smot
Sustainable Mediterranean Old Towns

Policy Guidelines for waste deposit & collection in Mediterranean Sea Basin historical medinas and city centres

Project funded by the EUROPEAN UNION

ENPI CBCMED

This publication has been produced with the financial assistance of the European Union under the ENPI CBC Mediterranean Sea Basin Programme. The contents of this document are the sole responsibility of SMOT project partnership and can under no circumstances be regarded as reflecting the position of the European Union or of the Programme´s management structures

This document has been written by the Sustainable Mediterranean Old Towns (SMOT) Partnership. The contents of this document are the sole responsibility of SMOT project partnership and can under no circumstances be regarded as reflecting the position of the European Union or of the Programme´s management structures.

Author

Sustainable Mediterranean Old Towns partners

Date of publication

December 2015

Table of Contents

Preamble

Foreword of D. Pedro García Jiménez,

President of “Saneamientos de Córdoba” (Sanitation Cordoba), SADECO

This document offers to the reader a summary of SMOT project story as well as a set of Policy Recommendations for waste deposit and collection in Mediterranean Sea Basin historical medinas and city centres.

This document is the result of the joint work accomplished by a human team composed of representatives of the administrations, universities and organisations linked to environmental management in the 5 cities participating in the project, all of them from both the north and south of the Mediterranean Sea.

This guide intends to point out the very basic principles to make the integration of waste management in our historical city centres feasible.

The aim is the recommendations provided to be of applicability in many cities of similar characteristics to ours in SMOT, so that the result to be environmentally friendly cities in the Mediterranean Basin that enhance their specific cultural values while promote the human and economic development in the area.

Regardless of the specific objectives and achievements reached thanks to the introduction of the pilot experiences for waste deposit and collection in our city centres, this project, framed within ENPI CBC MED Programme, has made possible to start a close cooperation and communication channel among the partners from both sides of our common sea.

The development of participatory methods in the partnership itself and also the application of them by the partners in their local realities it is a value in itself that justifies in itself the work accomplished and strengthens both our organisations and the relations between our countries.

Pedro García Jiménez
President of Saneamientos de Córdoba, S.A.

1. Waste in Mediterranean Sea Basin Old Towns as depicted by SMOT

1.1. Sustainable Mediterranean Old Towns (SMOT): why did this project emerge?

Cities are a permanent feature in Mediterranean History. Their origin can be placed where first trading activities began to occur. Maritime routes were articulated around these locations and the most ancient cities in the world were born in the Mediterranean space.

The old towns are the original nucleus of the city. Surrounded by defensive walls, they were founded as administrative, commercial, religious and social centres.

Many cities in the Mediterranean basin have, due to their age and heritage, historical districts similar to "open-air museum". The preservation of these values for future generations is a key aspect; but this responsibility should not only concern monument protection but also the adoption of severe compromises with the environment, introducing sustainable practices and consequently ensuring the maintenance of the artistic and natural heritage, air quality and biodiversity protection, improving general social welfare.

Mediterranean cities are typically characterised by urban spaces with intricate thoroughfares, housing of low height and narrow streets, which often host significant commercial activity. This commercial activity has evolved from the traditional markets selling products to satisfy primary needs (food, textiles) to tourism-based commerce (accommodation, restaurants, tourist services, souvenir retailing and local crafts).

The concentration of monuments and historic buildings in these unique spaces within our cities is the result of their history and the historic old towns reflect the tradition and cultural values that characterise and distinguish these cities. These historic districts also attract tourists, making them an important economic engine and they are often the primary source of local wealth.

A number of regional, national and international bodies are in place for the conservation of this important heritage. On a worldwide level, the World Heritage Committee has the function of protecting heritage of international interest, such as the one in SMOT historic old towns of Alexandria (Egypt), Al Salt (Jordan), Sfax (Tunisia), Ragusa (Italy) and Córdoba (Spain).

In these unique areas of our cities, waste collection must overcome three main challenges. It must safeguard the health of inhabitants, it must be integrated with town planning -protecting cultural values- and it must overcome the specific technical problems associated with refuse collection in these areas. The size of our historic old towns is naturally variable, as is their population density, and they can occupy even the 10% of the surface area of the large cities included in the study. They vary in terms of inhabitants. While some historic districts have a significant number of residents, others are quite sparsely populated, due to depopulation (the result of difficulties of access, restrictions on construction and on the provision of services) and the pressure of the commercial sector, which tends to occupy these attractive tourist locations.

Waste generation is directly related with the different scenarios: in districts with low population but an intense commercial activity, waste production per capita can be as high as twice that of the average for the city. This is due to the high rate of waste generation, mainly in the commercial sector, and the low number of residents. In larger more densely populated historic old towns, with less commercial activity, average waste production is lower, in some cases as low as half that of the average of the city. These are only some examples of possible specific scenarios.

In any case, municipal waste collection in historic districts is hindered by access and circulation difficulties which place constraints in collection methods. This results in a need for more human resources and smaller vehicles and equipment.

These are features shared by many cities worldwide but the situation in the Mediterranean Basin shows some special particularities in addition. According to Union for the Mediterranean (UfM) reports, half of the world population is in process of becoming urban; in the case of the countries bordering the Mediterranean two out of three inhabitants are already city-dwellers. By 2030, three quarters of the Mediterranean population is expected to be urban indeed. In this scenario Mediterranean cities need now and will need to support in the future increasing rates of waste management derived from the increasing agglomerations.

SADECO, municipal company set up in 1986 by the Córdoba City Council is responsible for waste management and street cleaning within the city boundaries. It is a pioneer in Spain for implementation of segregated collection (particularly of organic matter) and for collection and cleaning technologies (implementation of side loader refuse collection vehicles, street cleaning and sweeping vehicles). In 2011 the municipal company embarked on a strategy of international cooperation, aware of commonalities to explore and the know-how to exchange with other cities worldwide. The main aim of the cooperation was developing solutions to optimise the waste related services for municipalities and general public. It is within this scenario that, in 2011, the process for building SMOT partnership and project started. SADECO engaged public administrations[1] of Heritage Cities within the Mediterranean Basin Cordoba could cooperate with to obtain results of interest for the whole group of Cities (Heritage or not) in the Basin.

The partner cities were to be Ragusa (Italy), Al Salt (Jordan), Sfax (Tunisia) and Alexandria (Egypt). Local universities and associations were also involved to cooperate with local public administrations in the searching for solutions. The process ended up with the approval of the project by ENPI CBC MED and the signature of Grant Contract for its implementation the 30th December 2013. It is during the 24 months that comprise 2014 and 2015 that SMOT project will be implemented.

[1] Municipalities (or municipal companies for waste) in the case of Córdoba (Spain), Ragusa (Italy), Sfax (Tunisia) and Alexandria (Egypt); Ministry of Municipal Affairs in the case of Jordan.

1.2. Project focus: solid waste deposit and collection in city centres

The application of specific waste management plans for city centre areas faces- in the case those plans exist- common problems, such as the architectural structures of these areas that makes collection difficult, the lack of tailored solutions and the lack of public awareness of the local population. But the fact is that mostly, specific plans for city centres do not even exist.

Waste management related solutions proved feasible for metropolitan areas are often simply not feasible in old town areas due to, among other factors, the very particular mixture of winding urban design and the confluence of cultural, economic and social activities interacting usually as consequence of intense tourist flows. The existence of invaluable heritage areas within these districts needs also specific treatment of specific spaces to ensure their preservation.

In this regard SMOT aims at fulfilling a gap in the waste management sector in the Mediterranean Sea Basin: the tailored attention to city centres as special areas with special features.
Moreover, SMOT concentrates- within city centres- onto a specific part of the chain for waste management: deposit and collection of waste, so that effective sustainable but also aesthetic solutions in line with the scenarios are tested and mainstreamed.

To summarise, we can say that what makes SMOT different from previous projects concerning waste in the Mediterranean Basin- cross-border, interregional, national or local- is the fact that SMOT focuses:

1. Upon city centre areas.
2. Upon the processes, infrastructures and policies for deposit and collection of waste within them.
3. Upon so-called "urban solid waste"[2] - also called "municipal waste" in EU papers upon which local, regional and national administrations can operate.
4. Upon the aesthetic integration of the solutions for waste deposit and collection in the particular scenarios.

It is worthwhile mentioning the fact that the solutions tested SMOT are applicable to every medina/old town in the Mediterranean Basin.

[2] Waste produced by the public in an urban area, not including industrial wastes, agricultural wastes, medical waste, radioactive waste or sewage sludge, but rather food wastes, yard wastes, containers and product packaging and other miscellaneous wastes from residential, commercial and institutional origin.

1.3. Portraits of SMOT partner cities: a representation of Mediterranean Heritage Cities

City centres and medinas of Cordoba (Spain), Ragusa (Italy), Sfax (Tunisia), Alexandria (Egypt) and Al-Salt (Jordan) have been the pilot scenarios of SMOT project.

In the project they have value for themselves, of course, as they are historical cities, but also as a representation of hundreds of cities in the basin that could find inspiration in the solutions they have introduced. Let´s know a little bit more of each of them:

Pilot Area

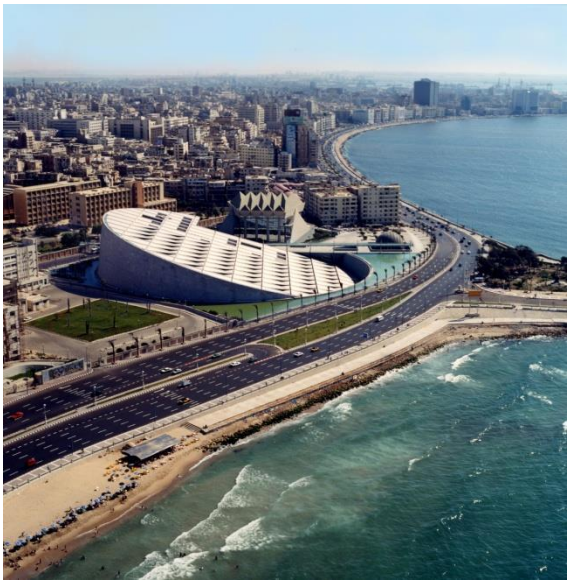
Alexandria (Egypt)

Alexandria is located in the North of Egypt, about 200 kilometres from the capital Cairo. The city extends for about 32 km along the coast of the Mediterranean and there is a new extension to the south in the direction of Borg Al-Arab. The extension of the city of Alexandria is about 2679 km2 while the extension of the old town is about 8 km2. Actually it is not clearly determined how the exact number of inhabitants in the city due to variations in recent years but we know that on 2006 the inhabitants were about 4 millions.

