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RESEARCH ARTICLE

THE IMPACT OF WASTE MANAGEMENT: ISSUES AND CHALLENGES

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ABSTRACT

Waste is items we don't need and discard. Where does it end up and how to minimize its consequences on human and environment, have been major environmental issues, since the industrial revolution. Now waste worries everyone everywhere, since it grows steadily along with population and economic growth. Big issues are discussed locally and globally in both developed and developing countries in different levels. Many experiences all over the world prove that local authorities (territorial collectivities) present an important force in promoting sustainable development policies as they make up the level of governance closest to citizens. It's our duty to care about waste management as producers and managers. Participation and prevention of risks related to waste management are in the core of public sector modernization. In this context, are we aware how deep and large risks and crises caused are serious and pressing?

INTRODUCTION

Waste, grows steadily along with population and economic growth. The World Bank confirmed that Municipal solid waste generation levels are expected to double by 2025 (l'Impact et la Gestion des Déchets Solides, 2015). Electronic-waste are not biodegradable, they persist in the environment for long periods of time, increasing exposure risk. Household waste - such as oil-based paints, cosmetics, antimicrobials, used motor oil, cleaners can enter the environment during use, when discarded in the garbage, poured down the drain, spilled accidentally, or are dumped outside; and cause injury ranging from minor nose and throat irritation to nervous system disorders and even death. The main objective of this study is the politico-socio evaluating of waste management in Morocco; to raise public awareness of the issue and its challenges and indicate the need for cooperation in order to improve waste management. The remainder of this paper is organized as follows; the first Section was, about materials and methods, In Second Section was the results and discussion, finally we conclude.

MATERIALS AND METHODS

Study Site

Morocco, about one-tenth larger than California, lies across the Strait of Gibraltar on the Mediterranean and looks out on the

Atlantic from the northwest shoulder of Africa. Algeria is to the east and Mauritania to the south. On the Atlantic coast there is a fertile plain. The Mediterranean coast is mountainous. The Atlas Mountains, running northeastward from the south to the Algerian frontier, average 11,000 ft (3,353 m) in elevation. Morocco the strength of the legal population reached on 1 September 2014, 33,848,242 inhabitants after the economic capital Casablanca and the political capital Rabat. Tangier is Morocco's second most important industrial centre after Casablanca. Tangier-Tetouan, Al Hoceima includes just under 4 million inhabitants in a territory under 30,000 km²: and 44 territorial collectivities (Fig1)

Data used

Morocco has recently undertaken a proactive management policy in terms of Sustainable Development and Environmental Protection. Since the establishment in 1992 of a government department responsible for the environment, many initiatives and developments have emerged, including those relating to professional collection services, cleaning and disposal of household waste

Legal framework

- Law 28-00 on solid waste management and disposal adopted in 2006 governs and provides the general framework for the sector in Morocco;

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- Application decrees and Dahirs support promulgate Law 28-00, and some are specific to certain waste streams; - In addition, Morocco has adopted international and bilateral agreements that concern waste and the environment, such as the Montreal Protocol, the Kyoto Protocol, and the Protocol on the Prevention of Pollution of the Mediterranean Sea, the Basel Convention, and the Stockholm convention on POPs.

Financial and cost recovery arrangement

SWM Financing

Local taxes

- Subsidies from the government budget;
- Clean Development Mechanisms (CDM);
- The Municipal Equipment Fund (FEC).

