; and establish a National Environmental Information Network. The scope of the Study also includes the preparation of a legal text concerning hazardous waste. This study therefore focuses specifically on three of the four key reform areas noted above.

4.3.4 Subscription to Decisions of the International Community

1) Agenda 21

Convinced by the fact that every policy of economic and social development cannot reach its objectives without taking into account the environmental dimension, Morocco subscribes to all decisions made by the International Community and join the collective will to pressure the environment according to the Agenda (action plan) 21, adopted during the Rio Conference.

In conformity with these commitments, some measures and activities were respectively taken and initiated, especially:

- The creation of the State Undersecretariat in charge of Environment Protection in August 1992, set up separately as an entire Ministry (MoE) in February 1995 constituting the national focal point in charge of coordinating the efforts of different departments concerned by the Environment protection. Besides its role of coordinator, the MoE is in charge of directing the national policy concerning environment, initiating and promoting the improvement of environment, the protection and rational management of resources, etc

- The reenergiztion of the National Council of Environment (NCE) as an organ of consultation and dialogue of all the Socio-economical actors, aimed towards its restructuring and adapting of new data especially the integration of the concept of sustainable development

- The setting of provincial and regional councils of environment in charge of following the state of environment at both regional and local scale

- The elaboration of a National Strategy for the Protection of Environment and Sustainable Development (explained in Section 4.3.1), which allowed to set up a diagnosis of national environment, to identify different problems and define the

positions and great axis of the national policy concerning the protection of environment and sustainable development

- The elaboration, with the collaboration of the UNDP (PUND), of a National Action Plan for Environment (NAPE), which aims at achieving the priority objectives identified in national strategy and to reinforce efforts for the protection of environment and the promotion of sustainable employment

- The ratification of Conventions relative to biodiversity, global warming as well as the one against desertification. About 60 Conventions have been ratified already by Morocco

In addition, the following efforts are being made by the MoE as a result of following the Agenda 21:

- The elaboration of a law and decree project against air pollution.

- The elaboration of a decree project relative against accidental maritime pollution.

- The setting of an information and data system about the environment, a network of partner actors in information and data about environment (RAPIDE), a geographical data basis about the use of soil (in progress) and a network of sustainable development (in progress)

- The execution of national study about biodiversity which has the objective to elaborate a strategy and an action plan for preserving and sustainabilty using the (current) biodiversity, as well as initiating a project relative to preserving and developing the diversity of plant genetic resources

- The preparation of a national action plan against the desertification in collaboration with the Ministry of Agriculture, and issuing of an information campaign for applying the convention of struggling against desertification

- The capacities reinforcement project in order to respond to the framework Convention arrangements about climatic changes (current)

- The execution of a project aiming at the promotion of growth and durability of water resources in agricultural, urban, and industrial sectors

- The implementation of a project with national guidelines for the improvement of solid waste management (with the assistance of JICA)

- A study for creation of funds for industrial pollution clearing up which aims at promoting with industrialists, pollution control up and investment in appropriate technologies

2) Basel Convention on Prohibition of Trans-boundary Movement of Waste

Morocco ratified the convention on December 28, 1995. For Morocco the convention came into effect on March 27, 1996.

From the regulatory point of view, Morocco does not have a law directly managing hazardous waste apart from the Dahir of 1914 carrying regulation of insalubrious, inconvenient or hazardous establishments which is in the process of updating.

In other respects, the Ministry of Environment started some studies concerning hazardous waste disposal and environmental audits concerning industrial pollution. The scope of the 1st phase study of the environment management project financed by the World Bank includes the elaboration of judicial texts concerning the management of toxic chemical products as well as hazardous waste.

As far as the implementation of the Convention's arrangements, the Ministry of Environment presented a request to the Secretariat of Basel Convention for an assistance for the elaboration of an inventory of hazardous waste managed by industrial activities as well as development of an ecologically reasonable waste management system.

4.4 Financial Aspects

4.4.1 General Policy: Central-Local Fiscal Relationships

1) Responsibility for Solid Waste Management.

The central government has no explicit policy with regard to the financing of solid waste management in Morocco. It does not earmark funding for solid waste management at the municipal level, nor does it set guidelines or targets for expenditures on solid waste management by local governments, who have total responsibility for carrying out this service, including collection, transport and disposal. The situation is similar for industrial and hospital wastes; the central government has no policies to influence the amount or type of waste generated by the use of economic or financial incentives; nor does it have any mechanisms to generate funds of industrial or hospital waste management.

Nevertheless, the central government plays an extremely important, although indirect, role, in solid waste management. Thus hospitals are virtually totally dependent upon central government finance; and industrial production and therefore waste discharge is indirectly heavily influenced by government industrial and trade policy. More importantly for the present study, the local governments, which are responsible for a wide variety of functions, including solid waste, remain heavily dependent upon the central government for financial resources, and to a large degree are subject to central government control over how those resources are used, particularly with regard to capital investments.

The present role of the central government in solid waste management can therefore be described in terms of its financing of local government expenditures as a whole. This

function is illustrated below in light of the key aspect of central-local fiscal relationships, namely the process of decentralization that has been taking place in recent years. The nature and amount of financial support provided by the central government to local governments in Morocco is then shown, followed by a description of the various mechanisms used by the central government to transfer funds to local authorities; these consist primarily of the share of Value Added Tax (VAT) allocated to local governments, and local taxes that are actually administered by the central government. In addition, almost the sole source of loans for local government investments is the FEC (Fonds d'Equipement Communale), of which the central government is the sole shareholder.

2) Decentralization

During the last 20 years, Morocco has been implementing a process of decentralization aimed at giving local authorities increased financial and administrative responsibility for economic and social development. Traditional areas of responsibility at the local level have included solid and liquid waste disposal, streets and certain tertiary roads, slaughter houses, wholesale markets, industrial zones, parks and green spaces. This policy of decentralization has been reinforced in the last few years with the implementation in 1988 of the decision to allocate 30% of VAT revenues to local governments. Subsequent reforms, which started to take effect in 1995, have involved the distribution of VAT revenues, and are designed to promote more efficient use of these funds at the local level by giving local governments more control over how they are spent.

The process of decentralization has been limited in past years by the significant role played by the central government through various financial controls and mechanisms. This is illustrated by the system of investment transfers from central to local governments, which appear in accounting terms to be purely local government expenditures; however, a significant proportion of these expenditures are not controlled by local governments at all. Thus "shared expenditures", while of benefit to all local governments, are actually funds administered by the Ministry of Interior. The importance of central control is further illustrated by the decision in 1990 to transfer a number of central government programs to local budgets; these national programs included rural development, water supply, education, and health; rural electrification and civil protection were added to this list in 1991. This action was taken in order to relieve the fiscal situation of the central government. Together, shared expenditures and transferred programs accounted for about one third of the VAT distributed to local governments over the 1990-95 period.

Although the recent expansion of the FEC has provided local governments with an additional source of funding, they still remain heavily dependent upon the central government for funds. Central-local fiscal relationships are highly complex and involve constant and close interaction, particularly between local governments and the Ministry of Interior, which has to approve local budgets, as well as the Ministry of Finance. One control that is of special relevance for solid waste management is the ruling that local governments may not enter into multi-year financial contracts, which inhibits their ability to engage in long-term planning. Nevertheless, recent trends in rationalizing the system of central government transfers combined with the growing importance of FEC as a

means of inducing greater fiscal responsibility and competence at the local level are extremely important steps in making decentralization an effective reality.

3) Local Absorptive Capacity

The rationale for the retention of tight fiscal and administrative controls at the center is that local governments do not have the administrative, managerial and technical skills to plan and execute development projects and systems. An audit of 150 local government operations conducted in 1995 provided some evidence to this effect. In particular, the audit revealed a lack of co-ordination between the various functions carried out by local governments, with local finance bureaus failing to play an effective management role. The government's strategy is to progressively increase local administrative capability and to bring about increased involvement of local officials in financial management. This is recognized as a priority given the importance of the traditional functions of local governments; provision of technical assistance to achieve this end is therefore a major objective of the recently expanded FEC.

4.4.2 Financial Support to Local Governments

The important role played by the central government in financing activities at the local level is summarized in Table 4.4-1. This shows that in 1994, only 20 percent of assessed local government income was derived from local taxes and fees actually administered by the local authorities themselves. At almost 47 percent, the dominant source of income was the local governments' share of the VAT, although, as noted above, much of this has been for activites undertaken by the central government itself. VAT has accounted for a consistent share over the period, having been about 48 percent of total local government income in 1990. Local taxes, particularly those administered by the local governments themselves, have increased most rapidly. Borrowing has increased at the slowest rate of all (i.e. has fallen as a share of total local government income).

Table 4.4-1 Sources of Income:Local Governments, 1990-94

Unit: million DH

Source	1990	1991	1992	1993	1994	Total 1990/94	% 1994	% increase 1990/94
Local taxes 1/	1,277.0	1,551.0	1,699.0	2,106.0	2,227.0	8,860.0	21.4	7.4
Local taxes admin.by CG 1/	1,539.0	1,867.0	2,085.0	2,443.0	2,559.0	10,493.0	24.6	6.6
Share of VAT	3,565.0	4,019.0	4,447.0	4,375.0	4,560.0	20,966.0	43.8	28.0
Borrowing	961.7	822.8	538.5	1,017.0	1,072.9	4,413.1	10.3	12.0
Total	7,342.7	8,259.8	8,769.5	9,941.0	10,418.9	44,732.1	100.0	42.0

1/Assessed values.
Sources: Table Ronde; Ministry of Interior; study team estimates.

With regard to local government investment projects, Table 4.4-2 shows that whereas the VAT continues to be the primary source of funds, its share has declined substantially in recent years. Borrowing has started to become more significant, but once more, local

taxes and fees have shown by far the most rapid rate of growth. In fact for the 1990-94 period as a whole, of the total of 11.4 billion DH financed by VAT, only 4.8 billion DH (about 42 percent) was for local government investments, the remainder being to finance national programs carried out at the local level. The foregoing implies that the VAT has become increasingly relied upon by local governments as a means of financing their recurrent budgets, which was not at all the original intention.

Table 4.4-2 Sources of Finance for Investment projects: Local Governments, 1990-94

Unit: million DH

Source of Finance	1990	1991	1992	1993	1994	Total 1990-94	% 1994	% Increase 1990/94
Local Taxes and Fees	604.4	868.7	1,043.0	1,424.6	1,253.0	5,193.7	29.3	107.3
Share of VAT	2,350.0	2,525.0	2,552.0	2,036.0	1,956.0	11,419.0	45.7	-16.8
Borrowing	961.7	822.8	538.5	1,017.2	1,072.9	4,413.1	25.1	11.6
Total	3,916.1	4,216.5	4,133.5	4,477.8	4,281.9	21,025.8	100.0	9.3

Source: Table Ronde.

4.4.3 Local Taxes Administered by the Central Government

Three major local taxes, i.e. the urban tax, the tax d'etilite, and the "patente", are administered by the central government because of the complexity of the assessment and collection procedures. As shown in Table 4.4-1 above, the revenues obtained from these taxes accounted for almost one quarter of local government income in 1994, having risen slightly from 20 percent in 1990. The relative importance of these three taxes has however, changed considerably in recent years. Table 4.4-3 shows, for example, that the "patente" is growing rapidly in importance, while the urban tax has declined.

Table 4.4-3 Proportion of Revenues from Local Taxes Administered by the Central Government, 1989 and 1993

	1989 (%)	1993 (%)
Urban Tax	43.6	16.5
Tax d'étilite	56.0	45.6
Patent	1/	37.8

1/Negligible.

Sources: World Bank; Ministry of Interior; study team estimates.