Alexandria is characterized by important historical buildings, monuments and museums that date back to Hellenistic civilization, Roman age and Islamic age: here there is for example the only Roman theatre in Egypt. The modern Alexandria is divided into six districts: El-Montaza, Shark, Wassat, al-Amriya, Alagamy and al-Gomrom and is characterized by new and high buildings. There are small numbers of compounds outside the city, in European style, and most of the old buildings are concentrated in the middle of the town.

Looking to the road network, we find in the medina narrow streets that can be travelled only with small cars, while the rest of the city is connected with a net of interior roads including Trams, Buses, Taxis, minibuses and internal Trains and a set of highways, round roads surrounding the town.

The Alexandria Governorate has selected private waste collection companies over the last 10 years, gradually covering different districts and necessities; manual and mechanical systems have traditionally been used but taking into account the huge number of people in the ancient districts of Alexandria there is an evident need to explore more solutions for the waste problem in these specific areas.[3]



[3] Coinciding with SMOT partners´meeting in Alexandria, held the 20th, 21st and 22nd October 2015, Alexandria Governorate has launched the official Alexandria Cleaning Bid 2016-2025. SMOT team had the chance to participate; indeed SMOT team in the city is acting currently as advisers of the Governorate for waste related issues.

Al-Salt (Jordan)

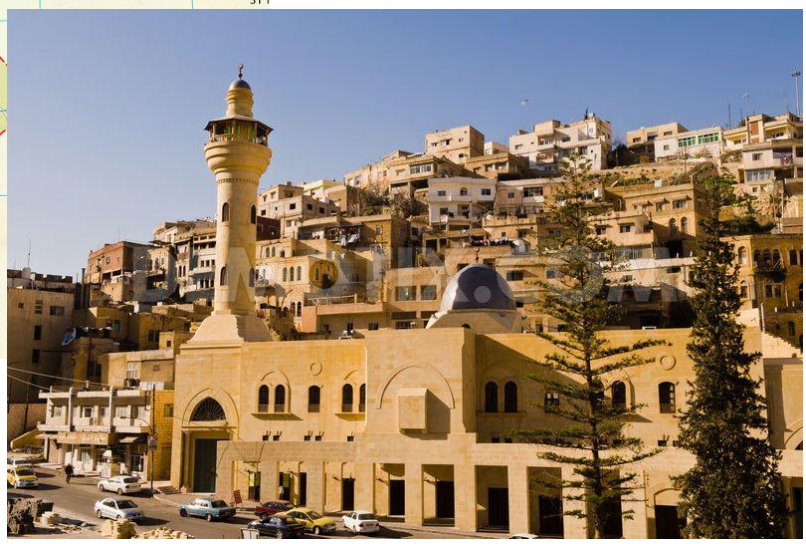
Al-Salt is located in the North of Jordan, about 30 kilometres from the capital Amman. The Al-Salt greater municipality (composed by city center and 8 districts) has an extension of about 79.4 km2, Al-Salt city 48 km2 while the medina is about 1 km2.

In 2013, the population of the Al-Salt greater municipality was of 147.082 inhabitants, the city itself was 114.895 inhabitants and the 15% out of them lived in the old town (17.424 inhabitants).

Al-Salt was the first capital in Jordan, here it was built the first school, the first chamber of commerce and the first hospital of Jordan. Muslims and Christians coexist and the city is characterized by historical buildings with decorative facades built from limestone; there are historic cemeteries also. Al-Salt is an ancient town with a huge tourism potential.

In Jordan, at the moment of SMOT submission, there had been already interesting experiences concerning waste management carried out in cities such as Madaba, but there was still much room for improvement concerning medinas, specifically, insofar as some useful methods for modern areas are simply- as said before- not feasible in old towns.

The primary environmental legislation in Jordan is Law no. 52 of year 2006, for protection of the environment. The 2006-2015 National Agenda for Jordan identified the need for integrated solid waste management hierarchy.



Cordoba (Spain)

Cordoba is a city in Andalusia, southern Spain, with a population of 328.704 inhabitants (2013). The extension of the city of Cordoba is about 23 km2 while the extension of the old town is about 2 km2.

Cordoba was, in ancient times, the capital of an Islamic caliphate and then the capital of Hispania Ulterior during the Roman Republic and capital of Hispania Baetica during the Roman Empire; the old town (about 2 km2, 38.653 inhabitants, 11% of total) contains a lot of buildings dating these times: The Mosque Cathedral, the Episcopal Palace, the Synagogue and so on.

In the old there are mostly widespread the patio-houses, neighbouring houses sharing a central courtyard or single family homes with the same structure, with gabled roofs of Arabic tiles: the special structure and uses of these houses has led to the inclusion of the Fiesta of the Patios in Cordoba on the List of the Intangible Cultural Heritage of Humanity in 2012.

The road network in old town is characterized by narrow streets (2-4 m width) sidewalks or pavers and small cobblestones and granite slabs. Looking to economic activities, in the old town tertiary activity is mostly developed, mainly trade and services related to tourism.

The urban particularities of the historical centre of Cordoba have been traditionally observed in the waste management systems applied, vehicles and special systems for the collection of waste and minimization of negative impacts on public space having been adapted, especially in the surroundings of the Mosque Cathedral area. Agreements with main "producers" of solid waste within the World Heritage area – restaurants, hotels, faculty, and government- have been signed over the last few years to commit them to keep containers provided by SADECO inside their facilities also. But there is still much room for improvement, learning from other similar areas.

Ragusa (Italy)

Ragusa is a city in the southern part of Sicily. It is built on a wide limestone hill between two deep valleys, Cava San Leonardo and Cava Santa Domenica. Together with seven other cities in the Val di Noto, it is listed among the UNESCO World Heritage Sites.

The population is about 70.000 inhabitants (2013) and about 3.000 of them (3% of total) live in the old town. Every year about 10.000 tourists visit the city.

The extension of the city of Ragusa is about 442 km2 while the extension of the old town is about 2,6 km2. The old town is characterized by restaurants and commercial activities: café, bar, wine shop, perfume shop, foodstuffs, shop. The road network, in the old town, is characterized by very narrow streets, medieval type.

Due to the enormous presence of tourists during holiday periods, there is a particular difficulty in the management of the organic fraction by local businesses in the area. The "Masterplan" issued in 2002 for Sicily has the aim of implementing the separate collection of municipal solid waste; however specific solutions for historical old towns have not been developed. SMOT has been an excellent arena to test in Ragusa Ibla (UNESCO Heritage Site) an interesting and fresh replicable solution for waste presented in the following pages.

Sfax (Tunisia)

Sfax is a port city in Tunisia, located 270 km southeast of Tunis, on the Mediterranean coast.

It is the second most populated town in Tunisia, after the capital city Tunis. In the old town live about 3.600 inhabitants and every year about 5.000 tourists visit the old town. The extension of the city of Sfax is about 220 km2 while the extension of the old town is about 0,24 km2.

The medina of Sfax has preserved its magnificent walls around it so that they act as an architectural division between the old and the new city. The area of the medina is very lively from the commercial point of view and it is mostly characterized by artisanal activities, in particular, there is remarkable handicraft shoes activity and a relevant fish market but also artisans for jewels, perfumes or hammer men, among many other activities.

Some of the specificities of the medina of Sfax are the intense industrial and commercial activities inside, what, in addition to the urban characteristics of the area, make effective solutions to deal with waste produced very necessary.

1.4. Photograph of waste issues in the Mediterranean Basin

The generation of waste is a serious environmental problem of our society.
His neglect or mismanagement can produce noticeable impacts on the environment and can lead to contamination of water, soil and air, to climate change and to affect ecosystems and human health. However, if managed properly, waste can become a resource contributing to the saving of raw materials and to a sustainable development. Our planet's resources are limited.

It is curious mentioning that in our XXI century, the urban solid waste deposit is somehow similar to the "here junk goes" shouted centuries ago when waste was literally throw to the streets. Waste is deposited off the house - if not directly thrown on the street- causing significant negative impacts on health and public image of our cities. Today, even if advances have occurred, waste collection systems are not integrated enough into urban planning yet. This is SMOT aim accordingly: to promote the complete integration of waste management systems into the urban planning of every city, paying attention to particular areas – such as historical city centres- within the city when needed.

The issue of waste management has become central in the Med Basin urban agglomerations as their global growing tendency leads to increased amounts of waste to deal with.

From Spain to Greece, the northern Mediterranean countries that had reported a steady urban growth until the 70s, present quiet moderate growth rates today, which, however, are likely to continue in the future. On the opposite side, the Southern and Eastern Mediterranean countries report accelerated town development. The driving force behind this urban growth is increasingly endogenous, fed by internal redistributions.

With nearly 100 million extra city-dwellers between 2000 and 2025 the cities of Southern and Eastern Mediterranean will be undergoing major social and environmental changes. In spite of economies of scale, the concentration of populations generates difficult problems in the fields of infrastructure and services, pollution and waste.

The demographic explosion and the present exacerbated town planning places many cities of the Mediterranean Sea Basin in an urgent situation concerning deposit and collection of waste, insofar as the appropriate running of services is difficult in such scenarios: deficient collection, waste crowding in unfeasible dumps and inexistence and/or inefficiency of waste processes. Inadequate waste management results in dirtiness as well as environmental and health problems, both of which are a major cause of concern for municipalities.

In this context, SMOT cities serve the function of contributing to the characterisation of these problems the cities of the Med Basin face. Thanks to their participation in SMOT, solutions proved feasible to help to confront this problem have been tested and are now expected to be replicated.

The work in the project has served to determine that southern pilot cities in SMOT (probably also other cities in the area)- Alexandria (Egypt), Al Salt (Jordan) and Sfax (Tunisia)- present similar criticalities and the same happens for the northern cities – Ragusa (Italy) and Córdoba (Spain), and many more in the area probably.

Although the waste collection coverage is complete in the southern Mediterranean pilot cities (except in Alexandria where the coverage is according to situational analyses drafted in SMOT 80%) the cities have not yet implemented an integrated waste management system. Municipal waste services are still mostly defined in terms of cleanliness exclusively with very limited attention to prevention, reuse and recycling of materials. The main criticalities observed through the analysis conducted during the project have been:

- The lack of reliable and comprehensive data about waste generation and management
- The absence of selective waste collection systems
- The difficulties of vehicles to go through with waste in the narrow road networks of city centre and
- The weak environmental awareness of the population.

In Ragusa (Italy) and Cordoba (Spain) the waste management system is more comprehensive, according to the situational analyses conducted. The strength in Cordoba waste management system is that all collected waste goes through a process in a recycling plant, no residue discarded directly to landfill, just the residues of recycling and composting. Instead, the most important problem has to do with the quality of the recycled materials, directly related with the quality of the separation at source made by the citizens, that should separate correctly at home and use the proper containers.