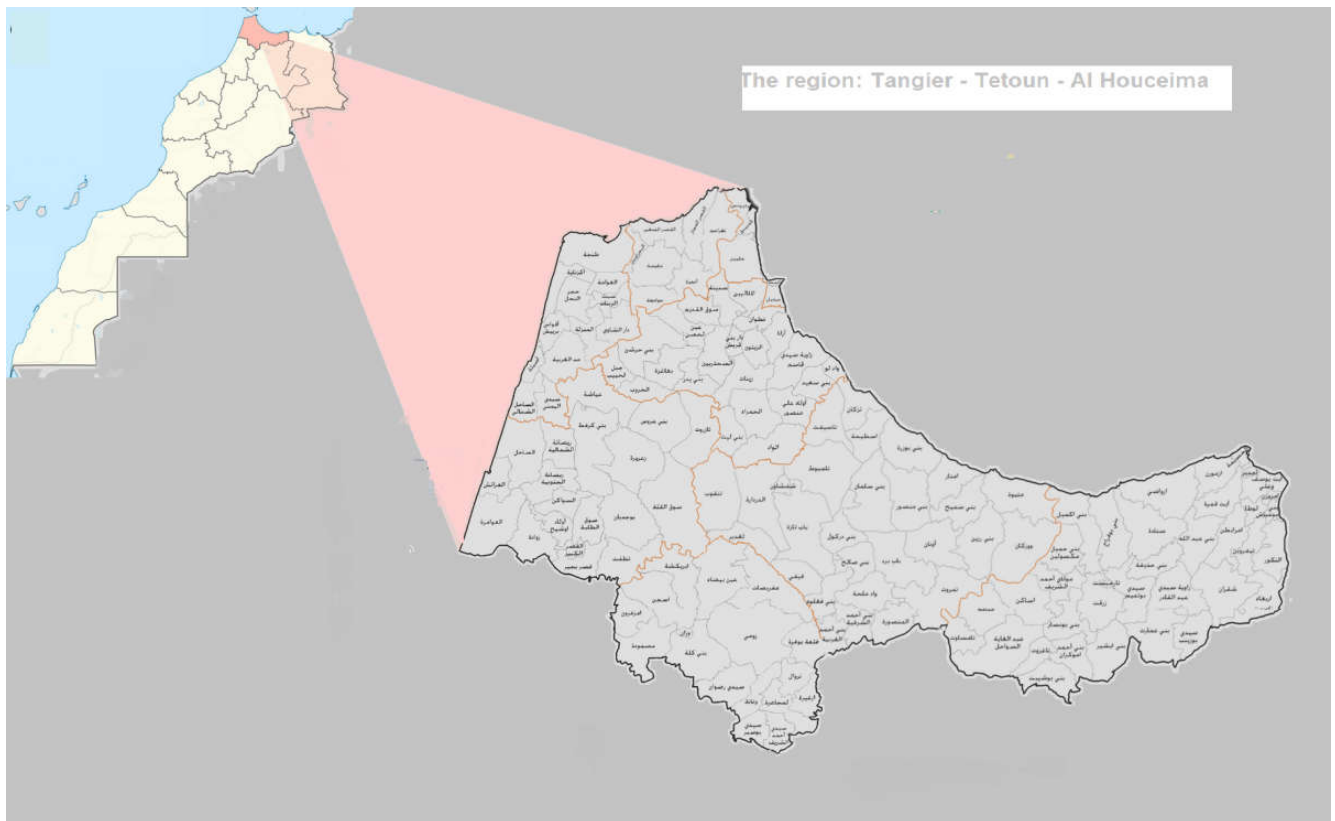


Fig. 1. Region of Tangier-Tetuon- Al Hoceima 2015

Institutional framework

Household waste

- Municipalities: responsible for municipal waste management;
- Ministry of the Interior / General Directorate of Local Authorities / Water and Sanitation Department (MoI /DGCL /DEA): technical and financial support;
- Ministry of Energy, Mines, Water and Environment / Department of Environment (MEMEE / DE): coordination, planning, monitoring and regulation.
- *Industrial Waste:*
- Industrial sector: responsible for the management of their produced waste;
- Ministry of Industry, Trade and New Technologies: promotion of waste recycling sectors, control and monitoring of cross borderflows.
- *Medical waste:*
- Managed by the Ministry of Health;
- Healthcare facilities are responsible for the management of their produced waste.

Costs of waste management

- Average cost of solid waste collection: 417 MAD /MT;
- Average cost of solid waste disposal in controlled landfills: 180 MAD /MT.

Private sector involvement

Waste collection by private operators covers about 74% of the urban population in 106 Communes and 80% of the urban waste tonnage.

Types of contracts

- For collection: Outsourcing management contracts with a major part of the investment by the subcontractor, and a portion by the municipality
- For disposal: BOT contracts (Build-Operate-Transfer) for the new sanitary landfills.

Activities approach

Options for improvement

Policy and Planning

The improvement of private sector participation especially for industrial and medical waste;

DISCUSSION

From local to global

Waste management sector suffered from several problems in Morocco, especially in cities where economic and social developments have contributed through the last two decades in the emergence of new lifestyles have led to increased human and diversification requirements what justify the difference in the amount of waste between urban and rural areas (table1). This development was accompanied by growing. And the diversity of the amount of waste left behind by static Morocco. But this development was not matched by real action at the level of aspects Legal, regulatory, financial, technical and sensitization resulting in a large number of negative effects of these wastes on the health of citizens and on the environmental area in general.