The urban tax, is based on the rental value of buildings and land as well as on any equipment and capital investment made on this land. There are different rates for properties used for businesses and those used for housing; rates also vary according to the rental value of properties. There are a number of variations, for example, owner-occupiers receive a 75 percent deduction. Since the introduction of the general income tax in Morocco in 1990, owners of income-generating properties have not been

subjected to the urban tax. To compensate for this loss in revenue, local governments have been receiving, since 1990, all the proceeds from the "patente."

The "taxe d'édilité, or the "cleansing tax" is also based on the rental value of the buildings and the land. The rates are 6 percent and 10 percent depending on whether the property is located at the center or the periphery of the city. No exemptions or deductions are applied. This tax was introduced initially to cover the costs of street construction and maintenance, though in fact it is not earmarked for any particular expenditure.

The "patente" is a tax based on the rental value of buildings and land used for business activities. Rates vary according to the type of business conducted. Despite the fact that this tax is not based on business activities or profits, it provides important local government revenues. It has the advantage of being well known and accepted by the population and can potentially reach businesses that are not subjected to other taxes. Prior to 1990 only 10 percent of the proceeds of this tax was allocated to local governments, but since that date 100 percent has been so allocated. Overall, the loss in local revenues due to the reduction in the urban tax appear to have been more than offset by the additional revenues from the "patente", at least for most local governments.

These three taxes are collected by locally based Ministry of Finance staff, the Treasury keeps 10 percent and distributes the remainder equally between the commune and communite urbaine concerned. Keeping up to date with assessments is costly, and collections are frequently hindered by disputes. Delays in the collection of these taxes are due not only to disputes but also to inadequate assessment and collection procedures. Although the rationale for central government involvement in the collection process is that greater administerative capability is to be found at this level, only about 85 percent of the assessed taxes are actually collected. The cost of this failure is borne by local authorities; moreover, the uncertainty involved has an adverse effect on local government financial planning and budgeting.

4.4.4 Share of Value Added Tax

1) Capital Transfers

Over the last 20 years there has been a steady increase in central government funds formally transferred to local authorities, particularly after 1988, when a new law allocated at least 30 percent of VAT proceeds to local governments. A major weakness of the system in its early years was that it encouraged local governments to overstate local expenditures and understate revenues in order to obtain bigger central government subsidies; the system was therefore conducive to inefficiency and waste. Another aspect of the system, as noted earlier, was that the formal transfers tended to underestimate the real transfers - particularly in the early 1990's - because of the importance of national programs. The original intention of the law introduced in 1988 was for the VAT to be used primarily to assist local authority investment. However, the dominant feature of recent trends has been, as shown in Table 4.4-4, a constantly decreasing subsidy for local investments, and a rapidly gowing subsidy to local government recurrent budgets.

Table 4.4-4 Allocation of VAT Resources, 1990-95

Unit: Million DH

	1988	1989	1990	1991	1992	1993	1994	1995
Local Govt. Recurrent Budgets	690.7	905.4	1,185.5	1,603.9	1,880.9	2,250.7	2,603.8	2,926.7
Local Govt. Capital Budgets	1,724.7	1,867.7	1,278.3	1,097.5	780.3	759.4	684.2	497.0
National Programs	-	-	582.4	1,065.7	1,434.8	637.6	627.7	891.5
Shared Expenditures	455.1	462.6	541.3	724.4	356.0	570.0	527.8	488.8
Total	2,870.5	3,235.7	3,857.6	4,491.5	4,452.0	4,217.7	4,434.5	4,804.0

Source: Ministry of Interior.

Thus whereas in 1988, 24 percent of VAT proceeds financed local government recurrent expenditures, by 1995 this had risen to 61 percent. Correspondinly, VAT funds allocated for investments managed by local governments themselves fell from 60 percent to 10 percent. (Further details of the components of these expenditures are to be found in Section 5.3 below).

The rapid growth in the local sector and in particular the growth in the number of local employees has been a major explanation of this trend - these factors have placed an increasing burden on local operating budgets, at the expense of considerable under-investment in local infrastructure. Alternative sources of funding, by borrowing, have traditionally been unavailable to local governments, which has compounded the problem of local under-investment.

2) Reform of the VAT Distribution System

The foregoing problems led to a major reform of the VAT distribution system, designed to eliminate the deficit subsidy, and replace it with a more objective allocation of resources to the local sector. The new system began to be implemented in 1995. Under the new system - and after a transition period - 70 percent of the VAT revenues will be earmarked for local governments according to the following criteria:

- An amount equally distributed, to replace the phased-out operating subsidies; (5 percent of the allocation)
- An amount distributed on a per-capita basis, corrected for social equity in accordance with fiscal endowment as measured by assessments of local taxes managed by the central government (50 percent)
- An amount distributed in accordance with per-capita fiscal effort, as measured by collection of taxes managed by local governments (20 percent)
- An amount equally distributed to provincial capitals, to cover the associated costs of managing provincial affairs (5 percent)
- An amount distributed at the discretion of the Ministry of Interior, mainly to subsidize local governments adversely affected by the system, as well as to cover emergencies and common expenditures (20 percent)

Of the remaining 30 percent, 15 percent is allocated for the national programs transferred to local governments after 1990; 10 percent for shared expenditures; and 5 percent for emergencies.

Local governments will be able to use their share of the VAT either to cover operating costs and service debt or to carry out investments. There will be no precise or systematic earmarking of these transfers; however, local budgets will continue to be subjected to the approval of the Ministry of Interior. The new system gives more responsibility to local officials for decision making and is thus an important step in the decentralization process. The new distribution formula also gives considerable weight to allocation on the basis of need; the poorer communities therefore will obtain relatively large benefits from the new procedure. Moreover, it was announced in May 1996 that the central government programs transferred to local governments in 1990 and 1991 will revert to the central government budget in 1997. Thus effectively, the share of VAT received by local governments will increase from 70 percent to 85 percent, which will further accelerate decentralization.

4.4.5 Borrowing: The Fonds d'Equipement Communal

1) Evolution of the FEC

Traditionally, local authorities in Morocco have had extremely limited borrowing powers. Even today, they are limited almost entirely to obtaining funds from one source, namely the Fonds d'Equipement Communal (FEC). The FEC was first established in 1985, to finance local government development projects. Until 1992 the FEC was a government agency responsible for appraising communal investment projects and channeling fiscal resources to them; because of unsatisfactory lending performance it was restructured as a publicly owned but autonomous financial institution. The central government is the sole shareholder, and the Board of Directors and Board of Credit are heavily dominated by government officials. Indeed the FEC serves as an agency to promote the government's development objectives at the local level.

The FEC obtains its capital from the Central Government, and borrows from the World Bank and other external sources. The World Bank's First Municipal Finance Project, approved in 1993, provided much needed support to FEC in both financial and technical terms. The loan ($100 million for FEC and $4 million for the Kingdom of Morocco) was aimed at improving the effectiveness of local investments; distribution of the local share of the VAT among local governments, availability and delivery of local services; and management of the local sector: the proceeds of the World Bank loan were on-lent to local authorities in dirhams with a margin of about 4 percentage points to cover the foreign exchange risk plus 2.0 - 2.5 percentage points to cover the commercial and interest risks; and management costs. Maturities are up to 15 years with a grace period on principal of up to two years. The central government assumes foreign exchange risks in excess of the above exchange margin.

Strengthening of the FEC has been extremely important, not simply in mobilizing much needed capital resources at the local level, but also in helping to improve the quality of investment decision making and project implementation at the local level. To this end, the FEC follows principles very similar to the World Bank itself, in requiring borrowers to meet certain financial, economic, environmental, management and technical criteria as a condition for obtaining loans. Eligibility criteria include tests of financial viability. These include, for example, appropriate example, tariff policies and rates of return for revenue earning entities such as water utilities, and assurance of complementary local

government funds for non-revenue earning projects such as maximum debt service ratios for the local government as a whole.

Criteria also include adequate accounting and procurement methods; economic viability and use of cost-effective methods for proposed projects. Training and staff development is also typically required. To this end, some reform of FEC financial and managerial operations itself has also been required; the World Bank loan required FEC to meet certain targets for procedures, staffing, and financial performance. Generally its performance has been satisfactory, and disbursements have been going according to plan. One problem has been in attaining the agreed debt-equity ratio target, which has not been achieved due to delays in release of capital from the Central Treasury.

The FEC currently lends over 1 billion dirhams per year to local governments, as well as a relatively minor amount to regies (water, electricity, transport). In 1994, 73 percent of total lending was to urban communes, 5 percent to communities urbaines, and 18 percent to rural communes, with the remainder to regies. FEC loans by sector for 1993 and 1994 are shown in Table 4.4-5, where it will be noted that in 1993 solid waste accounted for only 3.5 percent of the total, rising to about 17 percent in 1994.

Table 4.4-5 FEC Loans by Sector, 1993-94

Unit: million DH

SECTORS	1993		1994	
	MDH	%	MDH	%
Water Supply	3.00	0.28	21.55	1.99
Electricity	670.98	62.86	142.94	13.22
Urban Transport	7.60	0.71	30.24	2.80
Commercial Equipment	22.33	2.09	172.21	15.93
Special Equipment	7.00	0.66	56.86	5.26
Urban Management	107.34	10.06	361.10	33.41
Sports/Tourism Equipment			21.16	1.96
Liquid Waste	43.50	4.08	89.62	8.29
Solid Waste	37.66	3.53	185.24	17.14
Other	167.97	15.74	-	-
TOTAL	1,067.37	100.00	1,080.90	100.00

Source: FEC

2) FEC Procedures for Solid Waste Projects

Protection of the environment, while ultimately the responsibility of the local governments, is of special concern to the FEC, and adequate environmental impact assessment is one of its investment criteria. With regard to solid waste, the FEC follows the procedures agreed with the World Bank, which are as follows:

a. Pre-Screening of Projects

- Any subproject involving solid waste collection (including the purchase of new equipment) should be supported by a comprehensive survey on garbage containers;

transfer locations and solid waste disposal; and a study for improving solid waste management (e.g., recycling and treatment);

- The proposed site for solid waste disposal at an existing public sanitary landfill to be improved, or at a new site to be developed; or a recycling plant to be built should be marked on a suitable map of the area;
- The status of the existing fleet of dump trucks must be assessed; taking into account its operating and maintenance scheme; and the possibility to shift from a public-owned and-operated system to private sector management;
- The capacity of solid waste disposal must be related to the volume collected; the nature and quality of household refuse; or other sources (e.g., industry; tourism, construction); and
- An environmental impact study and measures taken to alleviate health hazards must include a diagnosis of the weaknesses and requirements of the existing sanitary landfill and address the risks of air and water pollution.

b. Eligibility Criteria

- A financial analysis must be included; taking into account the marginal cost of effluents to be treated or re-used, including the cost of operation and maintenance;
- The economic analysis must assess the environmental impact and social indicators such as health improvement;
- Cost recovery procedures must be explained;
- In forecasts of future volumes of solid waste to be treated, reuse over a 10-year period must be related to the capacity of solid waste disposal; and
- Cost estimates and economic comparison of selected alternatives must support the selection of the proposed scheme, and detailed cost estimates and implementation schedule must be prepared.

c. Project Design

- Engineering standards must be adopted to the proposed system and feasible alternatives discussed (e.g. location of landfills; recycling of refuse;
- The environmental impact and measures to alleviate health hazards must be defined and assessed according to World Bank guidelines; and
- Cost estimates for the selected alternatives involving; in particular; the private sector and economic comparison of these alternatives should lead to the selection of the proposed sub-project.

3) Potential Key Role of FEC

In general, the FEC has a major role to play in developing the capability of local governments to become more efficient in investment decision making and management of local economic development activities. It is therefore a key part of the government's effort to make decentralization really effective.