In Ragusa (Italy), the strength of the waste management system, is the positive reaction of the inhabitants to door to door collection introduced in 2008 in old town but, however, the percentage of separate collection in the whole city remains low, the rest of the city being served by a street collection system.

According to the analysis conducted, the southern partner cities – Al Salt, Alexandria and Sfax- have faced difficulties in obtaining basic information such as the quantities of waste collected and the waste composition, due to the lack of a specific accounting system for waste. In these cities the separation of waste at source was completely missing[4] at the time of planning the project, the total amount of waste generated is collected and the different waste fractions are separated at the final disposal plants, mostly by hand. Waste prevention or reuse initiatives are not in place with the exception of some limited experiences in Al Salt. The final destination of the waste is landfill and energy recovery facilities do not exist except for some specific waste streams, such as healthcare waste or animal carcasses.

The northern partners cities- Ragusa and Cordoba- count with a more advanced integrated management system for waste- both cities implement the separate collection of waste- even if in both cases the process could be improved, both in terms of quantity and quality of waste collected. The different waste fractions are sent to recycling plants, while the residual waste is treated in sorting plants. However, both in Cordoba and Ragusa the final disposal in landfills is still too high, although in both cities a significant decrease is observed in the last decade. Some relevant waste prevention and reuse initiatives are already in place in both cities- home composting, food waste reduction, promotion of reusable bags, second hand goods markets or shops- as well as environmental education projects in schools, but these initiatives could be strengthened.

[4] The aim of some SMOT pilots has been working upon separation at source.

Considering the criticalities highlighted, in all the pilot cities the first important thing that should be improved, and in some cases completely realized, is the sensitization of citizens and other local stakeholders on the importance of a waste management approach based on the hierarchy that places waste prevention as the best option, followed by reuse, recycling and energy recovery.

The realization of extensive and effective awareness raising campaigns and educational activities in schools is thus a fundamental action to be implemented in each pilot city involved in the project.

Also, the implementation of demonstrative waste prevention, reuse or recycling actions in the cities, realized with the active involvement of local stakeholders, would be very effective in raising awareness on sustainable waste management. This would be particularly important in the historical centres, since in those areas the initiatives realized would be visible for all citizens and also for tourists and thus the target groups will be reached more easily.

In Alexandria, Al Salt and Sfax it would be also fundamental to organize suitable accounting systems for waste generation and management, in order to have reliable data for planning proper waste management strategies. In Ragusa and Cordoba, where accounting systems are in use already, it would be important to improve the monitoring and control activities on waste collection systems, in order to improve the technical, environmental and economic performances of waste separate collection (increase of separate collection and recycling rates, better quality of materials collected, increase in the services productivity, etc.).

As to the waste collection services in the historical centres, it has to be considered that all the pilots cities are characterized by high tourist flows, so it is important, in designing waste collection services from now onwards, to take into account the increase in waste generation during the touristic season and to introduce adequate increase in the frequency of collection services and specific services targeted to tourism facilities. Of course, as has been made clear in the process of implementation of SMOT pilots, when eventually designing new waste collection systems in the historical centres the physical structure of these areas has to be taken into account.

In any case, the effectiveness of selective waste collection would be vain if proper recycling plants are not available in the Med Basin.

The analysis concluded with a pull of good practices (references provided in chapter 4 of this document) that will be for sure of added value to the waste management systems of the cities in the basin, as provide, specially, an input for prevention. The proposed good practices cannot solve all the existing problems linked to general plans on waste management, but they can help for gradually, municipalities to implement activities in the city area addressed to Prevention, Education, Communication and for moving towards a Circular Economy.

During the limited duration of SMOT – 2 years- some systems for waste deposit and collection in line with the urban scenarios of these magnificent cities have been tested. It is however expected, that after SMOT they all go ahead testing other solutions and practices and replicating those already proved positive. Thanks to SMOT, extra knowledge is available now and a good deal of experience also.

Last, but not least, to remark, at Mediterranean Basin level, the existing H2020 initiative to depollute the Mediterranean. The leaders of Euro-Mediterranean countries agreed to increase efforts to substantially reduce the pollution of the Mediterranean by tackling the sources said to account for around 80% of the overall pollution of the Mediterranean Sea: municipal waste, urban waste water and industrial pollution.

2. Ways forward for improving waste deposit and collection in Heritage Cities

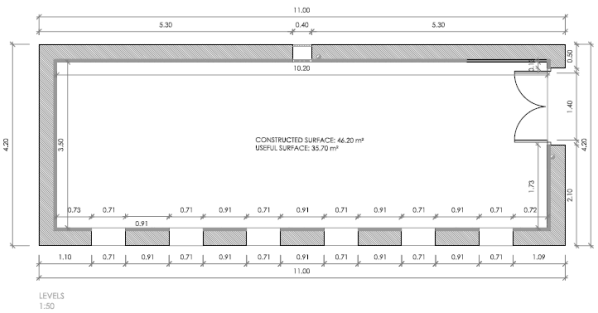
2.1. The 5 solutions explored in SMOT project

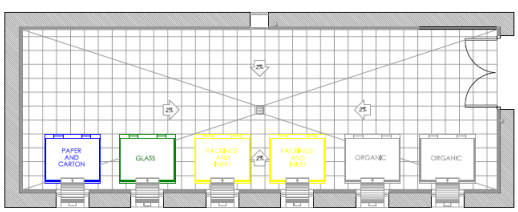
Waste room of public use

This system aims to use a public area for the storage of public solid waste so that it is kept away from public visible areas, the best hygienic, sanitary and security conditions being ensured while the impact on the environment and surrounding scenario is minimised.

The public area usually belongs to a public entity and it is located in very lively streets with easy accessibility for users and collecting operators. The waste room can have a variable design with regard to the capacity to store a different number of selective containers each, depending on the number of users expected in the area, times scheduled for waste collection and fractions collected.

Some technical work suggestions to adequate the storage spaces are the following:





- ✓ **Paving with anti-slip tile**, porcelain or similar. The pavement should be constructed with a slope towards the drain system. The joints between walls and floor have to be concave.
- ✓ **Sanitary coating** and wall panel insulated 60 mm thick, provided with inner foam injected polyurethane 40 kg/m3 density, prelacquered.
- ✓ **Drainage** of stainless steel sink with draining connected to the sewerage.
- ✓ **Stainless steel mailboxes**.
- ✓ **Lettering and signs**. External labeling of the waste storage room and the type of waste to be deposited in each mailbox is essential. The exit and the fire extinguisher will be clearly signalled.

Waste room of private use

This system consists in devoting a private area to store the containers, away from the public areas, guaranteeing the maintenance of the hygienic-sanitary conditions and minimizing the impact of waste upon the surrounding area. The use is limited in this case to a certain number of beneficiaries. The waste area can be designed with capacity for the storage of a flexible number of selective collection containers, depending on the number of users, types of waste, etc.

Technical characteristics of the waste collection area could be regulated under local laws as it is the Spanish case (Código Técnico de la Edificación) which contains basic requirements concerning waste collection and evacuation.
Basic conditions of these documents can be used as a guide to set some suggestions for the design and size of this type of storage areas:

Container storage. Design and sizing

- ✓ Each building must have a reserved space to store containers.
- ✓ When households are isolated or grouped horizontally, the storage space can be adapted to serve to several households.

Location

- ✓ Storage and additional reserved areas, if outside the building, must be located closer than 25 m from the building access.
- ✓ Distance between storage space and external collection point must be of at least 1,2 m. If there are manual doors, they must be opened towards the external area. Maximum slope must be of 12 % and no steps are allowed.

Other characteristics

- ✓ The location and design should be such that the internal temperature does not exceed 30 °C
- ✓ Walls and floor must be waterproof and easy to clean; joinings between the walls and floor should be rounded;
- ✓ Water supply indispensable with appropriate draining system available; lighting necessary also.

Door-to-door collection

Selective door to door municipal waste collection system consists in the segregated delivery of different waste fractions at source, within an existing schedule and a certain level of quality control.

The main feature of this system is that each household waste is collected separately. It is a feasible system for all the fractions of ordinary municipal waste: organic fraction of municipal waste, recyclable materials such as glass, paper and cardboard, packages, inorganic fraction of municipal waste, multi-product, etc.

This collection system does not require a specific area reserved for its application. A space outside to place the container is enough, such as the house main door, the front gate of the private property or communal area, etc. The containers to be used can be individual or collective. The individual ones are watertight containers with a cover. Its capacity is usually 35 litres. The capacity of the collective ones can spam from 90 litres onwards and they are fitted with wheels.

The material used to build these containers is mainly plastic, in its various qualities (PVC, PEAD, etc), but they can also be built with metal.

The organization of door to door collection is *ad-hoc* for each area based on its needs and characteristics. Each city/area will schedule collection times, special collection, collection by type of waste …but one common point is the fact that for door-to-door a clear regulated schedule needs to be set up to deposit the waste.
Thus, waste remains very few hours on the street.

Aesthetic containers

Aesthetic containers are designed to mitigate the impact caused by waste containers in areas of special added value cultural or natural heritage.
The design of the containers makes them to match with the surrounding scenario and/or urban furniture. The design can be individual- for a specific location- or collective.

The collective waste collection systems use larger containers and their specifications vary depending on the way they are loaded (vertically, rear or lateral loading), different materials (mainly plastic and metal) are used for their production and also for their final covering. Different sizes can be found in the market depending on the different manufacturers.

Individual Veneering

An enclosing element fully covers the container, which can be provided of a mechanism that allows its opening and closing. Veneering elements are built from different materials, mainly metal and plastic. There are different designs and benefits according to the manufacturer.

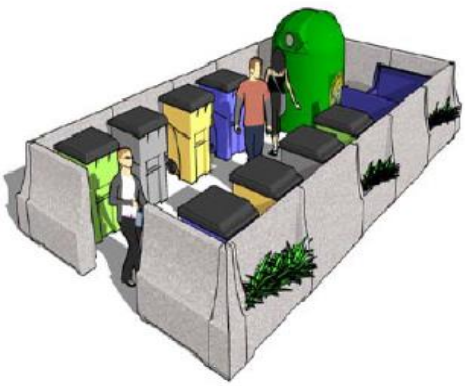
Technical characteristics of this system are:

- ✓ Dimensions: vary according to container model and size
- ✓ Material: galvanized Steel and/or stainless Steel
- ✓ Parts: front part, front folding doors or system with hydraulic damper, fixed sides and rear parts,etc
- ✓ Opening lid through a frontal pedal
- ✓ Height adjustable

Collective Veneering

Collective containers are normally hiding behind a screen that covers most of their parts. The only visible part is their top part, forming what is generically denominated “islands”.
They can be adaptable to the available space and can be grouped into one or two container rows or maybe making rectangular or any other shapes.

