CONTARINA SPA

Proposal for the Development of an Integrated Waste Management Model

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INTRODUCTION

It is well known to all that poor waste management constitutes a serious health, hygiene and environmental problem. From a sanitary point of view, the presence of uncontrolled piles of waste near urban centres can cause illnesses linked to unhealthy conditions. From an environmental point of view, abandoned plastic packaging and other non-biodegradable waste in lakes and rivers and the emission of toxic gases stemming from the decomposition of waste are the main cause of the degradation and contamination of natural resources such as water, air and soil.

In developing countries, municipal waste management is often characterised by the general absence of the population as regards the correct disposal of waste, inappropriate equipment and infrastructure, a delay in appropriate solutions and insufficient financial and material resources. From the legal-institutional point of view, the sector is sometimes struck by an excess of decisional/executive centres with lack of clarity on the roles and responsibilities of the different parties. Such voids are also due to the lack of specific laws and rules governing the waste management chain. Moreover, the demographic increase, the rapid economic growth and the urban planning and industrialisation processes of the continent have an important impact on the increase in the production of waste. To reduce the social and environmental effects mentioned above, waste should be managed according to an integrated sustainable model.

The construction of an integrated municipal waste management system, capable of satisfying citizens' needs, protecting the environment and supporting economic development in a country is what is promoted by the Circular Economy paradigm. To achieve such objective, the country must develop a model which considers waste an "economic resource" by creating a system which enhances the recovery and recycling of the material, reduces the quantity of waste sent to landfills, offers new employment opportunities (green jobs) and promotes the creation of new business models.

The introduction of this change and improvement in the sector and the move towards a favourable future scenario implies the acquisition of know-how, an element which decision-makers find in the experience of a partner such as Contarina, which has implemented an efficient waste management model according to the Circular Economy paradigm. The company can offer its support in the elaboration of strategies, the transmission of knowledge and technological innovation and guide the country in laying the foundations for an integrated management of its waste. In practice, the study of a flexible and modular technical intervention over time is necessary. Such intervention must be implementable independently by the local actors once the project has been completed and easily adaptable to the future local needs.

This document supplies the necessary information to understand the guidelines which Contarina develops in its own integrated waste management programs in developing countries.

ABOUT CONTARINA

Contarina S.p.A. is an entirely public-owned company, in charge of waste management for 49 municipalities in the Province of Treviso in northern Italy. Its governance model has guaranteed a lean and dynamic decision-making process by ensuring the coordination between numerous municipalities. The company mission is that of being a driver in the development and execution of environmental solutions protecting the environment in the interest of the citizens living in the municipalities in which it operates. The service offered is the result of a synergy between different operational sectors including the introduction of a waste collection model and vanguard technologies, the development of environmental education proposals in schools and an intense citizen-awareness activity on the separate collection of waste and environmental sustainability.

Contarina is a leader in the waste management sector at national level thanks to the efficiency of its management model which is known, studied and replicated both at national and international level. The efficient application of its model based on a door-to-door collection and pay-as-you-throw tariff has enabled it to move up the hierarchy of waste, abandon landfills and obtain optimal results in terms of separate waste collection[1] thanks to a planning and long-term vision based on the Circular Economy principles.