4.4.6 Issues

The central issue seems to be to make the central government's role in environmental management in general, and in solid waste in particular, more proactive. In addition to specifying environmental standards and responsibility more clearly in legislative and administrative terms, possible financial measures that might be considered include the following:

1) Environmental Taxes

Introduction of environmental taxes, based upon the "polluter pays" principle. Such taxes might be in the form of effluent or discharge fees, levied at the point of discharge, or blunter instruments (product charges), which are based on the presumed environmental damage costs involved in their use and subsequent disposal. For solid waste in particular, such charges could be used to reduce the total volume discharged, or to switch to more environmentally friendly products. Deposit-refund systems should also be considered. These kinds of policy would both reduce costs as well as raise revenues, as well as encouraging economically efficient in resource use.

2) Industrial Incentives

In many countries, industrial investment in environmental controls has been encouraged by government subsidies, such as tax relief, and low interest loans. The potential contribution of such measures in the Moroccan context should also be examined.

3) Earmarking of Funds for Solid Waste

One possibility to consider would be to require a certain proportion of central government transfers to be used by local governments for specific environmental purposes. Possibly the funds obtained from pollution taxes could be used for this purpose. One reason why central government intervention might be justified is that the benefits of solid waste management (or environmental protection in general) do not always accrue solely to the area in which these activities take place. For example, inadequate solid waste disposal by one community may adversely affect another, possibly by the impact upon water resources that are used by more than one community. These "externalities" might justify central government financial as well as legislative intervention.

Another alternative might be for the FEC to establish targets for various activities it finances which give increasing emphasis to environmental projects in general and solid waste projects in particular.

4) User Charges

Increased revenues and more efficient solid waste management may result from the introduction of user charges for this service. Although actually implemented at the local level a consistent policy in this respect should be established by the central government.

5) Privatization

Similarly, privatization of certain slid waste management functions may yield operational efficiencies and thus cost-savings. The central government should create the legislative and administrative conditions conducive to privatization, including removal of the constraints currently faced by local governments in entering into multi year contracts.

6) Setting Priorities

Determination of the relative priority to be given to solid waste and other environmental expenditures should be assisted by epidemiological and other studies, including the cost of threats to water supplies. These should be carried out primarily at the central government level.

References

1. Table Ronde sur le Finacement des Investissements Municipaux dans les Pays du Maghreb, Republique de Tunisie, Banque Mondiale, Hammamet, Tunisie, 12-14 Juin, 1995.

2. Staff Appraisal Report, First Municipal Finance Project, Kingdom of Morocco, World Bank, May 21, 1993.

4.5 Technical Supports

4.5.1 General

Following the 1976 decentralization law, in principle SWM in the urban areas became the responsibility of the following elected bodies;

Urban Community

Operation of disposal site, and when available intermediate treatment facilities and transfer stations (inclusive of secondary transfer from the station to disposal site)

Urban Commune

Collection and Transport of Solid Waste

In terms of waste types, no laws clearly defining responsibility for management of medical and industrial wastes were found. However based on hearings the present situation is understood to be as follows;

Medical Waste

Wastes generated at hospitals are mostly transported by the urban communes to the disposal site. Only a small amount of pathogenic waste is incinerated in some cities such as Rabat.

Industrial Waste

Factories are responsible for the management of the waste generated on their premises. In principle they arrange for the waste transport to the disposal site either by their own vehicles or sub-contract.

Prior to this law, SWM was formally the responsibility of the Ministry of Interior's appointed local officials.

4.5.2 Central Government Role as defined in the Law

The draft decree on the "Law on Protection and Improvement of the Environment" defines a role for the central government to "... provide the necessary organs in order to implement the present law." Further the government should assist the concerned organizations and coordinate their activities in protecting and improvement of the environment. The law specifies the environmental protective measures to be considered for waste management, but not the detailed contents or measures, as described in articles 66 to 68 as follows;

reduction of waste amount generated,
provide adequate disposal, and
conditions for operation of collection, haulage, recovery, reuse, recycling, etc.

Decree 2/93/1011 (20th January 1995) sets out the duties and composition of the "National and Regional Councils of the Environment". The national council is composed of various central government organizations and has the following duties;

preserve ecological equilibrium of the natural surrounding, waters, soils, air, fauna, flora, and the landscape,
prevent, fight against and reduce all forms of pollution and nuisance, and
improve the environment and living conditions of the public.

4.5.3 Present Technical Role of Central Government for SWM

1) Ministry of Interior

The recent activities of the Ministry of Interior on the technical side of SWM, based on the hearings of this Study can be summarized as follows;

a. Compilation of SWM Data Base

In an effort to evaluate SWM operation the Ministry of Interior, in 1993 sent out questionnaires to the urban communes and communities. The questionnaire was divided into five (5) parts as follows:

Municipal public works (equipment, transfer stations, workshops, staff)
Urban commune personnel (organization chart, classification of staff)
Collection operation (equipment use, discharge, recycling, waste amount collected, collection problems)

Disposal site (site particulars, groundwater pollution, heavy equipment at the site, Operation method)
Waste collection cost

Slightly less than 1/2 of the questionnaires were returned, with varying degrees of coverage. The data base needed by the Ministry to assist it in providing technical guidance to the local authorities, was therefore not comprehensive.

b. Circular Letter to Urban Communities and Communes

In February 1995 the Ministry of Interior sent a letter to the urban communities and communes on SWM. The letter requested them to organize and implement campaigns with the following objectives:

Eliminate illegal dump sites located in the urban areas
Educate the public on proper discharge of the waste (suitable bins and locations, collection time schedule)
Select disposal site locations that are far from urban areas and pose no polluting dangers
The letter also included the need to prepare mid-term plans in the following fields;
Optimization of collection routes
Construction of transfer stations
Implementation of suitable treatment and disposal methods
Preparation of institutional, organizational and financial measures

The reaction of some of the urban communities and communes was surveyed in this Study's questionnaire survey and is shown in Table 4.5-1, of section 6) hereafter.

2) Ministry of Public Health

The Ministry of Public Health recently conducted studies and seminars on hospital waste treatment, in cooperation with WHO. In 1993 the incineration of hospital waste was studied but the implementation costs were found to be too high. An action plan was developed in 1993 but was not implemented because of lack of budget, organization and low priority.

In 1995 a technical committee was established for hospital waste to;

identify the issues,
prepare technical manual for collection, storage, transport, treatment and disposal of hospital waste,
prepare rules inside the hospital,
educate the personnel, and
coordinate related and necessary efforts amongst agencies.

The conclusions of this committee have not yet been published.

3) Ministry of Environment

The "National Strategy for Environment Protection and Sustainable Development" was developed by the Ministry of Environment in 1995. This study sets targets for collection and recycling rates for municipal and industrial wastes for the years 2005 and 2020. At present the only instance found where the Ministry provided technical guidance in SWM was during its participation in the committee for selection of the new Rabat disposal site.

4) Ministry of Industry

The Ministry of Industry has prepared a study in 1994, estimating generated industrial wastes by amount and types. Visits to a number of factories by the Study Team show that the ministry does not provide any official instructions or technical advises to them on treatment of industrial wastes. The ministry has however recently began to conduct seminars and hold discussions with groups of similar industries on the problem of industrial waste.

5) Ministry of Public Works

The Ministry of Public Works, through its regional offices has provided technical assistance in the selection of new disposal sites in at least two instances known to the Study Team; Rabat and Safi city. The regional office in Beni Mellal has also participated in preparing a study on SWM for that municipality. However these efforts appear to be based on request basis and no system for providing continuous technical guidance is in place.

6) Survey Questionnaire Results

Under the questionnaire survey conducted by this Study, the surveyed Urban Communities and Communes were asked about receiving any technical guidelines from the Central Government, and the steps they intend to take in reaction to the letter circulated by the Ministry of Interior, and described in the preceding section. A summary of the results is shown in Table 4.5-1.

Table 4.5-1 Questionnaire Response to Central Government Guidance

Unit: number of communities (4) and communes (18)

Item	Yes	No
A. Urban Community		
1. Receive guidance from Central Government	1	3
2. Reaction to the Ministry of Interior Circular		
2.1 Issue instructions to Urban Communes concerning waste collection service	1	3
2.2 Close and clear illegal dumping sites	2	2
2.3 Construct intermediate treatment facility		4
2.4 Construct new disposal site		4
2.5 Improve disposal operation	1	3
2.6 Implement public education campaigns	1	3
B. Urban Commune		
1. Receive guidance from Central Government	9	9
2. Reaction to the Ministry of Interior Circular		
2.1 Expand collection service coverage	9	9
2.2 Purchase new equipment	13	5
2.3 Recruit new personnel	14	4
2.4 Improve operation monitoring	11	7
2.5 Implement public education campaigns	10	8

The responses show that the number of urban communes and communities that do not receive guidance from the Central Government is notable. The negative responses of the urban communities to the need to improve disposal operation, and the urban communes to implement public education campaigns both indicate that there is the need for governmental guidance in these two important issues. On the other hand the positive reaction of the urban communes to the ministry's circular to procure more equipment and manpower, and improve monitoring system testifies to the weight that can be brought to bear by the central government.

4.5.4 Technical Support Role of the Central Government

Based on the existing SWM conditions in Morocco, and the experience of other countries, Table 4.5-2 lists the items in which the Central Government can provide technical support those supports actually provided.

Table 4.5-2 Technical Support from the Central Government

Issue	Remark
1. Develop appropriate technical systems and technologies	evaluate intermediate treatment systems, equipment suitability, landfill site operation, illegal dumping sites closure, etc.
2. Develop standards for operation based on city sizes, land use nature, etc.	indices for collection service rates, cost/ton of treated waste, ton/SWM laborer, vehicle utilization efficiencies
3. Provide technical assistance/ information to local authorities	data base collection, operation monitoring and evaluation, accounting system, tendering and contract preparation, training of personnel, etc.
4. Lead in initiatives on waste amount reduction and recycling	citizens cooperation, market studies for recycling, incentives to industries participation in recycling, etc.
5. Public education and citizens' awareness	education programs in schools on mass media on proper discharge manner, recycling, surveys of citizens awareness and identification of problem points, cultivate respect for SWM workers, etc.

4.6 Environmental and Sanitary Management

4.6.1 Environment Management

1) Policy Trends

a. Jurisdiction

Quality of the sanitary environment (habitat, salubrity, sanitation, potable water supply) is controled and managed by the municipalities and communes. Protection of the natural environment (water, air, nature, living species) is a task integrated in the jurisdiction of line ministries. The MoE, established in 1995, is the coordinating and controling agency. MoE has not yet established agency at provincial level.

Since the coordination policy of the MoE has just been established, the present situation is still determined by the piecemeal approach of environment management. Protection of natural resources is a responsibility shared by various agencies like the Direction of Hydraulics (MPW), Ministry of Health and ONEP, and several departments of the Ministry of Agriculture, among others.

b. Ministry of Environment

MoE has no direct jurisdiction on the environment. The advantage is that existing human and financial resources of line ministries are efficiently used through coordination. A prerequisite for success of coordination is that each concerned agency is being aware of environmental problems and is willing to set protection measures.

Policy for the protection of the environment is being developed by the CNE and the MoE. Objectives and recommendations adopted in the Agenda 21 constitute the framework for environmental policy development in Morocco. Basic tools for developing the main lines of an environmental protection policy are as follows:
- setting of environmental laws
- setting of environmental norms and standards
- setting of objectives in the environment strategy
- environment action plan
- EIA procedure setting

According to the draft environmental law, the standpoint is that responsibility for environmental protection is a task shared by administrative agencies, enterprises together with the citizens and organized associations.

Information, sensitization, education and training are priority objectives of the MoE and of the departments responsible for environmental protection. In that concern, the following projects are MoE's priorities:
- Development of a national network of data and exchange of information
- Development of human resources through training and education programs

c. Principles

Environmental protection policy development seems to be based on the following principles:
- to establish coordination between different departments;
- to get responsibility of each line ministry as regards to the protection of the environment;
- to get benefit of the existing expertise in each department;
- to take into account the scarcity of human and financial resources.