This type of protections are built from different materials, such as artificial stone, concrete, plastic, wood, etc., allowing to integrate decorative elements, planters, etc.



Underground containers

This solution implies obtaining hidden underground containers, only the part that allows the waste to be deposited and entered into the container being visible, what is clean and secure. There are various types of containers of this type.
Underground containers are installed individually or in a group up to 5 containers usually.

The capacity for waste storage usually ranges from 80 to 120 liters. The average total capacity of the underground container ranges from 3.000 to 5.000 liters if vertical loading, between 800 and 1.100 liters if rear side loading and between 2.400 and 3.200 liters if lateral loading containers used.

Mechanism can be electric of hydraulic, allowing in some cases the link with the truck hydraulic system. The installation system is prefabricated.

Suggested measures for installation:

- ✓ Existing pavement being cut by radial saw in the area occupied by the facility; demolition of the existing pavement area.
- ✓ Excavation by mechanical means, land extraction, load on truck and transport to landfill; refined base compacted.
- ✓ Levelling: concrete 15 cm thickness above the base.
- ✓ Assembling of the structure.
- ✓ Installing container equipment consisting of upper and lower platforms, entrance, etc.
- ✓ Paving the top.

2.2. The role played by participatory processes

5 participation processes were scheduled to be celebrated during SMOT project in the city centres and medinas of Alexandria (Egypt), Al Salt (Jordan), Cordoba (Spain), Ragusa (Italy) and Sfax (Tunisia). When building the project, it was deemed important for its success the early involvement of different groups interacting in the city centres/medinas in the project.

The plan was each group of local partners to cooperate to celebrate one participation process in their city centre. Each local team would constitute a group of 40 people (approx.) to be the participants in the forum. They would compromise to meet 4 times during project, once per semester (approx.), during 2 hours. Each team would be composed of:

- 10 political representatives of the municipality and region in areas related to urban space, waste, education and heritage.
- 10 multidisciplinary local experts in the fields of environmental sustainability and waste management.
- 10 representatives of the private sector in the medina/city centres: owners of restaurants, hotels, shops, markets….
- 10 representatives of civil society: communities inhabiting the medina/city centre, associations, representatives of schools/secondary schools in the area of the medina, etc).

Definitely, we can assure in the project finalisation that the participation processes in SMOT have revealed themselves as one of the strengths and successes of the project.
The interest of target groups in participating, the compromise to attend several meetings, the contribution to choose the better pilots for the better places within city centres in each case, the criticisms to intended solutions at some point: all these facts have probably been the root of part of the success of SMOT pilots. The population was already involved with them when the interventions occurred in the urban space, as they already knew them and had participated in their selection and preparation.

4 meetings in SMOT should be organized during the project in each partner city. The format for each meeting was clearly defined in advanced and it was intentionally different for each of the four so that an important degree of interaction /confrontation would happen. The approach for each of the four meetings has been the following:

* 1st meeting. -plenary session. All the participants were informed on the project and on the participatory process they were about to participate. First impressions concerning were to be explored in depth during meeting 2 and meeting 3.

* 2nd meeting- four groups of different composition, each devoted to a profile, debate on the main concerns for waste deposit and collection in the area. Possible pilots to be tested are introduced.
    group 1 politicians (10 participants)
    group 2 local experts(10 participants)
    group 3 private sector in medinas(10 participants)
    group 4 representatives of civil society(10 participants)

* 3rd meeting- four groups of identical composition work simultaneously: each group has representatives of groups 1, 2 3 and 4 mixed together.
group 1 politicians +local experts +private sector in medinas + civil representatives(10)
group2 politicians +local experts +private sector in medinas + civil representatives (10)
group3 politicians +local experts +private sector in medinas + civil representatives (10)
group4 politicians +local experts +private sector in medinas + civil representatives (10)

Depending on the main issues /problems/suggestions that have emerged in meeting 2 it is possible to assign each of these groups a specific "topic" to be explored in detail. In addition at this moment of the project (semester 3) the SMOT pilot interventions in medinas will be ongoing so that the groups can also assess these interventions.

* 4rd meeting- plenary session. Presentation of project results, assessment of the pilot experiences held in the city and assessment of the participation process also.
It is worthwhile mentioning the high level of cooperation and interaction between the participants in each process what is an excellent experience to be reduplicated for future interventions in the city area.

3. Pilot Solutions & Participatory Processes in the SMOT cities

3.1. The case of Alexandria (Egypt)

Alexandria University as project partner worked closely with Alexandria Municipality (associate) in order to find solutions for waste deposit in Alexandria key spaces taking into account specific problems:

- The large amount of solid waste produced daily: about 3500 tons, 40% increase than expected.
- The lack of sensitization in the local culture towards solid waste collection: very limited separation at source.
- Difficulties to arrange who is responsible for solid waste separation, collection and recycling processes.

In order to palliate somehow these negative aspects reflected on the city in day to day life of citizens, it was decided to carry out three suitable pilots experiences in different locations.

Garbage separation at source

In order to encourage waste separation at source in a heritage scenario SMOT team in Alexandria have installed 110 coloured garbage bins for separate collection alongside the Corniche, within the Citadel and the district of “Hay El-Jamerek”. Besides, green and black bags for separated fractions for organic and recyclable were also distributed in the area.

It is worth mentioning awareness raising activities celebrated to encourage the citizenship to use them appropriately and the appealing advertisements produced to encourage recycling- with a famous Egyptian singer, a famous song and a famous film as protagonists.

Container veneering

Solid waste usually remains in the street for a long time. Also the amount of solid waste is higher than the capacity the company can collect. This solution was planned to be located in front of one of the city historical Mosques and in the area of the Faculty of Engineering. SMOT team has designed the containers veneering model, the purchase and the instalment being pending yet.

Underground Containers

For the same key locations that container veneering is scheduled there are also underground containers projected, in Mosques square and in the area of the Faculty of Engineering.

On the occasion of the World Environment Day, the Faculty of Engineering of Alexandria University organized the first of the SMOT meetings for the participation process scheduled. The attendees were divided into groups and discussed about the different solutions suitable for different Alexandria locations. As a result of the participation process specific locations and tailored solutions for them were selected.

The participation process meetings have shown the general lack of consciousness in the society with regard to solid waste deposit and collection, therefore the design and implementation of awareness campaigns has revealed itself as a crucial activity to be accomplished.

The Governorate of Alexandria and Sanitation Cordoba (SADECO) have agreed to cooperate in the field of waste management on a regular basis through formal contacts and exchanges being currently being promoted. The fact of SMOT team participating as advisory body for waste issues in the Governorate of the city is an example of excellent cooperation of the project with its environment.

3.2. The case of Al Salt (Jordan)

SMOT Jordan partners- Ministry of Municipal Affairs of Jordan (MOMA) and University of Jordan (UJ) with close collaboration with technical team from Al- Salt Municipality (project associate), selected the following three pilot solutions for waste deposit and collection for the medina of Al Salt, as a result of the following facts:

1) the situational analyses conducted during the project, that contributed to identify the current situation of Al Salt total waste production and the waste collection systems in use as well as to learning from the good practices exchanged;

2) the chance, during partners meeting in Cordoba (June 2014) to test the 5 pilot experiences in the virtual reality laboratory of the University of Cordoba as well as visiting on ground waste deposit and collection experiences in Cordoba.

On the basis of this experience gained, the Jordan team decided, supported by the citizenship through the participation process held, to implement in Al Salt city centre the following solutions:

1) Installation of a Public Room for waste deposit and collection in the city centre.

2) Implementation of the door to door collection making use of tree structures for containers and

3) Installation of aesthetic veneering containers in a key space within the medina

…as can be seen in the map on the left that represents Al Salt city historical centre.

Waste Room of public use

The Public room (3 m x 6 m) for waste collection was completed in March 2015. It consists of 6 opening (windows) three on each side, for depositing the waste. At each opening there is a container of 770 liter capacity, with four wheels and flat cover. It is interesting to notice how firstly people were against the waste room, when it was firstly suggested in the participation process meetings. The reason was they though it could become a focus for dirtiness. However, as these issues were appropriately resolved by the municipality and explained to people their position began to change. Now, the citizens see the waste room works perfectly and there is a clear citizenship support to the model. It has been very clearly organized how many times a day cleaning and removal of waste takes place- main concern of the citizens- and the system is working fine.

Door-to-door waste collection

The start of the implementation of the door-to-door collection was welcomed and encouraged by the dealers, citizens, NGOs, and from different Al- Salt community categories, as revealed during the first participatory meeting that, especially for collecting the residential waste and the waste coming from the commercial stores and shops.

It was decided four plastic containers with 35 litres capacity would be placed on steel columns in 15 selected locations in Al- Hamam street, which is the main commercial street, with many shops and also residential buildings.

Aesthetic containers

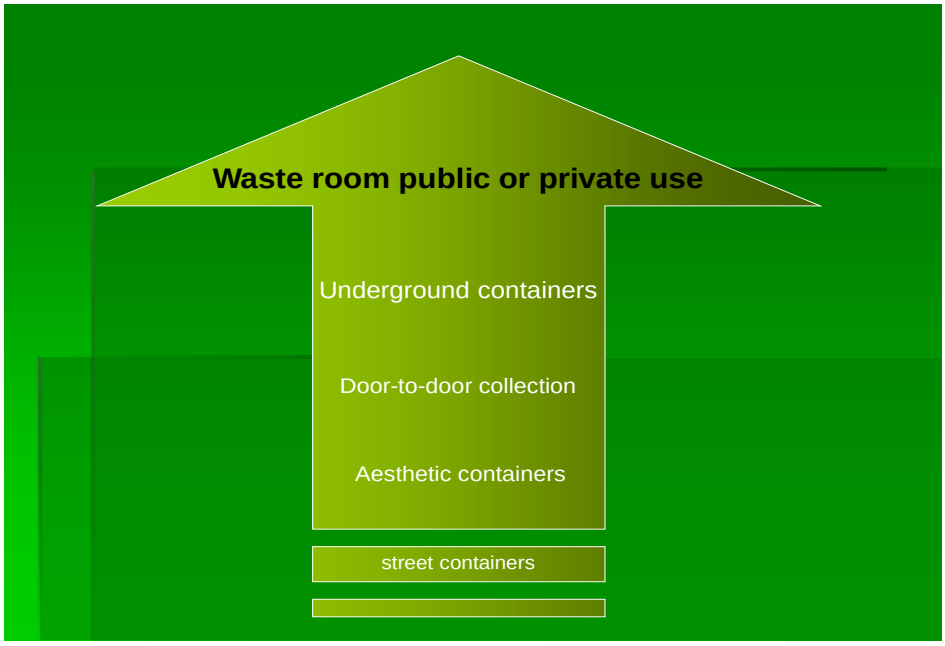
The introduction of aesthetic containers was deemed perfect for the location in front of Al- Salt high school for girls as it would help reducing the negative environmental impacts issued from the old containers in an aesthetic environment location.