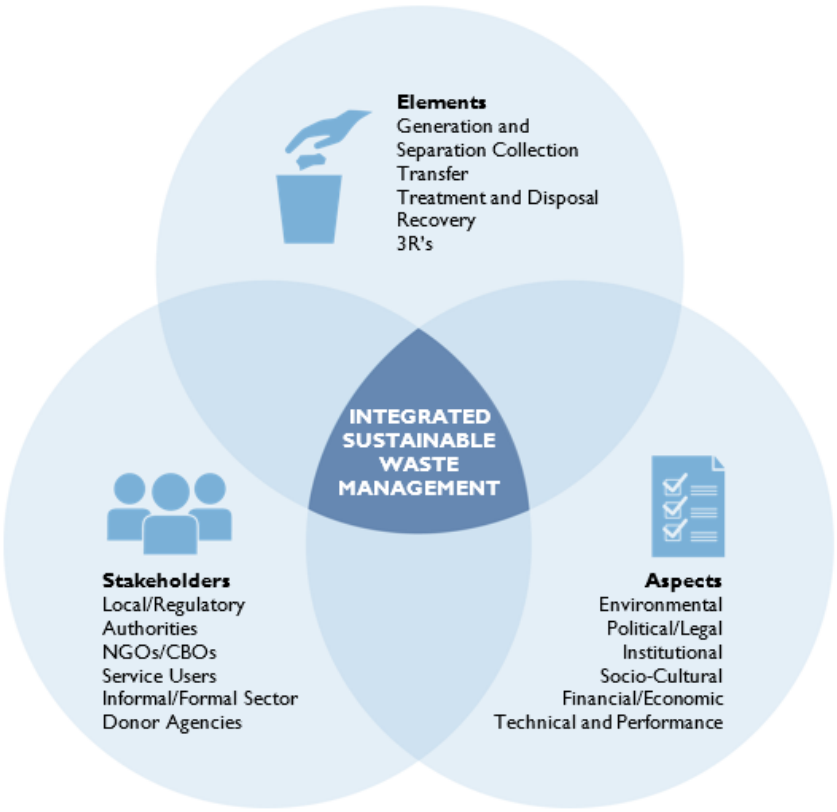
[1] According to ARERA calculations, Contarina has achieved 88,29 % in separate waste collection rate and collects every year about 47.6 kg of residual waste (non-recyclable) per inhabitant, an amount that is well below national average. Moreover, this fraction has high quality content, given that is contains only 1 - 1.5% of non-compostable material.

CONTARINA'S INTEGRATED WASTE MANAGEMENT MODEL

Here below is a description of the main characteristics of an integrated waste management model

Contarina's model is an integrated and sustainable system, which considers waste from production to collection, to its treatment and recovery and produces a positive impact on Nature as well as on citizens' lives. An integrated waste management considers waste in its overall lifecycle since all the activities included in the process are linked to each other.

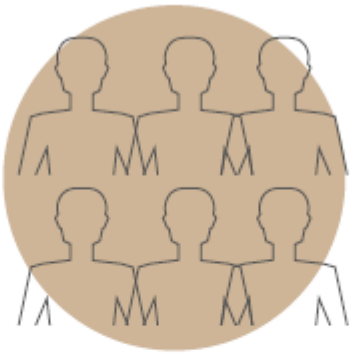
The model is a dynamic instrument comprising several **elements**, ranging from the decision-making process and the institutional development, to the technical design of integrated solutions for the collection, disposal, treatment and the enhancement of waste. It must simultaneously integrate and coordinate the technical, environmental, health, financial, economic and socio-cultural, legal and political **aspects**. The integration concept also refers to the participation of all the **stakeholders** involved who must take upon themselves their responsibilities, collaborate together from the waste prevention to resource recovery, including the interaction with other systems. The integration and coordination between the different interested parties ranging from the government agencies involved to the local authorities, NGOs, the communities and industry is important. The present experience in waste management demonstrates that it is only with a partnership approach (such as a public-private partnership – PPP) in which the responsibilities and roles are clearly defined is it possible to avoid confusion and redundancy in the efforts made and appropriately tackle the challenge of urban waste.



An integrated model does not manage waste as a mere technical problem, it also considers the political and social factors.