2) EIA Development

EIA is adopted by line ministries in certain cases but there is no legal obligation for it and there is no standard procedure. The MoE's approach as regards to the planned EIA procedure is as follows.

A new project must be reported to the MoE and to the line ministry together. The purpose is to set up TOR of the EIA if the activity belongs to the list of projects liable to EIA, or to determine the need of EIA in case where the activity does not belong to any of the 2 lists established. Waste disposal sites and waste storage establishments will be subject to EIA. The line ministry is in charge of establishment of TOR, submitted to approval of the MoE, which will improve the TOR in coordination with the concerned

departments. The line ministry will also participates to the EIA evaluation, and for providing recommendations about acceptability of the study. The EIA study will be transmitted to the MoE, before submission to the concerned departments.

According to the new EIA procedure actually set up by the MoE, control and follow up of environmental protection measures will be based on reporting by the project manager to the MoE and to the line ministry, according to conditions previously specified in the approved EIA evaluation report.

3) Monitoring and Control of Environmental Quality

Environmental monitoring of water quality, air quality, and marine water is organized on a piecemeal basis, with several jurisdictions and periodic investigations. Monitoring in the field of water is the most advanced one. Surface and groundwater quality is monitored or sampled by the Direction of Hydraulics (Ministry of Public Works), the National Laboratory of Study and Control of Pollution and Nuisances (MoE). Water resources quality is regularly checked by ONEP, and data communicated to the Ministry of Health. Permanent monitoring is still limited to surface water of the Sebou river basin.

As regards to solid waste disposal sites, there are isolated investigations made specially about water contamination issues (Casablanca, Rabat).

4) Hazardous and Toxic Waste Control Policy

The MoE's view is that hazardous and toxic waste should be correctly managed, on the basis of the Agenda 21's requirements. The draft environmental law and coming regulations will set the types of substances subject to authorization for disposal and transport, and the conditions of transportation.

Among the priorities given in the national environment strategy is the need to reduce the hazardous effect of industrial waste by control of quantity and concentration of toxic substances contained in waste materials.

5) Measures for Cleansing of Soil Contaminated by Waste

There is no inventory of soil contaminated sites. However, the occurence of soil contamination is probable for the following reasons:

- Industrial waste disposal conditions are not controled;
- Municipal landfills and clandestine dumps contain unknown quantities of hazardous and toxic wastes

The high concentrations of heavy metals in leachate, like those found in the analysis of the leachate at Akrech disposal site, are possible sources of soil and groundwater contamination.

The draft environmental law does not explicitly mention soil cleansing measures or soil contamination. There are however some principles that are significant for the soil issue. The approach of the draft environment law is that the manager of the site or activity

which presents environmental risks is responsible of dammages, and is in principle responsible for restoration of initial conditions.

6) Environmental Auditing

Direct work of the MoE with the enterprises level has started with environmental audit of industrial processes, with the pilot study of Mohammedia / Casablanca, concerning 10 industries. The purpose is to help the establishment of pollution control systems. Involvement of industrials has been possible through arguments like optimization of production, competitivity, and challenge with the coming regulations on emission standards.

4.6.2 Sanitation Management

1) Pest Control and Control of Vectors

Pest is a major nuisance for the people, specially in dirty places: Rodents, flies, insects. These species are also representing a serious threat to the health of the people. Main diseases transmitted to humans under unsalubrity conditions in Morocco are diarrheal diseases, intestinal parasits, cholera, typhoid, trachoma, and leishmaniosis. There are 2 species of flies that are considered as potential vectors for intestinal diseases, and might induce skin or eye illnesses. They particularly proliferate in unsalubrity conditions during summer, which is the peak period for diarrheic diseases in certain areas (Mohammedia case).

Sanitation management is a task delegated to the municipalities and communes. The MoH has however responsibility when vectors are a source of illnesses or diseases. Quality of drinking water is under control of the Ministry of Health. Control of vectors is organized by this ministry in epidemic or critical situations, and for the control of transmissible diseases. Main programs of the MoH in the field of control of vectors are those to manage malaria (anophel mosquitoe), schistosome (mollusc), and leishmaniosa (rodent species). Only the later is a risk related to environmental hygiene. There is no specific program for the control of vectors in relation with solid waste.

Provincial delegations of the MoH are in charge of control, identification, treatment, and prevention of diseases. Prevention activities are desinfection of the water sources with chlorine, and sensitization of population and communal staff. The nuisance aspect of vectors proliferation is entirely managed by the agency in charge of pest control, at local level, namely, the Municipal Office of Hygiene.

2) Drinking water

About 70% of the urban population is connected to a centralized system of water supply (ONEP). ONEP has 80 to 82% of the total production of potable water in Morocco. 67% is surface water resource. The water resources availability has been mainly developed from surface water. However, deep groundwater and superficial aquifers are used. Some deep groundwater resources are already overused. Groundwater seems to be the main resource in certain places like Fès, Marrakech, Agadir, and Oujda.

According to the questionnaire results, drinking water supply through the municipal network is ranging from 55% to 100% of the population, when data is available. Water supply outside this network is made of public fountains, and additional techniques like tank trucks, wells, and rain water tanks (case of Asfi Boudheb). Groundwater seems to be a minor resource for most of the investigated cities.

3) Sewerage

Drinking water supply and waste water treatment are priority issues in Morocco. Improvement of the treatment capacity, together with the increased quantity of waste water discharge due to economic growth, will generate important quantities of sludge waste.

45% of the urban population is connected to centralized sewerage, but population of big cities is almost connected to a centralized sewerage network. In 1990, there were 46 treatment plants for domestic wastewater, partially operating and totalizing a treatment capacity of 1% of domestic wastewater.

Main problems cited by the MoI for the operation of these plants are the lack of financial means, lack of maintenance, lack of information and training, and lack of planning operations.

4.6.3 Issues

In Morocco, national SWM policy development is in its preliminary stage. The environmental policy framework related to SWM has not been elaborated yet. It is proposed that the national environmental policy related to SWM should have the following conditions:
- Waste prevention or waste avoidance to reduce the potential environmental pollution;
- Waste reduction to reduce loads on the environment;
- Appropriate waste disposal to reduce environmental pollution.

To achieve the above objectives, the government must prepare a SWM law, which however would take some time before enactment. Without waiting for this law and in parallel with law development, it is necessary for the government to prepare guidelines concerning responsibilities and actions required on the part of organizations and people involved in SWM.

The following guidelines should be prepared from the environmental point of view:
- Guidelines concerning waste disposal site selection and facility design;
- Guidelines concerning disposal site operation and control;
- Guidelines concerning environmental impact assessment (EIA) required in connection with construction and operation of disposal site;
- Criteria for defining hazardous waste and inventory inventory of hazardous waste.

The above listed guidelines should also be prepared in parallel with the preparation of the SWM law. The central government should accumulate knowledge and experience in SWM administration, without which it cannot effectively enforce the law and guidelines.

4.7 Public Environmental Education and Participation

4.7.1 Public Environmental Education

1) Institutional Aspects

Several agencies or commissions are responsible for the development of environmental education: Direction of Communication and Training (MoE), Division of Sanitary Education (Direction of Population, MoH), Division of Epidemiology and Control of Diseases, Direction of Hospitals and Ambulatory Health Care (MoH), Commission for Environmental Education (Ministry of Education), Direction of Training and Communication (ONEP, MoPW), and several departments of the Minstry of Agriculture. As regards to the solid waste issue, awareness activities are mainly conducted by the MoH, the MoE, and the ONEP, which is however concerned from the standpoint of water quality.

Several programs of the MoH have public awareness objectives, like the school hygiene education program, the hospitals hygiene program, the awareness programs set up by the provincial animators of the health delegations, and others. School hygiene program covers school medicine and hygiene awareness, and is provided by a nurse.

Sanitary education at provincial level is provided by an animator of the provincial commission for health and hygiene. The animator is in charge of a program which was defined by himself in coordination with existing health sectoral programs. The Division of Sanitary Education (MoH) is conceiving a set of messages that can be refered to by the provincial animator.

2) Education Policy Trends

There are trends showing that environmental education should be more interactive, which means the involvement of educating and educated sides together, and should be decentralized at local and provincial levels. The project of partnership between MoE and NGOs, mentioned below, follows the same principle of heightening responsibility and taking actions at the local level. In addition, the need to develop supporting communication tools for the strengthening of public awareness has been recognized by central agencies.

The development of interactive campaigns has been traditionnally adopted by the MoH, but is taking a new turn with the establishment of mobile units with animators for the presentation of educative materials like video films. ONEP (Ministry of Public Works) has also started interactive approach in schools. The idea is to provide a kit of awareness materials to the pupils, and a corresponding guide for teachers (materials are going to be distributed during 1996).

Decentralization of the strengthening of public awareness action at the local level is also a major trend. The MoE's approach is that it is necessary to integrate the communication into the current activities of the local agencies, in order to ensure a permanent heightening of public awareness, which is consistent with the general purpose of sustainable development. Provincial commissions for population / environment have

been established in 20 provinces with the purpose of identification of environmental problems and improvement of public awareness. MoH has already adopted a similar view since the Division of Sanitary Education provides the educative materials, but planning and implementation are under responsibility of the provincial animator.

3) MoE's Actions

The MOE's actions for environmental heightening of public awareness have been initiated with the project of public awareness and education of people to the problems resulting from interaction between population and the environment (realized by the Under-Secretary of State for Environment with United Nations funds of FNUAP and UNESCO). General principles of awareness campaigns have been presented by the MoE in a study of the basic methodological steps for awareness heightening.

Pertaining to the communication tools, the MoE's study recommends the use of traditionnal ways of communication like video projections in markets once a week in rural areas, and the imam's speech at mosque each friday.

Main objectives identified by the MoE's study are the following:
- to make known the importance of environment, the types of nuisances and the effects;
- to inform the Moroccan people about the state of environment, within the regional and international context;
- to underline the potential negative impacts on quality of life and on local, regional, national development due to unenvironmental behavior;
- to influence such behavior through messages.

4) Projects and Campaigns for Hygiene Awareness

There are national campaigns about cleanliness of the livelihood and hygiene, generally linked to the international environmental calendar, mainly the Earth Environment Day, or the Earth Tree Day.
Examples are given below:
- hygiene of beaches (1994, earth environment day);
- blue chain (protection of the Meditteranean sea);
- clean city (1995, earth environment day).

The clean city campaign has been animated by the itinerant exhibition on urban environment (MoE), according to the following circuit: Marrakech, Fes, Casablanca, Kenitra, El Jadida, Sale / Rabat.

There are campaigns which have been more specifically dealing with the waste issue, and initiated within the scope of awareness programs:
- Hygiene at hospitals (MoH), initiated by the Division of Sanitary Education, and now endorsed by the Division of Hospitals;
- The "health - cities" WHO program, under MoH, with pilot projects in Mohammedia, and a school sanitary education project at Agdal Ryad commune (3 schools);

5) The Case of the Water Saving Program (ONEP)

The ONEP water saving program is an important program which includes waste and hygiene issues. Besides its awareness heightening actions, this program includes aspects like the identification of water losses in the distribution network, the technical restoration of the network when needed, and the water price setting to penalize important water consumers.

The sensitization action of the water saving program of the ONEP is under evaluation. The global result of the program is known: Water demand increase, which was of 8% per annum, has decreased to 4%.

The experience of the ONEP for water saving is useful to be considered given its success, because benefits are regarded to be largely higher than the investment cost of the program. The ONEP's approach is:
- that awareness is integrated within a program of actions;
- that awareness has been always innovated and improved;
- that awareness campaign have mobilized important budget and staff.