The municipality of Al Salt has decided to replicate in other locations within Al Salt the three solutions, once their positive impact has been proved. Also, the Al Balqa Governorate plans to replicate them in other cities of the Governorate apart from Al Salt.

3.3. The case of Cordoba (Spain)

The participation process held in Cordoba has been useful to reach the vision with regard to waste management of the different stakeholders interacting in the Heritage city centre of Cordoba. It has been mainly neighbours and merchants that have remarked the necessity to establish feasible methods to deposit waste in the area being simultaneously respectful with the monumental environment, the environment and the commercial activity around, closely linked to important flows of tourists in the area.
Representatives of hotels, restaurants, cafes, pubs but also current neighbors and municipal representatives have concluded that the solutions to adopt must always aim at the streets resulting free of containers with waste.

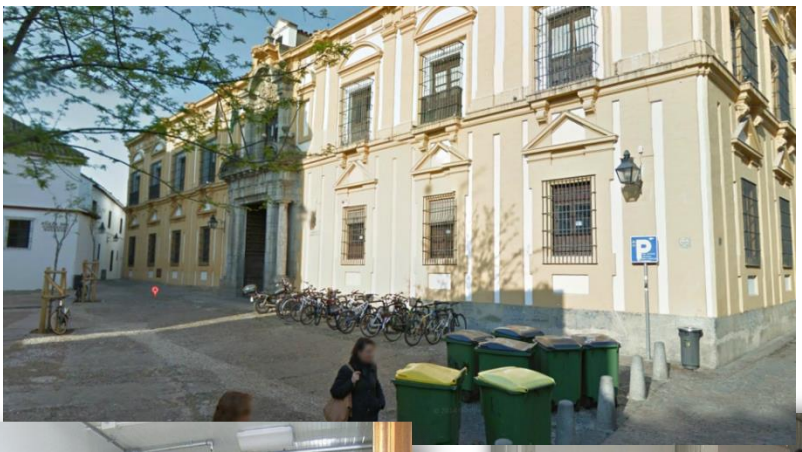
Consequently, during the meetings of the participation process a scale of different options aiming at 1) integrating waste collection in the surrounding scenario and 2) reducing the impact of the activity of collection in the heritage area is analyzed. Within the following picture we can see the options discussed, in a scaled representation, from the one that implies the highest integration with the surrounding scenario and the highest reduction of impacts to the one reaching the lower results while observing both parameters however.



During the participation process the interest of the different stakeholders groups to develop and introduce the waste room solution has been confirmed. “Ecopunto” (*Ecopoint*) is the local name assigned to waste room in the city of Cordoba. There is a plan for settling up several in different locations of the city centre.

The Ecopoint being projected in SMOT is being located within the building of the Faculty of Philosophy, which belongs to the University of Cordoba. This institution- SMOT partner also besides Sanitation Córdoba (SADECO) - aware of the importance of specific waste deposit and collection necessities in the heritage area and compromised with the provision of solutions, grants a space within its Faculty of Philosophy building to install an Ecopoint of public use (waste room) there opened to the street, in the very heart of Cordoba Heritage area.

This resolves the problem of the impact of containers in this monumental and commercial scenario within the Heritage City Centre, only a few metres from the Mosque-Cathedral. Indeed, the building of the Faculty of Philosophy itself, where the Ecopoint is installed, is a protected building declared as a Cultural Interest asset. It is the building and historical square below:



It is worthwhile remarking the contribution to the environmental awareness the installation of the Ecopoints in a teaching building for hundreds of university students means. In order to make them more aware even of the installation of the Ecopoint and in order to encourage their active participation in the process, a competition for the decorative design of the corridor being part of the Ecopoint has been launched among the students of University of Cordoba – the winner design has already been granted.

The participative process has been an experience of consensus: the solution adopted has obtained the explicit support of both the merchants association of the city centre of Cordoba and the corresponding neighborhood association. Besides this, the authorization for the use of the space in the Faculty as waste room is accompanied by a Use Plan agreed with the Faculty itself and the neighbors using the waste room which defines in an agreed way the use and management of this innovative installation.

SADECO has reached interesting agreements with the "Network of Spanish UNESCO Heritage Cities" and with the "Spanish National Association of Public Companies for the promotion of the Environment (ANEPMA)" so that the experiences proved in SMOT and the knowledge gained out of them to be communicated to the rest of heritage cities and public companies for waste management of cities throughout Spain.

3.4. The case of Ragusa (Italy)

Municipality of Ragusa and Svimed Onlus (SVIMED) inaugurated on 23RD December 2014 the Ecostation of Ragusa Ibla, the pilot activity whose main objective is to promote a new way of conceiving "waste", not as something bad to hide, but as an opportunity for the city to show a sense of civic duty and an attention to the environmental, economic and social context.

According to the pilot experiences for waste deposit and collection to reduce the impact of waste disposals around the historical centre of Ragusa (Ragusa Ibla), the Italian partners proposed and validated, during the first participation process, the pilot activity that has been called: "EcogreenIBLA". This pilot activity takes place after Cordoba partners meeting held in June 2014, visiting "waste room" good practice and deciding to import "somehow" this good practice mixed with the idea of re-use /recycling.

The developed pilot consists in adapting a room of public ownership as waste-storage rooms for public use in keyspaces of partner medinas/old towns, in particular in Ragusa Ibla: the idea is to support people to separate waste with the help of a responsible of the Municipality who is constantly in the Ecostation. In order to improve the system and the results, the model aims at incentivizing the citizens to improve the quantity and quality of their separate collection, respecting the principle of PAYT (Pay As You Throw) and Prevention, that are boosted with parallel awareness' activities.

The Ecostation has been opened in the old city but is available to all citizens and allows to them to deliver their solid waste, such as paper, plastic, glass, cans and small WEEE, and some fraction of special waste, similar to urban solid waste, such as batteries, light bulbs, toner and cartridges, vegetable oils and expired medicines, with the opportunity to collect "eco-scores" and enjoy a consequent reduction in the municipal waste tax. At the moment the Ecostation is managed by municipal volunteers which work 5 days a week.

The message intended to be spread is that “waste” is a resource and, thus, it was started from the design of the Ecostation:”waste” was the starting point for designing the furniture of the "EcogreenIBLA. Furthermore, to involve people and spread more and more the message of the “EcogreenIBLA" we settled up a software not only for weighting the separate waste of each citizen but also to involve them in this “e-participatory” system through a friendly eco-platform: this interactive software allows citizens to consult the data relating to their own different fractions of waste delivered to the Ecostation and the number of “eco-scores” collected with direct economic benefits on waste tax.

By means of the software and the related Ecoportal (www.ecoportal.it), we can check daily how many people go to the Ecostation, which kind and the weight of the separate collection delivered, but above all we can guarantee the quality of the separated waste (in fact we are improving the quality of the system if compared to the door to door collection system already ongoing in Ragusa Ibla).

The platform is also a communication tool, because it’s an online tool, free for everybody for checking statistics, data, private information about its own “waste” state of art but also news and documents, as the “waste dictionary” on how improving their own behaviors!

The “Ecostation” is going to be replicated soon in other locations of the city to serve the different districts what gives idea of the success of the experience and its mainstreaming in the local policy.

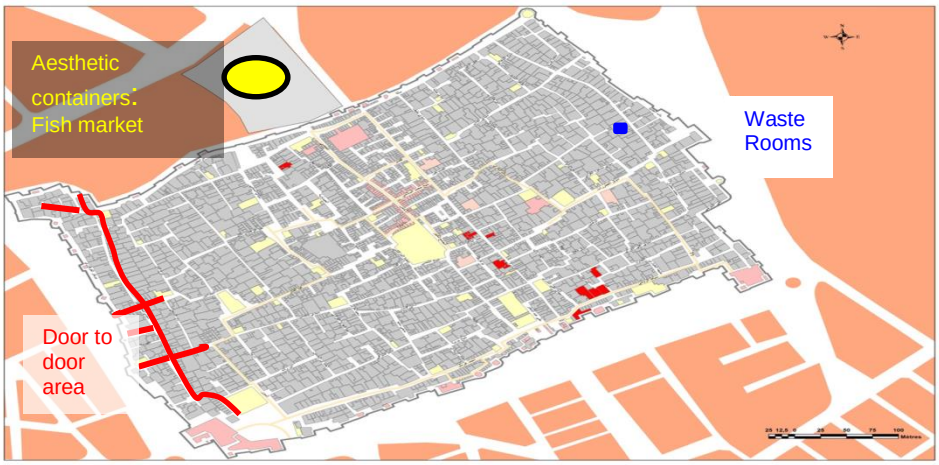
3.5. The case of Sfax (Túnez)

ARDES - Association de Recherche et Développement Economique et Scientifique (Sfax)- has been the entity responsible for carrying out all the pilot actions in the medina of Sfax. The Municipality of Sfax - project associate- has supported the pilot interventions and the participation process held in the medina.

Pilot interventions and participation process held in the medina of Sfax are aiming at:

- Extending experiences to improve waste deposit and collection to various types of commercial and economic activities in the medina and consequently to various types of wastes produced (industrial wastes of shoes manufactories, fish market wastes, domestic organic waste…).
- Improving conditions for municipal solid waste workers promoting sustainable behaviours.