The fundamental elements for the construction of an integrated model are:

the presence of a solid political, legislative and institutional context and a strong governance in which the roles and responsibilities of the parties are clear



the involvement of all the local stakeholders: NGOs, private companies, local governments and central institutions

responsible and active citizens who are aware of the problems linked to a bad waste management

the presence of an efficient separate waste collection and transport system which must also be convenient, accessible and sustainable over time (economically viable)

the existence of an appropriate waste treatment and disposal system and the presence of substantial investments in technology and installations

the existence of a market ready to recycle and re-use products

An integrated waste management system allows the protection of health and the environment and maintains a high level of hygiene in the territory. In particular, it allows certain types of waste not to be sent to landfills thus reducing the need for land for this purpose. This implies an improvement of environmental conditions including the mitigation of emissions and the reduction of soil and water pollution. Moreover, such model is in line with the **Circular Economy principles** in which the materials at the end of their lifecycle do not become waste but are enhanced and recycled to become new products and are used in other production cycles. This helps reduce the quantity of waste to a minimum and reduces the need for large quantities of raw materials since it makes the use of "secondary" raw materials possible.

The development of a model based on the Circular Economy principles produces human wellbeing and social fairness. Moreover, it ensures an increasingly better service to the public which constitutes the base for a healthier, more satisfied and more active community of citizens for the achievement of the model.

The starting point for the development of an integrated waste management system depends, of course, on the local conditions, the economic possibilities and on many other factors. Therefore, the integrated management models must be studied and implemented on a case-by-case basis specifically for each context taking into consideration the activities and mechanism that are already in place. The activities that are necessary to improve and/or implement an integrated waste management system in a country in general consist of: an improvement of the disposal phase from the environmental as well as the hygiene and health points of view, the introduction and/or improvement in the selective collection of waste in urban areas, the dissemination of information and awareness programmes in the investment in appropriate material treatment and recycling systems, in the strengthening of the norms and control systems and the guarantee that the entire system is financially viable.

FOCUS ON THE MANAGEMENT OF WASTE FLOWS

An integrated management of the waste cycle implies considering the entire lifecycle of waste. The following aspects are thus of crucial importance:

Separation at the source: The separation between different categories of waste from the production point of view is recommended. It is to be carried out by means of the creation of transfer stations having an appropriate capacity. Stocking areas are to be kept separate and protected to avoid any type of contamination and/or deterioration by atmospheric agents. Moreover, the organic fraction must be separated from the general flow and such separation is to be gradually extended to other fractions. As the secondary raw material market develops it can help support the local governments in improving the environmental and health conditions of the landfills.

Collection and transport: The collection and transport of waste are fundamental services which must be systematically integrated in the overall management to ensure the efficiency of the model. The model envisages the collection of waste from the users and its transport to the same mixing and stocking site for the enhancement and disposal. It is important to develop a transport system for the different waste flows coming from rural and urban areas towards appropriate disposal and treatment centres. The use of the same reception area for the different types of waste instead of separate areas is also functional. The vehicles used for the collection and transport of waste must be appropriate, in terms of their number and type, to the existing local situation.

Material valorisation: The materials' re-use, recovery and recycling activities are crucial phases in the framework of the mechanism of an integrated waste management. Different technological solutions for the treatment of the different recyclable fractions are available depending on the context and the final market of the materials. The NGOs and local authorities must promote the use of recycled, recyclable and/or biodegradable materials, the creation of regional networks contributing to the recycling of the material and re-use activities by means of appropriate incentives.

- *the valorisation of plastic and aluminium*: Many objects can be made from plastic including benches for public parks and waste collection bins, basic components for bricks, tubes etc.

- *the valorisation of the organic fraction*: Today, composting and anaerobic digestion (AD) are considered the best options for organic waste management as they reduce the environmental impact and allow the production of a fertilizer which is rich in nutrients, compost and energy in the form of biogas. One can choose either flexible solutions with a modular structure allowing also the management of limited quantities with variable characteristics of the biomass or decentralised systems allowing the waste treatment plants to be positioned close to where the waste is produced to help simplify the conferral, help reduce the costs of separate waste collection and the transport of waste and allow the users to be part of the project on a daily basis. In particular, to strengthen this last element, it is possible to adopt systems for the household treatment of organic waste. There are compact, simple and economic technologies which apply a wet digestion process for the production of biogas which can then be stocked and/or used directly. This may be a solution for some urban areas

in which the collection conditions are more difficult and the onsite management of waste is to be preferred as it is more efficient.