6) Environmental Education Programs

Environmental Education programs are adressed to primary and secondary schools and are generally under responsibility or supervision of the Ministry of Education. They are as follows:
- The program of education in the field of population;
- Project V.

The program of education in the field of population has already been implemented and achieved. The output has been integration of population issues, of which environment and hygiene are important, into the school cursus. Teachers have received a reference book for that purpose.

The "Project V" (Promotion of education in the field of environment) is the 5th step of a cooperation agreement between Morocco and the African Development Bank (restructuring the education system). The project, starting in 1995, is scheduled for 5 years, and involves 5 departments, of which the MoE. Output is a manual for pupils, a guidebook for teachers, and the training of 21,500 school teachers to develop competence in environmental education.

Morocco is also enforcing international cooperation in the field of environment education, through the GLOBE project, and the project to establish an Arab Association for Environmental Education.

The GLOBE project (World Program of Sensitization and Research on Environment) is a 5 years project that needs agreement of the Ministry of Education.

4.7.2 Environmental Training

1) General

Environmental training for SWM has several purposes:
- to increase awareness of the workers of the SWM sector;
- to create new jobs for protection of health and environment in SWM sector;
- to increase awareness of decision makers in relation with SWM;
- to upgrade skills in SWM.

Main tools used in Morocco for environmental training include study days, stages, integration into technical school courses, workshops, seminars, and study tours.

Training is operated by each line ministry. The National Institute for Hygiene (Direction of Epidemiology and Control of Transmissible Diseases) trains people to become animators of environment and environmental hygiene, within the provincial delegation of the MoH. The Ministry of Interior (MoI) is making a considerable efforts towards training of local technicians and city councilors. The MoE provides training for the in-house staff, and takes opportunity of study needs in the field of environment to increase skills. For example, the organization work set up for the preparation of the regional environmental monographs is an opportunity for the MoE to play its role of animation and stimulation, and for the staff to be trained.

2) The MoI Training Program

The MoI's purpose is to have at municipal level a chief engineer trained by one of the training institutes of the ministry, covering a team of municipal engineers. The idea of the MoI is to set at communal level a complete basic and competent team composed of an engineer, a jurist, a medical doctor, and a technician.

Training needs have been investigated. As regards to the training needs of city councilors, a questionnaire has been sent to 22,000 of them. 92% have sent answer, of which 97% considered that training is important. MoI is planning 490 actions / year for this specific task.

The MoI is managing 11 training centers, of which 4 are technical institutes. These 4 institutes are training 1,000 technicians / year (2 years training). In each commune and province, there is a training division which controls the execution of the training program prepared by the MoI. The action of the MoI in the field of training can be illustrated by some data: 1000 executives were trained in 1994, 10,000 in 1995, and 20,000 are expected in 1996.

Training in the field of solid and liquid waste has been instituted, starting with the training of trainers for 20 selected. For that purpose, 8 actions (or seminars) have been set up for 1996, with 25 participants for each action. Trainers are sent in foreign countries to improve their skills. At the same time, the MoI has signed a convention with the engineering school of Hassaria for establishing a new technical course, for training of municipal engineers. First promotion is planned for 1998.

3) Solid Waste Related Employment

Creation of new employment and enterprises for the management of environment is identified as one major objective in the environmental strategy. The lack of human resources and manpower, mentioned in the responses to the JICA study questionnaire, shows the high potential for environmental employment. Creating employment is directly linked with the identification of needs, with development of training, and with environmental education at long term.

4.7.3 Participation of Public

1) Consultation of the Public

Consultation of population is regulated according to the law of classified establishments. However, the present permitting procedure is a simple one and does not include any specific procedure at planning stage to ensure active and direct consultation of concerned populations. Within the new permitting system based on EIA procedure, town councilor will be authorized to give comments and to make propositions.

Provincial commissions for population / environment are generally composed of the provincial delegations of line ministries, urban communities and municipalities. Professional associations, communities associations, and private sector are almost not represented.

2) Partnership with NGOs

There are trends to consider associations as partners of the administration. Examples are the transfer of management duties to an NGO by the MoA, as explained below, and the project of a partnership convention between MoE and NGOs.

a. Case of MoA

The National Center of Environmental Education lies in the natural reserve of Sidi Boughaba, which is a wetland classified as a RAMSAR site. According to a convention signed with the ministry, the management of part of the reserve and of the education center has been transferred to an NGO, called the Committee for the Problems of Nature Conservation, established in Temara. One person staff of the ministry, a forestry engineer, has taken a permanent function at the center. Staff has recently been enforced by employing a person belonging to the Ministry of Education, through a convention between the NGO and the ministry.

b. Case of MoE

NGOs have organizational weaknesses that inhibit their impacts. Projects are isolated one another and isolated from the planned governmental projects. The on-going partnership between MoE and NGOs will help to exchange information and coordinate actions.

4.7.4 Issues

Key information to be disseminated through public education includes:
- Information on the benefits to the people from environmental protection;
- Objectives of actions required on the part of citizens and enterprises in connection with SWM;
- Basic information concerning SWM.

Concerning the public education in connection with SWM, the following needs are identified:
- Need to strengthen environmental awareness;
- Need to design appropriate policy for the strengthening of awareness;
- Need of coordination between involved agencies to avoid duplication of efforts;
- Need to create education materials;
- Need to increase the role of NGOs.

Chapter 5 Municipal Solid Waste Management

CHAPTER 5 MUNICIPAL SOLID WASTE MANAGEMENT

5.1. Institutional and Legal Framework

We have seen in the previous sections the national organizations which are involved in S.W.M. In this section, we will present S.W.M. at the municipal level. We will analyze the organization and the procedures, the legal framework, the policies, programs and plans put into place for the management of S.W.M. at the communal level.

5.1.1 Institution and Organization

To have a clear idea on the reality of S.W.M. at the communal level, we will study successively :

1. The organization of the municipal services (organization chart),
2. The respective responsibilities of the communal council and of the technical services,
3. The management of human resources,
4. The coordination of actions.

1) Organization of the Municipal Services

This organization must be understood at two levels : at the level of the commune and at the level of the technical services.

The organization chart of a commune is generally presented in the form of a rake. At the top of the services we find the President of the communal council, then directly under him the secretary general who runs the various services, of which number depends according to the importance of the commune, namely : the financial service, the technical service, sometimes called Communal Works, the service for new works, the municipal office of hygiene, the department of human resources, the registry office, the social and cultural service, the legal service, the public corporation service if necessary, the computer service, the plan service, the market service, office of order, ...etc.
The technical service of the commune comprises many subdivisions such as road works, lighting, sewage, cleansing and municipal workshop. The subdivision of Waste Management may be itself organized into sectors and sections. The sectors are under the responsibility of a corporal. The sections correspond to the territory which is under the responsibility of an agent or a team of Waste Management agents. The subdivision of Waste Management frequently has many activities : solid waste collection and haulage, street sweeping and washing, parks and gardens, treatment. The communal workshop is in charge of the maintenance of all the commune vehicles. It does not pertain therefore to the service of Waste Management.

In typical Moroccan communes, a professional officer such as engineer or accountant is responsible for doing his or her professional job for multiple sectors (functions) such as SWM, water supply, roads, etc., while in Europe and Japan for town of a certain site (more than 100.000 inhabitants), each sector (SWM for

example) in the commune office has all necessary professional officers including engineers, planners, and accountants which are required to perform the sector's function.

The Moroccan system is a rational system under the current condition that the qualified professional officers are scarce, and the need for respective function is not extremely high. However, with the increasing needs for higher level of public service, it would be necessary that each sector (SWM for example) should necessarily have professionals within the sector.

2) Respective Responsibilities of the Municipal Council and the Technical Services

In section 2.6.1. Delegation and Local Government, we have seen that there is no legal obligation for the commune to organize a solid waste collection service. However, in most of the urban communes, this service is normally provided for the population. Not only waste collection, but also the sweeping and sometimes the washing of the streets, the maintenance of parks and gardens, and the disposal of waste are provided. We will analyze the responsibilities of the municipal council and of the technical services in the following paragraphs.

According to the 1976 Decentralization Law, the president of the commune is chosen from the commune assembly members who are chosen by the citizens. Because of the introduction of this democratic system, the communes and its president are now more concerned with the citizens' needs than before.

a. Responsibility of the Municipal Council and its President

The President of the municipal council defines the commune's policy in the field of environment in general, and of S.W.M. in particular. He has to fix the objectives to be attained in this field, and to inform his colleagues about these objectives by means of precise instructions. He has to define the priorities of S.W.M. of the commune, and thus the financial means which are appropriated to it. He prepares in collaboration with his vice presidents the communal budget which is the financial transcription of his policy.

The municipal council votes the commune's annual budget (see 2.6.1. Delegation and Local Government). Therefore, he has to agree to the commune's policy concerning waste management and to assign to this service the necessary human and material means to carry out this policy. He decides for the investments, in particular for the purchase of the collection trucks, and fixes the financial means, i.e. own funds, loan from the FEC, supplier's credit.

The President of the municipal council or rather his assistant responsible for the Waste Management may initiate communication campaigns to heighten the population's awareness as regards Waste Management within the Commune. Through reading the questionnaires filled by the questioned communes during our study, it appears that these campaigns are not systematic. Despite the fact that the responsibles display a great interest for S.W.M., several communes have not taken

any action in this field. One Municipal Engineer has even told us that he could not carry out any action of awareness in the schools because the council does not consent.

b. Responsibility of the Technical Services

The technical services are responsible for the implementation of the commune's actions in the field of S.W.M. For the appropriate daily running of the services, the Municipal Engineer sets to divide the commune into sectors and sections. In principle, for each section are assigned precise human and material means. A particular route is fixed for each vehicle. It must be respected by the driver. The right execution of the service is controlled by the corporals of the sectors.

This organization is actually often theoritical. Owing to the breakdown of a truck, for example, the service will become disorganized, the other vehicles must extend their routes to cover his sector. Teams of S.W.M. may be called for to carry out non-regular tasks by the supervising authorities, the Governor or another agent from the authorities. These non-regular tasks, such as the organization of feasts and events, do not have a particular budget and are improperly charged to the expenses of SWM.

The communal technical services are in charge of the management of S.W.M. expenses. As there is no analytic accounting per service within the Moroccan communes, it is difficult for the engineer to know precisely the expenses of each service. The ratios of S.W.M. expenses per inhabitant or per tonne are not generally known, which makes it difficult for communes to make any comparison and therefore any acute analysis of this sector.

The Municipal Engineer may take initiatives to improve S.W.M. by organizing night waste collection for example, which allows communes to use the vehicles for other activities during the day (public works or construction), as is the case in Taza. In some communes the engineer has to submit his propositions of reorganization to the President and get his approval. In other communes he takes advantage from a large delegation from the part of the President and gains therefore a wide autonomy.

A computerized management of S.W.M. is planned for some communes. According to our data, the commune of Agadir has an on-going project for organizing its collection circuits, the management of its vehicle workshop, and the optimal use of its personnel with computers.

3) Management of Human Resources

S.W.M. is an activity which uses many workers. The President or by delegation the personnel department of the commune are in charge of recruitment. The hierarchical positions, the recruitment procedure and the other procedures are fixed within the framework of the general status of the public service.

The level of training recorded in S.W.M. is weak. The number of graduates is limited, 1 to 7 per commune. Nevertheless, a tendency which consists of giving

assistance to the communal engineer by young graduates is taking place. It would be interesting to know the university degrees of these executives.

The workers' level of education is low. The number of illiterates can reach up to 40 %. Despite this considerable rate of unskilled personnel, there is no scheduled training programme in the communes. Among those which we have visited, it is not even planned for their agents to have the driving licence test for which they ask.

Although work in the service of Waste Management is recognized to be particularly laborious, the rate of absenteeism is low. Except one commune, it is less than 5 %.