Three pilot solutions are being carried out in the medina of Sfax. Let´s know a bit more about them:



Sfax Medina. Areas selected for pilot implementations

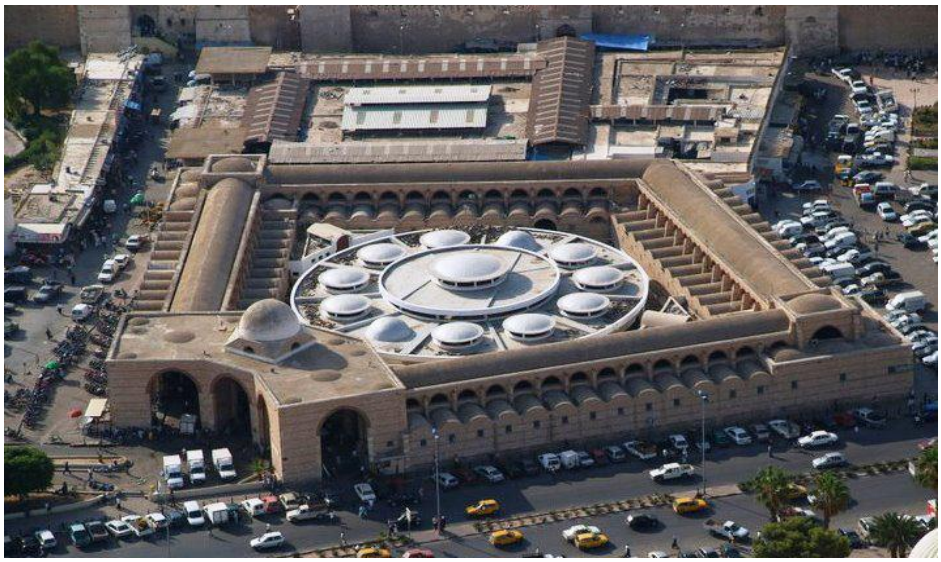
Solution 1.- Door to door waste collection

The door to door collection implantation zone corresponds to the AL Ksar Steet and annexed alleys. The pilot has consisted in the distribution of plastic bags and / or bins with different colors for the recyclable wastes (plastic, cardboards and cans) and the remaining fraction of waste. Containers have been installed in the collection stations for the different zones where current containers were inaccessible.

To enhance the project interventions, a survey was made to the local population, artisans and local representatives. This survey aimed to provide data of usefulness to arrange the door to door collection: lifestyle, type and quantity of produced waste and stakeholders feedback and recommendations for the pilots.

Solution 2.- Aesthetic containers.

The pilot experience is located in the fish market of Sfax with the aim to enhance the hygiene of a zone where huge amounts of fresh product are sold. It has consisted of the installation of containers in order to ensure a safe and clean containment of the fish market wastes.



Sfax Medina. Fish Market

Solution 3.- Waste rooms in the medina

The conditioning of two waste rooms is planned and designed. These rooms are being adapted and equipped in the area selected in accordance with the cleaning service of the Sfax municipality recommendations. The waste rooms will be managed by Sfax Municipality and equipped with special containers.

The municipality of Sfax has decided to implement another waste room within the area of the medina of Sfax apart from the one introduced by the project itself as pilot. This implies an important degree of support to the experience and its mainstreaming. Also National Tunisian Agency for Protection of the Environment (ANGED) has agreed with the project team to support the labour done for sensitization to make the door to door collection in the area of the medina extensive.

4. References to Good Practices in consolidated urban environments

SMOT partners have exchanged and shared during the project interesting practices for waste management either carried out in their cities or well-known by them, some coming from neighbouring cities, other provided to them through other projects or cooperation forums. With them all it has been produced this chapter so that they are all shared with you:

Partner cities Good Practices

Alexandria

Environmental education projects/initiatives in schools

Environmental awareness campaigns have been held by Ministry of Health, in particular by the department of Health Education, so that primary schools are visited to teach the students heath care including environmental behaviour issues.

Reuse Centre

Some non-governmental groups collect unused clothes and papers and distribute them for reusing.

Presence of particular collecting/recycling initiatives dedicated to a certain waste fraction

In some buildings, the caretakers collect the newspapers and bread separately from the apartments and supply them to a general collector.

In most areas in Alexandria groups of people known as “Nabasheen” take the valued things from the collecting boxes such as papers, plastics, cans, etc. and supply them to private general collectors.

There is a normalised system for collection of used oil from hotels and restaurants so that it is reused to produce biodiesel.

Al Salt

Environmental education projects/initiatives in schools

All Jordanian students, in secondary schools attend a course of Earth and Environmental Sciences; furthermore many schools in Al-Salt separate cardboard and paper from schools solid waste and send them to recycling factories.

Food waste reduction

Within the customs and traditions related to wedding parties, the leftovers of the meals served to the invitees are collected by some of the charities and re-packaged and re-distributed.

Reuse Centre

In Al-Salt there are many thrift shops that sell second hand clothes and shoes, household second hand goods (electrical and furniture) and car second hand parts.

Cordoba

Home or Community Composting

This project involves 2.608 companies (large waste producer and companies in industrial areas), each of these pay depending of production.

Environmental education projects/initiatives in schools

In 2012, 8.227 students attended an environmental education project. The programme, agreed with the municipal delegation of education and childhood, consisted in a continuous plan of training for all the educative centres:

- Visits to the environmental hall, the waste treatment centre and the animal control centre - guided by specially hired educators of recycling and urban hygiene.
- Recycling workshops directly in the schools adapted to each level.
- Specific programs in neighbourhoods (Information stands in fairs and cultural activities).

This is a yearly programme.

Food waste reduction

Directly managed by the NGOs

- The "food bank" collects food from producers or distributors who donate food close to expire or surpluses and distribute it in places managed by this NGOs.
- "CÁRITAS"(organization of the Catholic Church) and other religious and not religious organizations perform similar duties.

Voluntary agreements undersigned by local authorities and /or private partners for waste reduction/ selective collection/ recycling purposes

Voluntary agreements between the main private or citizens around the "Mosque-Cathedral" and SADECO to collect their waste inside the establishment (organic and inert matter, glass, paper packaging – cardboard).

Ragusa

Home or Community Composting

Two activities have been developed recently (1500 users involved):

- "The Reuse day" where citizens are invited to deliver at the Municipal Centers of collection, their second hand goods.
- Municipality of Ragusa encourages the practice of home composting for the citizens living in a house with garden, by assigning 600 home composting and organising info day – free call center – compost analysis in order to promote the reduction of waste by focusing on the recovery and recycling.

Reuse centre

Every Sunday, in the centre of Ragusa, there is a street market of second hand goods

Presence of particular collecting/recycling initiatives dedicated to a certain waste fraction

WEEE (waste electrical and electronic equipment) are collected in the Municipal Centres of collection.
Municipal door to door collection service for bulky waste.
Municipal door to door collection service for second hands clothes.

Projects in order to discourage the use of plastic shopping bags

Customers have to pay for biodegradable shopping bags (plastic bags are forbidden by law)

Projects for cutting paper use in offices

Some few interesting experiences outside the partner regions

Experience of incentives to the separation of domestic waste

Rewarding schemes in the UK: the best practice in the Royal Borough of Windsor & Maidenhead

Positive rewards system are promoted by the UK Government and are proving to make a big difference to recycling behaviour. A best practice in this sense is represented by the Royal Borough of Windsor & Maidenhead. In 2009, households in the borough were invited to pilot the Greenredeem rewards scheme (then the Recyclebank rewards scheme). To date, over 35.000 households have signed up to take part. Recycling performance in the Royal Borough of Windsor & Maidenhead grew three times faster than the national average to 2012 and residents have earned more than 20 millions points for taking green action. Residents are also using points to redeem vouchers for use in local businesses, putting economic benefit back into their local area. In the Royal Borough of Windsor & Maidenhead, they've been offering 25 bonus points every month for everyone who recycles food waste alongside complimentary rolls of compostable food waste bags being delivered to every household in the borough. Such combination has led to offering intelligent features on the web and mobile app that allows members to not only instantly see the points they are awarded for recycling, wherever they are, but then get instant access to rewards.

http://www3.rbwm.gov.uk/info/200175/recycling_and_waste/50/greenredeem_recycling_rewards

Experience with the "Pay as you through" principle

"Fair Charge, Pay-As-You-Throw for Municipal Waste" in the province of Treviso

Within the region of Veneto, in Italy, the public company Contarina is responsible for the management of waste in most of the province of Treviso, including the capital Treviso. Here they serve 554.000 inhabitants in 50 municipalities and have reached levels of source separation of up to 84% and generate only 53kg of residual waste per inhabitant and year. This result has been achieved with the use of intensive and adapted kerbside collection combined with "pay-as-you-throw" system. Municipal solid waste is collected in five or six major waste-streams: non-recyclable dry, organics, garden waste, paper and cardboard, glass, plastic and cans. They are placed in special colour-coded bins collected at the kerbside. The cost of the service to the user (households and non domestic users) is proportional to the amount of waste produced. This provides an incentive to do the right thing and minimize waste generation as well as promote home composting. More concretely this boils down to splitting the fee for waste generation into two parts; one fixed and another one variable. The fixed part depends on the number of members living in the household whereas the variable portion is calculated according to two variables. One penalizes the number of times the non-recyclable dry waste bin is emptied. The other one is a bonus for those households doing home-composting which see a reduction of 30% on the variable fee. http://www.contarina.it/en

Experiences of Prevention

Wasteless in Chianti project

The aim of the project has been to contribute to the success of the European and National policies on waste prevention and sustainable consumption through the implementation and monitoring of an integrated waste prevention and reduction program in a significant and internationally known territory as Chianti (Province of Florence), thus providing to Member States a relevant case study for the establishment of their waste prevention programmes. The project, recognized among the best life in 2014, has demonstrated the effectiveness of combining many different good practices in a comprehensive approach, characterized by the implementation of many concrete waste prevention actions through the active involvement of many different local stakeholders, accompanied by the revision of waste collection schemes and the related regulatory/charging framework in a "waste prevention" perspective, and by extensive local communication campaigns. http://www.wasteless-in-chianti.it/

Deposit, Devolution and Return System, Germany

The producers (bottlers, importers or distributors) pay the deposit to the system for each package they put up for sale. The commerce buy the products and the packages to the producers and pay the price of both the product and each package. The consumers buy packaged product and they pay the deposit for each package to the commerce.

Experience of Composting

Mini Waste project

Miniwaste is a European project co financed by the program LIFE+ that has developed effective methodologies for organic waste management. The Miniwaste project partners have made some progress with the aim to reach the three project's objectives: implementation of various demonstrative projects at different scales, development and implementation of waste prevention process and computerized tool for monitoring this process, and communication and dissemination actions about the project. Demonstrative actions focused on prevention and reduction at the source of organic waste have been implemented in Rennes Metropole, Porto region and Brno: individual and collective composting for citizens living in apartments or in detached housings; composting in private and public organisations such as schools, cribs and social centres, fighting against food waste through food conservation techniques and the cooking of leftovers. http://www.miniwaste.eu/index.php?lang=EN

References to other Projects and Good Practices Guides

The following guides contain an impressive corpus of knowledge with regard to good practices in waste management in urban contexts, with potential for reduplication:

1.Pre waste

www.prewaste.eu

Inside this site, click on the icon "GOOD PRACTICES".