Waste Disposal: Landfill disposal remains necessary for the part of waste which cannot be otherwise recycled. Landfills however, must be specially-dedicated places allowing the safe management of waste while simultaneously protecting the environment with mechanisms for the capture of the biogas and leachate.

THE ADVANTAGES OF A NEW WASTE MANAGEMENT MODEL

Here below is a list of issues and problems that can be tackled at national level thanks to a new waste management model

The adoption of a new integrated waste management model would enable the country to tackle many of the situations it is at present facing, including:

- an increase in waste production and its complexity and dangerousness following the strong demographic growth and the increase in the level of development and wealth in the country;
- the need of managing waste with a view to an integrated cycle with stocking, collection and transport systems which are innovative and efficient;
- the importance of involving the different actors along the waste chain so as to manage the complexity and the costs of the service in a more efficient manner, including through the creation of economic opportunities for the SMEs and the creation of new jobs in the management plants, recovery and transfer;
- the need of offering a service dedicated to the entire population, including the poorest living in informal settlements;
- greater awareness as regards the environmental damages caused by bad management and the consequent tendency of local governments to see in waste the capacity of creating value and protecting health and the environment and the need of educating and empowering citizens on these issues;
- lack of water thanks to the reduction of water pollution due to waste;
- the need of adapting legislation so as to bring it in line with Circular Economy principles.

In order to tackle all these matters, one must adopt a **systemic view** with appropriate solutions capable of ensuring the correct and efficient execution of an integrated urban waste management system. A reprogramming of the system including all the infrastructure and services for the complete management of the waste flows is necessary. The waste management model must be developed so as to ensure a certain level of flexibility in the technology and strategies, so that it can be adapted to possible future changes envisaged by the economic and legislative conditions. This also requires the structuring of a solid governance model capable of adjusting, managing and guiding the different activities which, if put into place in a synergic manner, support the path towards a sustainable management.

JOB CREATION

An integrated waste management model can offer important employment opportunities and "**green jobs**" along the entire waste management chain from the collection and transport activity to the management of the treatment plants, material recycling and recovery activities. In many developing countries, at present, most of the activities involved, particularly in the collection and selection phase of the solid waste at the landfills are carried out by the informal sector. The same is true for the recovery, recycling and reuse phases. However, in the framework of a new integrated waste management model, it is important to make this sector emerge and to structure it since it can offer an important contribution to the development of policies based on the "green economy".

In this context, public-private partnerships (PPP) must be encouraged to allow the private sector to create recycling centres and increase employment and qualified personnel to manage the different processes in the waste chain. Along these lines, it is important to highlight that the model also stimulates the birth of new businesses, start-ups and other initiatives for the enhancement of waste in the circular economy context.

ACTION PLAN

Here below is an overview of the objectives and intervention modalities adopted by Contarina in its international integrated waste management projects. In particular, a description of the timeline of the project from its preparation to the macro-activities envisaged and its final testing are outlined

Contarina is committed to promoting sustainable development and constantly makes its environmental protection skills available to others. Thanks to its participation in international projects, it accompanies the partners in the definition of integrated waste management models through the study, selection and adoption of the most appropriate technical solutions within the context in which they operate. The overall objective guiding it during a project is that of transmitting to the interested communities the value of the bond with their territory to be preserved and enhanced and the sensitivity towards environmental, social and educational matters. Moreover, Contarina seeks to involve the local stakeholders in the search of the best solutions so that they carry out real, efficient actions and can become independent in the management of the waste integration model.
Generally, the company intervenes in the territory by initially proposing the development of a pilot project in one or more areas in the region of interest (for example in neighborhoods of approx. 50.000 inhabitants), to demonstrate the validity of the implemented model. Then, in a later phase, it undertakes to guide the country in the replication of the same model in other regions.

OBJECTIVES

The main objectives Contarina pursues in its projects on solid waste management, particularly for organic waste, with the objective of protecting the health of the citizens and the environment in the municipalities involved are the following:

1) Reduce the quantity of solid waste produced which ends up in the landfills and/or is abandoned in the environment and ends up in the rivers and then washes out to the sea.