It is necessary for the communes to recruit more number of engineers to strengthen the commune's public services. It is also necessary for the communes to provide some training for personnel involved in public services, especially solid waste management. The communes should also teach their illiterate workers reading and writing skill as well as sanitation and safety so that they could be more concerned.

Ministry of Interior has training programs for the communes' technicians in the fields of civil engineering, hydraulic power, construction and trees planting. In future, it is advisable that this program will include also a training program for SWM.

4) Coordination of Actions

At the commune's level, S.W.M. services have coordination with the financial services, with the Municipal Health Office (BMH) and especially with the communal workshop for the maintenance of their vehicle parking. They have weak relationships with public transport, the service for water supply which is often a public corporation having an autonomy of management, and sewage.

If the commune belongs to an urban community, they coordinate actions with each other as regards solid waste treatment. If the urban community runs transfer stations as is the case in Marrakech, and as planned in Casablanca, coordination is also ensured for these stations.

Coordination also exists with the decentralized services of the administration of Rabat. The most frequent relations are with the services of the Governor or of the Wali, who has an authority for supervising the communes. This coordination is not always perceptible within the services of S.W.M., but it is strong at the level of decision. The Ministry of Interior's letter dated February 7th, 1995 illustrates this coordination. According to this letter, the communes must send a monthly report to the Governor to sum up the actions undertaken in the field of S.W.M. It is a good exercise to initiate reflection in this field and to prepare a programme of actions.

As for the urban communes who do not have a disposal site on their communal territory, a coordinated action must be set up with one or several rural communes to define a suitable site for treatment. Taking into account the technical, psychological, and political difficulties linked to this kind of choice, arbitration from the part of the supervising authorities is necessary.

5) Issues

It is judged that in Morocco, the waste collection service is rather satisfactory, while the disposal is of poor level. On the whole, SWM of the urban communes is of a primitive level.

The urban communes do not have explicit SWM service objectives. Responsibilities of personnel involved in SWM is not adequately specified. There is no explicit indicators used for evaluation of SWM service performance.

It would not be easy to improve the SWM service under the current organization and management system of the communes. It would be necessary to change the organization and management structure to upgrade the SWM.

Human resource development and securing of qualified professionals including engineers and technicians of different level are essential. In future, it would be necessary to change the commune's SWM organization from the current type to an enterprise type, i.e. a SWM organization which has all necessary professionals within it.

A compost plant in Rabat has a form of public enterprise. However, its management is not good possibly because the managerial independency of the enterprise is not assured.

It is now become a world wide consensus that private SWM contractors would provide better service efficiently. Use of private SWM contractors should be seriously considered in Morocco.

5.1.2. Legislative Framework

We will not go back to the legislation or the lack of legislation concerning S.W.M., illustrated in section 4.2. Legislation related to S.W.M., which is of course applying to the commune. We will present the following points :

1. The communal decrees concerning S.W.M.,
2. The applied penalties,
3. Influence of laws or projects of law concerning environment.

1) Communal Decrees Concerning S.W.M.

At the municipal level, the texts applicable to S.W.M. are just decrees. These generally fix the schedule of solid waste collection. They sometimes specify the conditions in which the waste must be presented in order to be removed by the communal service. It is interesting to note that certain non conscientious communes have forgotten to modify the text of their decrees to suit to the new schedule for collection, which would put citizens in a situation of continuous violation.

In general, the Moroccan urban communes do not have a SWM norm which clearly specifies respective responsibilities of the citizens, enterprises and the communes. The urban communes should have such norm.

Under the current laws, it is not clear whether or not the urban communes have a right to refuse the provision of waste collection service for illegal houses or specific enterprises. The legal clarification on this point is necessary.

2) Applied Penalties

The lack of discipline on the part of the citizens is often mentioned to explain the difficulties of S.W.M. services for maintaining the quality of the communes' environment. But this lack of discipline is rarely penalized. It is true that it is not easy to confound the violators, except if they are caught on the spot. Moreover, the amount of the fines is not sufficiently dissuasive. In Tanger, the 1961 decrees which fixed the fines to DH 5. had to be replaced by a new decree which fixes the rate to DH 50. A body of 6 agents from the BMH have the responsibility to charge any violator in this commune.

3) Influence of Laws or Projects of Law Concerning Environment

In section 4.2 Legislation related to S.W.M., we have cited the law on water and the project related to protection against the pollution of the atmosphere. These two texts enable to mention what would be the action of the communes in the sector of industrial waste : repressive and incentive.

It is the police that can charge the penalty. Actual cases of the enforcement of the penalty are shown in Section 5.2.2.

The 1914 law gives to the communes the power to control the establishments classified as potentially dangerous for the environment. Actually this control is theoretical because it lacks standard bases for its exercise. The project decree of the implementation of the law related to protection against the atmospheric pollution provides in its appendices maximum values of emission standard in the atmosphere. Owing to such elements, it will be possible for the communes to have indisputable bases for controlling industrial emissions.

The law on water institutes basin's authorities. These authorities will be provided with controlling organs. It would be convenient that they should also have, as it is the case in France, budgets enabling them to provide financial incentives to industries which are willing to be equipped with non polluting manufacturing processes. The communes may help the industries set up on the communal territory to fill up the financial incentive request form before sending them to the basin's authorities.

5.1.3 Programs and Plans

In the light of the questionnaire answers obtained from the communes, we will describe the programs and the objectives defined by the communes concerning S.W.M.

1) Programs

The communes pay more and more attention to S.W.M. in recent years, as this has been confirmed to us on several occasions. According to the communes' estimations, solid waste collection service ensures a coverage rate between 75 and 100 %. The strong urbanization observed in the large urban centers of Morocco obliges the communes to increase their human and material means to face up to an ever-increasing production of waste.

The demand for new housings is taken into account by master plans, and the communes have been endowed with a planning service in order to harmonize and to implement their policy of municipal territory planning. But the technical services do not have a specialized section to devise and to draft the master plan for S.W.M. It is the communal engineer who is in charge of this task. As he is very much in demand by the management of the current affairs, he can dedicate only a limited time to the S.W.M. planning. That is why only 5 communes have declared to have a specific plan for S.W.M.

These plans have often been elaborated by independent consultants or engineering consultants asked to back up in the completion of the analysis of the data already collected by the commune. During the last 10 years, many studies have been carried out concerning the main cities of Morocco. Other projects also exist, in particular that concerning « Cities Health » for the cities of Agadir, Meknes, Mohammedia, and Settat, a study in progress for the master plan of solid waste of the urban community of Agadir, and a consultation for that of the Wilaya of Rabat-Sale.

2) Objectives

In their plans the communes define the objectives set for S.W.M. for the months and years to come.

An often-mentioned objective is the elimination of blackspots. During the cleaning campaigns, on the occasion of the international day of the environment, the communes organize actions in order to remove them. The commune of Mohammedia has undertaken to set up a chart showing 80 blackspots of the city, 10 of them are large, in order to better solve this reccurent problem.

Another objective concerns the material means. The needs are expressed by the technical services who prepare a list of the equipments to be purchased. After the approval of the communal engineer, this request is addressed to the President of the communal council.

This procedure of successive fittings is preferred to an investment plan set for the short and the middle term.

Concerning human resources, the objectives are contradictory. For the quality of the cleaning service and to promote work, it is desirable to reinforce manpower. On the other hand, for the sound management of the commune's resources, a rationalization of the personnel is recommended. One way to avoid this dilemma is to promote temporary employment within the framework of the National Promotion (NP). In fact, this possibility has been widely used in certain communes like Sidi Belyout and Mohammedia, the manpower of the NP goes beyond 50 % of the personnel used by S.W.M.

The computerization of S.W.M. services is an objective sought-after. Much sought-after than really implemented. In fact, because of the lack of means, the management of the personnel, of the workshop and of collection or cleaning routes, remains manual. The adoption of computerization means will enable to have a better knowledge of S.W.M. expenses. The computerization would be the opportunity to set plans of training for the management and administrative personnel.

Except for the Urban Community of Casablanca, it seems that the urban communities do not have adequate capacity to plan appropriate waste disposal sites. The central government (MoE) should provide guidelines for disposal planning as well as for disposal site selection and design, and encourage the urban communities to establish a disposal planning unit within the community. The Central Government should also clarify the legal procedure followed in connection with the construction of disposal sites.

5.2 Technical and Operational Aspects

Under this Study a questionnaire was sent to 5 urban communities and 23 urban communes. Site visits were also made to a number of these communes. The data from these surveys are still being compiled at present (translation, information confirmation, etc..). This section is prepared based on the preliminary results of that survey.

The surveyed urban communities of Rabat, Oujda, Casablanca, Marrakech and Safi cover four regions of the country and represent 60% of the total urban communities population (in 1994). On the other hand the combined populations of the surveyed urban communes comprise 22% of the total urban population (1994) and over 10% of the national population. Therefore in the analysis of the results generalization has been avoided.

5.2.1 Solid Waste Generation

1) Waste Amount

An attempt was made to understand the unit generation rates by waste type, but the majority of the questionnaires provided total waste amounts. As to the method of estimation of generation amounts, most of the urban communes referred to the truck

trips and their estimated service coverage rates. However a small number of communes based their estimates on measured weights. The results are shown in Table 5.2-1.

The unit generation rates ranged from 0.3 to 1.3 kg/cap/day, with an average of 0.65. This is considered rather high. Generation rates produced through weighing were lower than those estimated using trip numbers, which may indicate the importance of weighing to obtain more accurate figures. The majority of the readings range between 0.45 and 0.85. It is unfortunate that no regional economic data could be obtained to correlate with the unit generated rates. However the large discrepancies in the figures shows the need for more detailed surveys by the urban communes, as described in section 3.2 of this report.

Table 5.2-1 Generated Waste Amount from Questionnaire Survey

Urban Commune	Population in 1995	Waste Amount (ton/d)	Unit generation (kg/cap/d)	Estimation method
A. TENSIFT REGION				
A.1 Marrakech				
(1) Machouar Kasba	29,827	22.05	0.74	trip number
(2) Menara Gueliz				
(3) Marrakech Medina	195,048	55.07	0.28	weighing
(4) Marrakech				
A.2 Safi				
(5) Asfi Biyada	67,847	43.84	0.65	trip number
(6) Asfi Boudheb	103,779	32.52	0.31	weighing
(7) Asfi Zaouia	98,470	30.10	0.31	trip number
B. CENTRAL REGION				
B.1 Casablanca				
(8) Hay Hassani	204,140	135.99	0.67	trip number
(9) Ain Sebaa	143,502	89.04	0.62	weighing
(10) Sidi Belyout	220,000	220.00	1.00	trip number
B. 2 (11) Beni Mellal	144,418	105.28	0.73	weighing
B. 3 (12) Mohammedia	175,164	112.51	0.64	trip number
B. 4 (13) El Jadida	122,655	139.50	1.14	trip number
B. 5 (14) Khouribga				
B. 6 (15) Settat	99,118	38.53	0.39	trip number
C. NORTH-WEST REGION				
C.1 Kenitra				
(16) Kenitra Maamoura				
(17) Kenitra Sakina				
C. 2 Rabat				
(18) Agdal Riyad	76,226	100.00	1.31	trip number
(19) Yaacoub el Mansour	205,665	91.20	0.44	trip number
C. 3 Tangier				
(20) Tangier	273,147	252.00	0.92	trip number
D. CENTRAL NORTH REGION				
D. 1 (21) Taza el Jadida	95,485	46.00	0.48	trip number
D. 2 Oujda				
(22) Sidi Maafa	116,225	NA	NA	NA
(23) Sidi Ziane	150,526	128.44	0.85	weighing

Note: Questionnaires from Urban Communes with no data are left blank

2) Waste Composition

The waste composition, as estimated by each urban commune surveyed is shown in Table 5.2-2. The composition is similar for all the communes, with the paper content showing an edge in urban communes where the commercial center is located (Sidi Belyout, Sidi Ziane). Of important significance is the fact that 44% of the surveyed urban communes do not have such data available.