1. Love Food Hate Waste Campaign in North London (Pre-waste factsheet 4)
2. Let's do it with Ferda in Estonian schools (Pre-waste factsheet 9)
3. R.U.S.Z - Repair and Service Center in Austria (Prewaste factsheet 10)
4. Ecomoebel – Redesign of furniture in Germany (Prewaste factsheet 13)
5. No-advertisement sticker with legal backing in Brussels (Prewaste factsheet 18)
6. Promotion of decentralised composting in Brussels (Pre-waste factsheet 21)
7. Accompanied paper waste prevention in schools in Brussels (Pre-waste factsheet 22)
8. Dematerialisation in Brussels offices, Belgium (Pre-waste factsheet 23)
9. Halmstad schools competing to reduce food waste in canteens, Sweden (Pre-waste factsheet 29)
10. Alelyckan Re-use Park in Gothenburg (Pre-waste factsheet 30)
11. Clothes library in Sweden (Pre-waste factsheet 36)
12. Self-service Detergents in Large Retail in Piemonte, Italy (Pre-waste factsheet 42)
13. Italian Ecolabel Legambiente Tourism in Marche Region (Pre-waste factsheet 43)
14. Marche Food Bank ONLUS, Italy (Pre-waste factsheet 44)
15. Light Kids, Washable Diapers in the Municipality Crèches and Incentives for Families in Italy (Pre-waste Factsheet 47)
16. Waste prevention campaign toward shopkeepers and artisans, France (Pre-waste Factsheet 53)
17. Travelling books, France (Pre-waste Factsheet 56)
18. Good waste prevention communication practices in Sofia municipality, Bulgaria (Pre-waste factsheet 65)
19. Household composting in Bulgaria (Pre-waste Factsheet 67)
20. Calendar with hints for waste prevention, Finland (Pre-waste factsheet 72)
21. European Week for Waste Reduction in Europe (Pre-waste factsheet 77)
22. Menu Dose Certa - Food waste reduction and certification in Portuguese restaurants (Pre-waste factsheet 86)
23. Environmental Education for the Unemployed & households in Malta (Pre-waste factsheet 90)
24. Ban on disposable food and drink containers at events in Munich, Germany (Pre-waste factsheet 99)
25. Brussels waste management plan with reduction targets, Belgium (Pre-waste factsheet 103)
26. EUREST services in Sweden (Pre-waste factsheet 106)
27. Pay-as-you-throw (PAYT) scheme in Schweinfurt, Germany (Pre-waste factsheet 108)
28. Promoting green public procurement, in Brussels Belgium (Pre-waste factsheet 24)
29. Eco-taxation on disposable plastic bags, kitchen utensils, food wrap & aluminium foil, Belgium (Pre-waste factsheet 26)
30. NU-Spaarpas, sustainable incentive card scheme, Netherlands (Pre-waste factsheet 27)
31. Reuse Center L'Alligatore in Italy (Pre-waste factsheet 38)
32. "Fontemagna City" modern public water fontain in Italy (Pre-waste factsheet 45)
33. Guide for repairing, selling & reusing goods in Rennes, France (Pre-waste factsheet 50)
34. Promoting eco-consumption in supermarkets in France (Pre-waste factsheet 52)
35. Monitoring the evolution of eco-consumption possibilities in France (Pre-waste factsheet 54)
36. Coaching Families in food waste prevention, Belgium (Pre-waste factsheet 55)
37. Campaign for responsible consumption of plastic bags (Pre-waste factsheet 59)
38. Differentiating of a waste tax for the juridical persons, Bulgaria (Pre-waste factsheet 64)

39. Separate collection of textiles at the territory of Sofia Municipality in Bulgaria (Pre-waste factsheet 68)
40. Gaabriella Kaatis - Puppet theatre project in Tampere, Finland (Pre-waste factsheet 71)
41. Education on back-yard composting in Finland (Pre-waste factsheet 73)
42. Reel Time film festival in Finland (Pre-waste factsheet 75)
43. Ecofellows: Awareness raising lessons for the school children (Pre-waste factsheet 76)
44. The Real Nappy Campaign in UK (Pre-waste factsheet 82)
45. Love Food Champion pilot project of the UK Love Food Hate Waste campaign (Pre-waste factsheet 83)
46. EQUAL A Reuse Initiative in Malta (Pre-waste factsheet 91)
47. Eco-tax on plastic bags in Romania (Pre-waste factsheet 94)
48. National quota for reusable packaging for deposit scheme (Pre-waste factsheet 100)
49. Ludoteca “Riù” in Marche Region - Italy (Pre-waste factsheet 107)
50. Witness families, France (Pre-waste factsheet 109)
51. Environmental levy on plastic bags in Ireland (Pre-waste factsheet 110)

2. Zerowaste

www.med-zerowaste.eu/deliverables.html

Inside this site, click on the icon “good practices database on line”.
Inside it, open the folder named “files to download” and there you can find:

1. Recyclodrome (Recyclodrome.pdf)
2. The development of Pay-As-You-Throw Systems in Hellas, Estonia and Cyprus” (Municipality of Elefsina.pdf)
3. Recycling of packaging waste (Municipality of Kea.pdf)
4. Recycling of electrical and electronic equipment (Municipality of Rhodes.pdf)
5. Recycling of packaging waste in Thermi (Municipality of Thermi.pdf)
6. Recycling of packaging waste in Zakynthos (Municipality of Zakynthos.pdf)
7. Capannori towards zero waste (Capannori.pdf)
8. Moon Cup Project: for women who love environment and like to feel “free” (Collegno.pdf)
9. Community Waste Domestic Composting (La Salle.pdf)
10. Plants for recovering and recycle materials (Quadrifoglio.pdf)
11. Water in Jug (Reggio Emilia.pdf)
12. Biobag (Biobag.pdf)
13. Omaplast (Omaplast.pdf)
14. Slopak-Ekotop price (Slopak Eko top_eng.pdf)
15. Zeos (Zeos.pdf)
16. Re-use center (Center ponovne uporabe.pdf)
17. Separate and win (Locuj in zmaguj.pdf)
18. A bin for biodegradable waste “Organko” (Organko_eng.pdf)
19. Yellow bags (Yellow bag.pdf)
20. Eco Punt Verd (ecopunverd.pdf)
21. “Retorna” Network, return for the future (SDDR.pdf)
22. Free newspapers, pay as you throw (PRENSA GRATUITA.pdf)
23. Fair Tax in Argentona: Pay-As-You-Throw Systems (Municipality of Argentona v2.pdf)

3. Zero Waste PRO Green Guide:

http://www.zerowastepro.eu/uploads/Green%20Solutions%20Guide%20ZEROWASTEPro.pdf

(please copy and paste this link into the internet searches bar so that you can access the document, as it is not possible to access automatically from the link above)

1. "Love Food Hate Waste"
2. "Halmstad schools competing to reduce food waste in Canteens"
3. "Let's Do it with Ferda in Estonian Schools"
4. "Advices to reduce the domestic wastes from the source"
5. "Organko"
6. "Self-service detergents in large retail"
7. "Elba Plastic Free"
8. "Sparkling Water from Public Fountains"
9. "Fair Charge, Pay-As-You-Throw for Municipal Waste"
10. "Menu Dose Certa"
11. "Home Composting, Steering with Fees"
12. "Animation - Composting"
13. "Repair and Service Center R.U.S.Z."
14. "Ecomoebel – Reuse of furniture"
15. "PRISCA, Pilot project for scale re-use starting from bulky waste stream"
16. "CPU Preparation for Reuse Center (Center Ponovne Uporabe)"
17. "Recyclodrome"
18. "RESPECT, Re-use of second-hand car components in company car fleets"
19. "Waste Deposit yes…but where?"
20. "EcoPaperLoop"
21. "Collect and Win with Plastic Bottles' recycling campaign"
22. "GMI-The Green Med Initiative: A culture of sustainability among young people"
23. "Deposit, Devolution and Return System"
24. "SCOW, Selective collection of organic waste for recycling in tourist areas"
25. "Application for smartphones, social networks and games: waste prevention everywhere, every time!"
26. "R4R Tool, Regions for Recycling"
27. "CO2 calculator by Zerowaste"
28. "No Waste Net, Networking Platform"
29. "The PRE-WASTE webtool"
30. "European Observatory of Municipal Waste Performances"
31. "Wasteless in Chianti"

4.Wasman

http://www.wasman.eu/
http://www.wasman.eu/media/uploads/deliverables/WASMAN_Best_Practice_Report.pdf

1. Zero Waste Strategy with Participation Process
2. Sparkling water from public fountains
3. Introduction of economical incentives to improve separate collection
4. Last minute market project
5. The waste: with the prevention, a revolution and a multitude of initiatives

6. Waste could generate up to 7% of Spanish electricity
7. Fair charge, pay-as-you-throw for municipal waste in the Municipality of Argentona
8. Love Food Hate Waste
9. Clean Point
10. Deposit, Devolution and Return System
11. The Hellenic Recovery recycling Corporation (H.E.R.R.Co S.A.)
12. Eco-Taxation: Good Practice in Waste Prevention
13. Automated Biological Reactor
14. Stationary Pneumatic Waste Collection
15. Proximity Farm Composting in Austria
16. “Cheaper with Koko”
17. Small scale organics processing bio-bins
18. Integrated Management System in Oslo
19. Use of landfill gas in town gas production
20. Mechanical Biological Treatment
21. Solar-powered public trash & recycling containers
22. European Week for waste reduction

5. Guidelines for Waste Management in Mediterranean Sea Basin City Centres

5.1. Socio-environmental principles

Below we present a declaration of the basic essential socio-environmental principles that should rule every waste management system.

Protection of human health and environment

Health and environmental protection objectives are ultimate objectives of waste management systems.

To improve environmental health it is necessary the systems created to target the reduction of human exposure to a variety of hazardous substances, including air pollutants and any toxic substances released into the environment.

As human influence on the natural environment increases, setting priorities for environmental protection becomes more important and urgent. Worldwide, humanity has heavily transformed 40-50% of the ice-free land surface; cooped 50% of accessible, renewable fresh water, fully exploited or overexploited 65% of marine fisheries; increased the carbon dioxide concentration in the atmosphere by 30%; increased the rate of fixation of atmospheric nitrogen by more than 100% over natural terrestrial sources and driven 25% of bird species to extinction, to put some data.

Effective but also sustainable waste management systems have a central role to play in reversing- as much as possible- the described situation. It is important to emphasize that a system that works managing the waste is necessarily respectful with the environment: both aspects need to be present, waste must be managed….but in a sustainable way.

Waste management hierarchy:

The “waste hierarchy” approach sets the following priority order when shaping waste policy and managing waste at the operational level: prevention, reuse, recycling, recovery, landfilling being the ultimate step. This should be the model to tend to and to work towards.