Table 1. Background Information

Population:	32.95 million
Municipal Solid Waste (MSW) Generation:	6.852 million tons
Per Capita MSW Generation:	
- Urban areas	0.76 kg/day
- Rural areas	0.3 kg/day
MSW Generation Growth :	1.36 %
Medical waste generation:	21,000 (2010) tons/year
Industrial waste:	1.6 million tons/year
Hazardous waste:	289,385 tons/year
Agricultural waste:	n/a tons/year
C&D Waste:	n/a tons/year
Waste Tyres :	n/a tons/year
e-Waste:	30,300 tons/year
Packaging Waste:	55,000 tons/year

Source: Country report on the solid waste management in Morocco, last updated in December 2013, (sweep net)

In spite of the vast difference between developed and developing countries, waste management is a global issue. OECD countries produce almost half of the world's waste, while Africa and South Asia regions produce the least waste. Current global MSW generation levels are approximately 1.3 billion tons per year, and are expected to increase to approximately 2.2 billion tons per year by 2025. Developed countries are looking for reducing waste going to landfill, increasing the recycling and recovering materials; whereas developing countries are trying to implement policies and legislation to achieve sustainable management.

Health and environmental damage

The estimated amount of waste left behind by industrial activities in Morocco about 1.5 million tons per year of industrial waste including 256,000 tons of hazardous waste; 5 million tons per year of household waste (in urban areas); 21,000 (2010) tons per year of medical and pharmaceutical waste. (table1). Due to the informal working conditions, poverty, and poor sanitation, e-waste is the most difficult waste to isolate, as proved by many researchers. Waste products were often disposed of in uncontrolled dumps or in dark spots without any treat mentor control, which had serious consequences on public health and the environment as well as the future of socioeconomic activities in the country.

Table 2. Solid Waste Management (SWM) infrastructures

Landfill status	Number of landfills
Controlled landfills built	14
Controlled landfills under construction	11
Controlled landfills planned	5
Rehabilitated or closed dumpsites	60
Dumpsites planned for remediation	24
Dumps planned to clean	84

Source: Country report on the solid waste management in Morocco, last updated in December 2013, (sweep net)

The World Bank for the solid waste sector in Morocco with three loans of U.S.\$ 400 million has enabled the improved management of this sector, what justify the Increased rate of municipal solid waste disposed in controlled landfills to 37%, compared to 10% prior to 2008, 28% in 2010, and 33% in 2011; as well as the Creation of 15 controlled landfills, 11 of which are operational (Fes, Oujda, El Jadida, Essaouira, Rabat, Berkane, Figuig, Guelmim, Al Hoceima, Agadir, Mohammedia-Benslmane, Nador, Dakhla, Laayoune and Khouribga) compared to 6 landfills prior to 2008, 10 landfills in 2010, and 13 in 2011. 6 controlled landfills are being built (Ifrane, Ouarzazate, Casablanca, Safi, and Tata); 26 uncontrolled landfills remediated to date, compared to 13 prior to 2010, and 19 in 2011; The proliferation of waste in the natural environment, and not to deal with it in a proper manner whether sources or produced during the waste process (Collected, transported and disposed) leading to serious health and environmental damage. It has serious effects at the respiratory system, eyes, skin diseases digestive and nervous system, and various allergic diseases, it may be a source or cause of many health and indirect environmental risks,

This can be summarized as follows

- The soil and groundwater and surface water contamination.
- The spread of odors and troublesome.
- Breeding of flies and disease.
- The proliferation of stray animals and caused by infectious diseases.
- Air pollution gases and smoke and dust and harmful or toxic vapors emitted from a variety of sources
- Health damage of groups operating in the collection of recyclable materials from landfill.

Moreover, waste is a source of visual pollution, distortion and aesthetic The UNEP estimates that between 2007 and 2020, domestic television e-waste will double, computer e-waste will increase five times, and cell phones 18 times. Morocco has undertaken a series of strategic actions to reform the waste management sector, such as: strengthening of the legal framework, implementation of solid waste management (SWM) programs, support for the National Household Solid Waste Program (PNDM), development of a national master plan for hazardous waste management, and reform of local taxation² as cited in data.

Conclusion

Waste management on an overcrowded planet becomes a global challenge. Even the best waste management system in the world has shown that it cannot withstand the test of a

global financial downturn. Solid-waste management is one of the greatest costs to municipal budgets, and has dangerous effects on environment and health as warned by Researchers such as Brett Robinson³, Factors that influence the development of solid waste management services are not purely technological; rather the particularities of the systems implemented are heavily influenced by the institutional framework and socio-cultural situation in a country. In one hand, Cooperation inside and outside will be recommended to face this global challenge. In the other hand, Waste minimization reduces the environmental and health damage caused. So could Morocco, especially local authorities, achieve the excellence in waste management and how?

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