Table 5.2-2 Waste Composition from Questionnaire Survey

Unit: percentage (%)

Urban Commune	Organic	Paper	Plastic	Metal	Glass	Others
A. TENSIFT REGION						
A.1 Marrakech						
(1) Machouar Kasba	78.84	13.20	3.33	1.30	0.83	2.50
(2) Menara Gueliz						
(3) Marrakech Medina	75.00	13.20	5.33	1.64	2.83	2.00
(4) Marrakech						
A.2 Safi						
(5) Asfi Biyada	NA	NA	NA	NA	NA	NA
(6) Asfi Boudheb	65.85	7.27	3.67	1.07	0.00	22.14
(7) Asfi Zaouia	65.85	7.27	3.67	1.07	0.00	22.14
B. CENTRAL REGION						
B.1 Casablanca						
(8) Hay Hassani	79.00	6.00	8.00	2.00	1.00	4.00
(9) Ain Sebaa	NA	NA	NA	NA	NA	NA
(10) Sidi Belyout	67.50	19.00	2.50	2.00	0.75	8.25
B. 2 (11) Beni Mellal	NA	NA	NA	NA	NA	NA
B. 3 (12) Mohammedia	68.30	7.20	6.10	5.00	3.90	9.50
B. 4 (13) El Jadida	NA	NA	NA	NA	NA	NA
B. 5 (14) Khouribga						
B. 6 (15) Settat	NA	NA	NA	NA	NA	NA
C. NORTH-WEST REGION						
C.1 Kenitra						
(16) Kenitra Maamoura						
(17) Kenitra Sakina						
C. 2 Rabat						
(18) Agdal Riyad	66.00	13.00	2.00	1.20	0.50	17.30
(19) Yaacoub el Mansour	NA	NA	NA	NA	NA	NA
C. 3 Tangier						
(20) Tangier	70.00	5.00	7.00	3.00	4.00	11.00
D. CENTRAL NORTH REGION						
D. 1 (21) Taza el Jadida	NA	NA	NA	NA	NA	NA
D. 2 Oujda						
(22) Sidi Maafa	NA	NA	NA	NA	NA	NA
(23) Sidi Ziane	68.00	18.00	3.00	1.60	0.40	9.00

Note: Questionnaires from Urban Communes with no data are left blank
Data on moisture content and bulk density were unavailable by most communes

5.2.2 Collection and Haulage

1) Roles of Urban Commune and Citizens

Urban Communes are responsible for the collection of the waste from the discharge points and transport to a collection point. The collection point is broadly defined as the dumping site, but in some communes such as in Marrakech part of the collected waste is transported to transfer stations.

Citizens discharge their waste usually in the early morning before the collection vehicles arrival. Citizens are aware of the vehicle arrival times based on experience and there seems to be no communications between the citizens and officials directly, on such matters as proper bin in which to discharge waste. Campaigns are done sporadically.

Directives for cleansing and protection of green areas were provided by four of the surveyed urban communes; Casablanca Ain Sebaa, Taza el Jadida, Safi Boudehab, and Tangier. For solid waste, the directives set a 100 Dirhams fine for violators of the following:

- No dumping of waste in open spaces and water bodies (all four communes)
- Providing suitable containers in size and handling by the citizens (all four communes)
- Scavenging from containers (Safi Boudehab commune only)
- Littering (Safi Boudehab commune only)
- Street sweeping in front of buildings, shops and coffee shops before the arrival of the cleansing workers and placing of the waste in the specified bins (Ain Sebaa and Taza). (The directive is not clear as to who is responsible for the street sweeping, the citizens or the municipal street sweepers??)
- Keeping the waste for more than 24 hours in the generated unit (Tangier)
- Proper disposal of waste at the designated disposal site (Tangier)

2) Equipment Used

The equipment used for collection is composed of the vehicles, communal containers and hand carts. Selection of the vehicle types depends in a large part on the financial health of the urban commune and of course the most suitable collection method. Communes appear to have freedom in selecting their equipment and no technical advice is advanced by the central government. The guidelines to be prepared under this Study will assist in the selection procedure. Table 5.2-3 shows the equipment used by the interviewed urban communes.

Table 5.2-3 Collection Equipment used by Surveyed Urban Communes

Unit: number

Urban Commune	Popula-tion in 1995	Comp-actor (16m3)	Comp-actor (10m3)	Dump truck	Pick-ups	Cont-ainer	Capacity/ generat-ed waste	Hand carts
A. TENSIFT REGION								
A.1 Marrakech								
(1) Machouar Kasba	29,827	0	0	1	6	0	0.24	13
(2) Menara Gueliz								
(3) Marrakech Medina	195,048	0	1	7	22	0	0.24	100
(4) Marrakech								
A.2 Safi								
(5) Asfi Biyada	67,847	0	0	6	0	0	0.24	9
(6) Asfi Boudheb	103,779	0	2	7	10	0	0.40	0
(7) Asfi Zaouia	98,470	0	0	6	0	0	0.16	0
B. CENTRAL REGION								
B.1 Casablanca								
(8) Hay Hassani	204,140	7	2	2	0	8	0.43	160
(9) Ain Sebaa	143,502	2	6	3	5	0	0.40	0
(10) Sidi Belyout	220,000	8	14	12	4	(5,940)	0.75	0
B. 2 (11) Beni Mellal	144,418	0	0	9	0	16	0.36	0
B. 3 (12) Mohammedia	175,164	7	7	11	5	74	0.85	140
B. 4 (13) El Jadida	122,655	0	2	12	24	(20)	0.41	100
B. 5 (14) Khouribga								
B. 6 (15) Settat	99,118	0	1	9	1	22	0.84	54
C. NORTH-WEST REGION								
C.1 Kenitra								
(16) Kenitra Maamoura								
(17) Kenitra Sakina								
C. 2 Rabat								
(18) Agdal Riyad	76,226	4	4	3	0	10	1.00	50
(19) Yaacoub el Mansour	205,665	0	0	19	1	0	0.25	90
C. 3 Tangier								
(20) Tangier	273,147	2	7	5	4	(60)	0.24	140
D. CENTRAL NORTH								
D. 1 (21) Taza el Jadida	95,485	0	3	6	1	(10)	0.39	23
D. 2 Oujda								
(22) Sidi Maafa	116,225	0	2	5	0	6	0.35	0
(23) Sidi Ziane	150,526	3	1	7	3	1	0.43	6

Note: Questionnaires from Urban Communes with no data are under processing
( ) small containers
Fleet capacity and generated waste amount estimated by Study Team on weight basis

It is interesting to note from the table that the urban communes of the Central region enjoy a larger number of compactor vehicles and their fleet capacities are larger than in the other communes. Obviously the communes in the Central region are more

prosperous. Fleet capacities on the whole are low which indicates that 3 or 5 trips are required per vehicle to provide 100% service coverage. Significantly low are the urban communes of Machouar Kasbah, Marrakech Medina, Asfi Biyada, Asfi Zaouia, Tangier and surprisingly Yaacoub el Mansour in the capital city of Rabat.

Replies to the vehicle purchase year were disappointing and it is difficult to estimate the average vehicle ages. Most of the compactors have been purchased within the past 5 years. Trucks are said to be used for 6-8 years.

In general, dump trucks utilized have low sides, and in some communes boards are placed to increase the height. Some communes use the collection trucks for other purposes such as road works and therefore lower sides may be more convenient. The older trucks («Paris» type) have a cover and it is difficult to increase the side heights therefore limiting their capacities. Small size pick-ups, with an installed container on the back are used in the old areas with narrow roads, such as the Medina.

Lack of vehicle purchase plans is common. Most communes wait until they are told what budget surplus is available from the commune council, and depending on the sum decide which type of vehicles to buy.

3) Collection and Transport Operation

Data demonstrating the collection and transport operation for the surveyed urban communes are shown in Table 5.2-4, and discussed hereafter.

a. Collection Service Coverage Rate and Frequency

Fifty percent of the surveyed urban communes consider their collection service covers 100% of the generated waste, and over 70% indicated service coverage of 90% or over. As most urban communes do not transport generated industrial waste, then these coverage rates do not include that type of waste.

Follow-up visits to some of these communes confirmed that a great effort is exerted in collecting the waste from the central areas, residential areas and market places. Shanty towns are also mostly served, but the frequency of service decreases.

Table 5.2-4 Operation System used by Surveyed Urban Communes

Unit:% of service coverage, Yes/No

Urban Commune	Collec-tion rate*1	Shift*2		Collection system*3			Daily coll-ection *4	Daily oper-ation sheets
		day	night	door-to-door		cont / open station		
				hand cart	veh-icle			
A. TENSIFT REGION								
A.1 Marrakech								
(1) Machouar Kasba	83%	100%	0%	60%	40%	0%	100%	No
(2) Menara Gueliz								
(3) Marrakech Medina	85%	95%	5%	10%	75%	15%	100%	Yes
(4) Marrakech								
A.2 Safi								
(5) Asfi Biyada	85%	100%	0%	12%	88%	0%	92%	No
(6) Asfi Boudheb	100%	100%	0%	0%	100%	0%	100%	Yes
(7) Asfi Zaouia	100%	100%	0%	0%	100%	0%	100%	No
B. CENTRAL REGION								
B.1 Casablanca								
(8) Hay Hassani	100%	95%	5%	0%	70%	30%	95%	Yes
(9) Ain Sebaa	100%	100%	0%	0%	52%	48%	90%	No
(10) Sidi Belyout	100%	49%	51%	0%	100%	0%	100%	No
B. 2 (11) Beni Mellal	75%	50%	50%	7%	52%	41%	100%	No
B. 3 (12) Mohammedia	100%	0%	100%	0%	40%	60%	100%	Yes
B. 4 (13) El Jadida	96%	100%	0%	0%	90%	10%	100%	Yes
B. 5 (14) Khouribga								
B. 6 (15) Settat	90%	100%	0%	0%	78%	22%	100%	Yes
C. NORTH-WEST REGION								
C.1 Kenitra								
(16) Kenitra Maamoura								
(17) Kenitra Sakina								
C. 2 Rabat								
(18) Agdal Riyad	100%	100%	0%	0%	100%	0%	100%	No
(19) Yaacoub el Mansour	100%	90%	10%	0%	100%	0%	100%	Yes
C. 3 Tangier								
(20) Tangier	92%	92%	8%	60%	25%	15%	90%	Yes
D. CENTRAL NORTH								
D. 1 (21) Taza el Jadida	100%	0%	100%	0%	82%	18%	100%	Yes
D. 2 Oujda								
(22) Sidi Maafa	NA	90%	10%	0%	95%	5%	95%	No
(23) Sidi Ziane	90%	75%	25%	0%	90%	10%	40%	No

Note: Questionnaires from Urban Communes with no data are left blank

*1 as replied to in the questionnaire (includes street sweeping)

*2 total 100% of collected waste

*3 total 100% of collected waste (excluding street sweeping)

*4 % of total service provided daily

In terms of collection service frequency, over 65% of the surveyed communes provide daily (6 or 7 days/week) collection service. Only in Sidi Ziane, 60% of the collection is provided every 2-3 days/week. It is therefore evident that the elected officials strive to provide a high level of service in terms of coverage and frequency.