1. Prevention/Reduction

   Good waste management begins with preventing waste being produced in the first place: what is not produced does not have to be disposed of. Waste prevention aims at avoiding the substances, materials and products become waste. It is becoming more and more important as the global population increases and we eat away at our finite supply of natural resources. To educate the public and encourage consumers to demand goods that produce less waste and to drive the creation of a more resource-efficient market, making use of eco-design, are tools to tend to avoid or at least reduce the amounts of waste produced.

   1.1. Reduction of amount
   1.2. Reduction of dangerousness

2. Reuse

It is interesting to mention the difference between the concepts “re-use” and “preparation for re-use”. “Re-use” would be an integral part of “waste prevention”[5] as *[…]it does not deal with waste but goods re-used for the same purpose for which they were created.*
The European Directive defines however “preparation for re-use” as *the operations of control, cleaning and repair by which the products or the components of the products that have become waste are prepared so that they can be re-used without further heavy treatment.* This difference implies that:

- When ”re-using” objects are simply re-used for the same purposes for which they were created.
- When “preparing for re-use” objects that have become waste are treated – checking, cleaning or repairing recovery operations- so that their components are prepared so that they can be re-used.

Reuse culture should be fostered.

3. Recycling

Recycling reduces the amount of waste that ends up in landfill sites, while cutting down on the amount of material needed from the natural environment. This is important because man y countries are highly dependent on imports of scarce raw materials, and recycling provides industries with essential supplies recovered from waste such as paper, glass, plastic and metals, as well as precious metals from used electronic appliances. Waste should be used wherever possible as raw material to make new products. Recycling also saves energy: recycling aluminum can, for example, saves around 95% of the energy needed to make a new one from raw material. Municipally, materials like glass, metal, plastics, paper or yard trimmings should be as much as possible collected, separated and sent to facilities that can process them into new materials or products.
Composting and recycling are two environmentally sound methods of handling waste. While reusing items or reducing consumption in the first place could have even greater long-term beneficial effects, recycling and composting are good waste management techniques for dealing with materials whose time for discarding has come. In most cases, the primary difference concerns the type of material involved: organic in the case of composting[6] or manufactured if we speak of recycling[7].

[5] European Directive 2008/98/EC in article 3 point 12 a

[6] Composting turns the organic waste you create into a useful product. Materials such as shredded leaves and grass cuttings, vegetable and fruit clippings, newspapers and coffee grounds --- in the correct ratios --- combine with air and water to begin a process of biological decomposition. The compost that results is useful for growing plants or as a soil amendment. Even if you do not maintain your own compost pile, many municipalities pick up yard waste and do their own composting from materials that citizens have set aside. Home composting is usually considered as part of “waste prevention” making a difference with other type of large scale composting because the food used at household levels for composting never becomes properly waste (no collection, no transport, no treatment…).

[7] Recycling takes manufactured products that might otherwise be considered waste and converts them into a new use, typically by breaking down the products into raw materials again and reusing those materials to create something new or different. As with composting, the recycling process is accomplished on an individual or broader basis, sometimes involving whole municipalities. When consumers purchase recycled products the environmental benefits are enhanced, because less energy goes into the creation of products from recycled materials than products manufactured from raw materials being used for the first time. Paper, for example, is compostable and recyclable.

4. Other recovery
   Recovery through combustion with energy recovery, incineration, composting.

5. Final disposal

   The disposal of waste from anthropogenic activity has been done by landfilling for centuries; however the tendency must be to decrease the amount of waste reaching this last step of the hierarchy as this technique provides inefficient and cost-effective urban waste elimination.

Self-sufficiency and proximity of waste management systems to be in force

This principles refer to issues such as efficiency of operational services, promotion of good standards of practice and quality services, protection of the interest of service users, alignment of organizational and social work practice objectives and effective and ethical work practice, among others.

Environmental education

Understood as the learning process that:

- Increases people´s knowledge and awareness about the environment and its associated challenges
- Contributes to develop the necessary skills and expertise to address the challenges
- Fosters attitudes of respect to environment and commitments with it, resulting in responsible action.

5.2. Economic principles

Below we present a declaration of the basic essential economic principles that should rule every waste management system.

The responsibility of the producer

From cradle to tomb

The environmental impact of a product during its life cycle is assessed, from the extraction of raw material to the production and distribution of energy through use, reuse, recycling and final disposal.

Who pollutes pays

This principle holds the idea that polluters should be made to pay for the damages they cause to the health and property of others. A straightforward interpretation of the polluter pays principle would suggest that if the consumption or production activities of one group of consumers or producers have harmful effects on others then the perpetrators of the harms should be held liable for the damages.

The so-called “Pay-As-You-Throw” it is a very interesting approach for municipal waste. It is a charging model which fosters reduction of waste generation and improvement of recycling levels. It is based on the principle of “who recycles and reduces pays less”. The variable part of the “waste charge” depends on waste generation of refuse and packaging, both for households and commercial activities.

From fix Taxes systems to variable Tariff systems

Taxes/Tariffs understood as an economic sustainability mechanism that makes possible to respond to the needs of current generations without compromising the abilities of future generations to meet their own needs.

5.3. Objectives of solid waste management systems in city centres

The waste management services in city centres cannot be limited to ensure cleanliness or hygiene, they much be much more ambitious and comprehensive.

The waste management services in historical city centres and medinas have to guarantee, at least:

- An efficient sanitation service through smooth organization of operational resources.
- A sustainable efficient service, being not only good at operational level but also environmentally friendly.
- An increasing tendency to separation of different waste fractions.
- An increasing degree of interception of bulky and special waste.
- An increasing tendency to the transition from a tax system to a tariff system based on the principle “polluters pay”.
- An increasing tendency to observe the hierarchy of prevention, reuse, recycle, recovery and landfill, in this order of prioritization.
- An increasing individual and collective responsibility and commitment with the environment and the city heritage.

In doing so, these systems will be notably contributing to:

- Health protection of the population
- Environmental protection of the different ecosystems and
- Cultural protection of the old towns tangible heritage

5.4. List of recommendations for waste management in city centres

Firstly, it is indispensable to remind which addressees we write these policy recommendations for. The answer is unequivocal: public administrations- mainly municipalities- of the Mediterranean Basin with competences upon waste management in city centres.

In any case, the following recommendations are of usefulness also for regional and national governments also.

The following recommendations, agreed by SMOT partners, are those considered essential to ensure efficient deposit and collection of waste in historical city centres under the approach of health promotion, environmental respect and integration with the architectural heritage around.

These recommendations emerge from the development of SMOT project during years 2014 and 2015.

In order to ensure an efficient urban system for waste management in historical city centres (and elsewhere in the city area)…

Recommendation n°1

It is indispensable the existence of a national frame regulating waste management and facilitating local norms in the field to be developed within. There must be a clear national frame and Complementary Local Regulations within.

The national regulatory framework must look at basic environmental management notions ensuring environmental and economic sustainability of the systems for waste collection and management, according to the bases stated in this document: mainly policies addressed to Reduction, Reuse and Recycling of waste and principles concerning the producer responsibility ("*who pollutes pays*") mainly.

Recommendation n°2

The strict compliance of local laws and norms in force concerning Municipal Solid Waste (MSW) - including clear methods for surveillance and control and systems to apply bonus or penalty- is indispensable.

It is highly recommended to start bonus/penalty systems addressed to waste producers on the basis of amounts produced and fulfilment of the environmental objectives set up.

It is recommended the creation of a body- one of its functions being the surveillance and control of regulations in force- with the legal capacity and necessary means to enforce the observance of the regulations.

Recommendation n°3

Progressive and extensive introduction at municipal level of systems articulating the principle *"who pollutes pays"*.

National legislation has to notice the impact on the producer of costs for collection and treatment of waste, while the local legislation has to introduce formulas making possible the quantification of waste produced and the assignment of those costs to producers in a fair and efficient way.

Recommendation n°4

Existence of clear and differentiated regulations for the different waste fractions.

Local regulations must clearly state how the different types of producers (neighbors, owners of shops…) have to proceed with the different fractions, depending on the environmental objectives scheduled.

In this scenario, separation at source of organic waste and recyclable inert matter and packaging it is considered crucial.

Recommendation n°5

Progressive and extensive introduction of the 3Rs principle- Reduction, Reuse and Recycling- in urban policies.

National objectives in this regard must be set up. After, local level objectives aligned with national ones must be established also.

These objectives must have a correspondence into the economic level by means of the establishment of progressive taxes promoting the application of the 3Rs principle.

Recommendation n°6

Existence of specific regulation approaching the interrelation between the installations for waste deposit and collection in city centres and the heritage scenario these installations are placed within.

It is deemed indispensable the national and local regulations concerning town planning to clearly state the obligatoriness for interventions in the town planning – what includes systems for deposit and collection – to be harmonic with regard to the surrounding scenario.

The principles for this integration with regard to infrastructures for deposit and collection of waste imply reducing as much as possible the presence of waste and deposit elements themselves in the public space, these infrastructures being as much as possible integrated into the private spaces of producers or, if in public space, integrated with the surrounding aesthetic scenario.

Recommendation n°7

Integration of informal and illegal systems for waste collection and separation- often efficient even if illegal- within the formal regulated frame.

It is deemed indispensable the elimination of informal networks for waste collection or their integration into the formal system, the authorities being the bodies in charge of the waste-related processes, municipal workers in charge and the work they accomplish being dignified. The tendency must be aiming at introducing taxes making possible to assign fairly and efficiently certain costs to waste producers.

Recommendation n°8

Citizenship informed and involved with regard to the interventions carried out within the public space around them.

Recommendation n°9

Education at all levels and in all sectors about the relevance and impact of proper waste management from the house to the public spaces.

SMOT Partnership

8 partners and 3 associates from 5 countries

Partners:

	Sanitation Cordoba (SADECO), Spain
	University of Cordoba (UCO), Spain
	Municipality of Ragusa
	Euro Mediterranean Centre for the Sustainable Development (SVIMED), Italy
	Association of Research for Economic & Social Development (ARDES)
	Ministry of Municipal Affairs (MOMA), Jordan
	University of Jordan (UJ)
	Alexandria University (Alex.Uni), Egypt

Associates:

1. Municipality of Alexandria (Egypt)
2. Municipality of Al Salt (Jordan)
3. Municipality of Sfax (Tunisia)

Find SMOT on the Internet

www.smotproject.eu

Find SMOT on Social Networks

facebook.com/smotproject

twitter.com/SMOTproject

Project funded by the EUROPEAN UNION

ENPI CBCMED