Table 5.2-3 shows that six of the surveyed urban communes have a low vehicle haulage capacity to waste generation ratio. In order to satisfy the service collection rates as shown in Table 5.2-4, the four communes should operate the following average trips per vehicle;

(1) Machouar Kasbah	3.2 trips
(3) Marrakech Medina	3.9 trips
(19) Yacoub el Mansour	4.0 trips
(20) Tangier	3.9 trips

These trip numbers are on the large side when compared to the actual trip numbers achieved at present.

b. Working Shifts

The majority of the urban communes work during the daytime. Some urban communes provide an additional evening shift for market and commercial waste. Mohammedia and Taza el Jadida have shifted completely to the night shift (Mohammedia from 11 PM and Taza from 8 PM). The reasons given were to avoid the traffic congestion and the decrease in the shift time to 6-7 hours from 8-10 hours during the daytime.

c. Collection System and Route Map

The majority of the collection service is provided door-to-door (curbside). Collection crews pick up the waste from the front of the buildings, using hand carts in areas with poor accessibility. Communal containers (4 to 5m^3) are coming into more use in heavily populated urban areas such as Casablanca urban communes.

Smaller communal containers (@ 1 m^3) made of plastic and metal are being used more often (refer to Table 5.2-3) in the collection system. However the placing of these containers in commercial areas and main streets increases the collection time as the compactor vehicles need to maneuver for their mechanical rear loading.

Two indicators of the operating system are the availability of route collection maps and daily operation sheets. All the urban communes, with the exception of Ain Sebaa replied in the affirmative as to use of route collection maps. However the samples provided indicate that most of the routes are plotted on large scale maps with insufficient details as to evaluate route efficiency. In the case of availability of daily operating sheets, useful to evaluate work efficiency, surprisingly 50% of the surveyed urban communes replied in the negative.

Lack of daily operating sheets and keeping records of vehicles arriving at the disposal site leads to low loading of vehicles and illegal dumping of the waste along the access roads. Many of the uncovered dump trucks are not equipped with nets or covers and waste is scattered on the road when the vehicle is moving.

4) SWM Staff

Overstaffing of SWM will result in costly service. Average figures of 0.8 to 1.0 ton/SWM workers and 3-4 crew members per vehicle including the driver may be considered reasonable in developing countries but are still low. Table 5.2-5 shows the SWM staff indices for the surveyed urban communes.

The figures in the table indicate low efficiency, with the exception of Asfi Zaouia (collection rate given by that urban commune appears to be on the high side). The large crew numbers support the door-to-door collection system operated by most of the communes surveyed and use of dump trucks. It is obvious that the urban communes must reconsider the number of staff required and maintain data as to the actual SWM workers. Crews of Machouar Kasbah, Hay Hassani, Tangier, Sidi Maafa and Sidi Ziane are unrealistically large which means that people doing other works may be assigned as SWM collection workers.

Majority of collection workers have no uniforms, boots or gloves and working conditions are poor. Wages are ranging between 1,000 to 2,000 Dirhams monthly. Workers therefore try to supplement their wages by separating the plastic, paper and glass while collecting the waste on the route. This results in delays on the route and in taking the recycled materials to the intermediate buyers.

Table 5.2-5 SWM Staffing for Surveyed Urban Communes

Unit: persons, t/staff, and crew members/vehicle

Urban Commune	SWM Staff						ton/ SWM staff *1	Crew/ veh
	Eng / tech./ admin.	Driver	Collection worker	Street sweeper	Workshop	Total		
A. TENSIFT REGION								
A.1 Marrakech								
(1) Machouar Kasba	9	11	36	8	6	70	0.18	6.7
(2) Menara Gueliz								
(3) Marrakech Medina	14	30	193	114	10	361	0.23	7.4
(4) Marrakech								
A.2 Safi								
(5) Asfi Biyada	2	6	18	13	16	55	0.52	4.0
(6) Asfi Boudheb	19	14	31	94	18	176	0.29	2.4
(7) Asfi Zaouia	3	11	21	8	2	45	1.09	5.3
B. CENTRAL REGION								
B.1 Casablanca								
(8) Hay Hassani	35	25	85	181	22	348	0.29	10.0
(9) Ain Sebaa	5	11	36	74	37	163	0.44	2.9
(10) Sidi Belyout	9	40	98	216	17	380	0.29	3.6
B. 2 (11) Beni Mellal	3	19	41	26	7	96	0.56	6.7
B. 3 (12) Mohammedia	15	25	80	161	16	297	0.29	3.5
B. 4 (13) El Jadida	45	24	39	40	16	164	0.36	1.7
B. 5 (14) Khouribga								
B. 6 (15) Settat	6	11	32	54	9	112	0.40	3.9
C. NORTH-WEST REGION								
C.1 Kenitra								
(16) Kenitra Maamoura								
(17) Kenitra Sakina								
C. 2 Rabat								
(18) Agdal Riyad	4	15	53	56	0	128	0.30	6.2
(19) Yaacoub el Mansour	9	36	101	127	11	284	0.36	6.9
C. 3 Tangier								
(20) Tangier	1	25	247	47	1	321	0.39	15.1
D. CENTRAL NORTH								
D. 1 (21) Taza el Jadida	4	5	45	21	5	80	0.60	5.0
D. 2 Oujda								
(22) Sidi Maafa	1	15	51	NA	8	75	NA	9.4
(23) Sidi Ziane	3	15	93	17	5	133	0.51	7.7

Note: Questionnaires from Urban Communes with no data are left blank.

*1 collected waste estimated based on collection rates given by urban communes and unit generation rates estimated by Study Team

More accurate data for Safi are given in Book 4.

5) Transfer Stations

The Study Team visited three transfer stations in Marrakech, Fez and Tangier which are briefly described below. Unfortunately information collected through the questionnaire survey was insufficient to objectively evaluate the operation of these stations. The transfer stations operated in Morocco play an important role in bringing the waste from the narrow alleys of the Medina to a collection point where the waste is transported to the disposal site.

a. Marrakech Transfer Station

The Urban Community operates three transfer stations with the urban area. All are of the same design and can accommodate 2 compactors each. At present there are four hydraulic compactors only so the full capacity of the stations is not utilized.

Compactors are $18m^3$ in size, and carry up to about 10 tons. Collection vehicles empty the waste by the direct discharge method into the compactors. The compactor is taken to the disposal site once a day. Each station is equipped with electricity to operate the compaction hydraulic system. Leachate produced during the compaction and from the arriving collection vehicles is drained to the sewage system. A guardsman keeps the station clean. The station is fenced in.

Alongside the station there is a shanty town where recycling activity was evident. Obviously the station plays a role in the informal recycling activity.

b. Fez Transfer Station

The Study Team visited a transfer station serving the Mechouar Medina urban commune in Fez. This commune was not included in the questionnaire survey but was of particular interest because of the nature of the Medina and the use of donkeys to collect and transport the waste to intermediate points.

The urban commune owns 8 donkeys and 2 mules which bring the waste to the main roads and also to a transfer station belonging to the commune. This station is of the direct-discharge type and can accommodate 2 dumpers of up to $5m^3$ capacity. Trucks loaded at this station are said to make 3-4 trips to the disposal site daily. The station is located on commune owned property. Informal recycling activity by scavengers and urban commune workers was evident. The station is not fenced in.

c. Tangier Transfer Station

In Tangier there are three transfer stations that are operated by the urban communes. The Study Team visited one of these stations located in Tangier urban commune. The station is a direct-discharge type, and the collected waste is discharged into containers of 4-5 m^3 capacity.

Waste is brought to the station basically by hand carts from the neighboring Medina area. The station was well maintained and fenced in. The station also serves as a depot for hand carts. Separated paper and plastics were stocked at the station indicating the

informal role the station plays in recycling activity.

6) Vehicle Maintenance

Most urban communes operate their own work shops, which serve all the commune's equipment inclusive of SWM equipment. Those not having a workshop, such as the newly established Agdal Ryad urban commune are in the process of constructing one. Visits to some workshops showed that there was insufficient effort exerted in preventive maintenance and basic items such as washing the collection vehicles each day after work. Table 5.2-6 shows some results of the questions related to workshops in the questionnaire survey.

Majority of the workshops are equipped with vehicle cleansing facility so there should be no excuse for not washing the collection vehicles. Lack of keeping maintenance records or refusal to provide copies to the Study Team is significant. These records are very important to keep track of the vehicle maintenance. Provision of spare parts is hampered by administrative delays and insufficient stocks at the workshops.

Table 5.2-6 Conditions of Workshops in the Surveyed Urban Communes

Item	Yes	No	no reply
1. Workshop available	16	2	
2. Facilities in the workshop			
- Welding shop	15	1	
- Motor repairs	13	2	1
- Oil change section	13	3	
- Gasoline pump	10	6	
- Vehicle washing facility	14	2	
3. Vehicle maintenance records kept	3	2	11
4. Problems associated with spare parts			
- Insufficient stock at workshop	12	1	3
- Admin. delays in purchasing parts	13	1	2
- Shortage of parts in the market	7	7	2
5. Operating costs available	9		7

5.2.3 Street Sweeping

1) Implementing Agency

Street sweeping is the responsibility of the Urban Communes. Only in Safi it was found that the Urban Community there sweeps the main streets bordering the urban communes. All the surveyed communes replied that they sweep all the streets in their territory. However half of them classified the road sweeping lengths into twice daily, once daily and once every two days. The others replied that they provide the sweeping service daily.

2) Implementation Method

Sweeping is done manually using hand carts and none of the surveyed urban communes had a mechanical sweeper (one commune is in the process of buying one). Table 5.2-7 shows the figures obtained from the urban communes on street sweeping.

In the majority of the surveyed urban communes, the ratio of population per one sweeper falls within the range of 1,000 to 2,000. In terms of road length per sweeper, it was not possible to evaluate 5 of the surveyed communes because the road length swept by them was not known. For those communes that replied it hovers around 1 kilometer per sweeper, which is a reasonable figure. In most of the communes each sweeper operates one hand cart for sweeping the road.

Table 5.2-7 Street Sweeping Activity from Questionnaire Survey

Urban Commune	Capita/ Sweeper	Km/ Sweeper	Hand cart/ Sweeper	Citizen Participation
A. TENSIFT REGION				
A.1 Marrakech				
(1) Machouar Kasba	3,728	3.75	1.38	No
(2) Menara Gueliz				
(3) Marrakech Medina	1,710	1.18	1.00	Yes
(4) Marrakech				
A.2 Safi				
(5) Asfi Biyada	5,219	2.77	0.69	No
(6) Asfi Boudheb	1,104	1.28	1.56	No
(7) Asfi Zaouia	12,308	NA	NA	No
B. CENTRAL REGION				
B.1 Casablanca				
(8) Hay Hassani	1,127	0.77	1.03	No
(9) Ain Sebaa	1,939	NA	NA	NA
(10) Sidi Belyout	1,018	0.99	1.00	No
B. 2 (11) Beni Mellal	5,554	1.74	0.77	Yes
B. 3 (12) Mohammedia	1,087	0.82	0.93	Yes
B. 4 (13) El Jadida	3,066	NA	0.30	No
B. 5 (14) Khouribga				
B. 6 (15) Settat	1,835	2.22	1.00	Yes
C. NORTH-WEST REGION				
C.1 Kenitra				
(16) Kenitra Maamoura				
(17) Kenitra Sakina				
C. 2 Rabat				
(18) Agdal Riyad	1,361	NA	0.89	NA
(19) Yaacoub el Mansour	1,619	0.98	0.71	NA
C. 3 Tangier				
(20) Tangier	5,811	0.74	0.64	No
D. CENTRAL NORTH REGION				
D. 1 (21) Taza el Jadida	4,546	1.00	1.00	Weak
D. 2 Oujda				
(22) Sidi Maafa	NA	NA	NA	NA
(23) Sidi Ziane	8,854	NA	0.65	NA

Note: Questionnaires from Urban Communes with no data are left blank.

Sometimes, citizens assist in street sweeping by either actually sweeping in front of their houses or shops or not littering the streets. Asked their opinion as to citizens participation in such activities, only three communes (17% of total interviewed) replied in the affirmative. But in discussions with ordinary Moroccan citizens and from personal observation it is noticed that citizens are more involved in street sweeping activity.