The objective focuses on the introduction of appropriate management practices including prevention and awareness. For an efficient monitoring and assessment information must be collected on the types and quantities of waste produced in the different areas of the territory.

2) *Carry out an efficient and effective collection of solid waste and have an infrastructure system for the treatment of waste in the municipalities involved.*

One must begin to create a modular system, which allows a homogenous separate waste collection to be carried out on the entire territory together with the treatment and enhancement of waste. The companies involved in the collection and management of waste and the other stakeholders are involved to explain the advantages of applying an integrated waste management system. They are supported in the development of the concept that waste is no longer to be considered a problem; it is to be considered a resource. To increase the percentage of recycling, the stakeholder participation will enable a better separation of solid urban waste and the creation of new markets for the material, which is recovered.

3) *Enhance capacity building at a local and/or district level for the implementation and sustainability of an integrated waste management model.*

In addition to the efforts to improve the waste management practices, the municipalities must develop and improve their plans and programmes to limit the increase in the quantity of solid waste. The strengthening of the institutions involved, both public and private, shall thus lead to a greater capacity in generating and exchanging information, the application of norms, carrying out of studies and in the monitoring and assessment of mitigation measures. The coordinated training activities at municipal and/or district level shall allow the harmonisation of the methods for the monitoring and assessment of the project activities. To reduce the uncontrolled disposal of waste one must absolutely increase stakeholder awareness. To increase awareness it is important to highlight the advantages of adopting a preventive approach in the integrated management of waste that can offer important economic advantages. Such solution also contributes to the national and local efforts to reduce unemployment levels by creating new job opportunities ("green jobs").

SUCCESS CRITERIA

Before starting a project one must carry out in-depth studies and onsite inspections to identify the best technological solutions which are both socially acceptable and economically sustainable for the recycling and reuse of the materials and develop management practices linked to them. In particular, modular solutions shall be proposed to allow the technology to be adaptable to future needs.

In general, the overall management of a project requires a coordinator and a technical committee comprising the partners in charge of the planning, implementation of the activities, monitoring and assessment of the project.

Moreover, for the success of a project one must promote the collaboration between the different national and local governments and the decision-making process. The coordination of the different players involved in the management of the waste ensures greater transparency and efficiency in carrying out the activities in the implementation of an integrated waste management. Similarly, involving a great number of stakeholders and in particular the local population which is requested to adapt its behaviour to the new waste management system, allows the system to sustain itself.

A project's **sustainability** over time depends on the local institutions' commitment to improve and protect their territory from the urban waste management programme and the community's acceptance and willingness to pay for the services they are being offered and support the model with their appropriate behaviour. Indeed, it is important to strengthen the tariff system in a fair manner, differentiating it according to the social situation and involve both the private sector and/or the NGOs in investments in the waste sector and in the opening of trade opportunities in the collection, selection and recycling of waste.

PROJECT PHASES

The project for the construction of an integrated waste management model with the support and guidance of Contarina envisages the following phases:

Phase 0: Preparation of the Project Idea

The first exploratory phase seeks to:

- carry out a preliminary survey on the local needs to comprehend the political, social and economic context and acquire data to define the macro objectives and the main activities of the project:
- identify possible sources of funding;
- establish an internal working group.

Phase 1: Analysis of the present situation

A technical visit to observe and study the local situation shall:

- improve the understanding of the present situation of the waste management system and help clear the environmental and health risks of a possible intervention;
- enable the identification of all the stakeholders which are more or less directly involved in the waste management in an integrated cycle (from the citizens to the schools, decision-makers, industries and other protagonists of the social fabric);
- allow the identification of priority actions to adapt the present management to an integrated waste management model in the framework of a circular economy;
- identify the best installation solutions taking into account the needs of the area and the territorial characteristics thus defining the collection, transport, treatment and enhancement modalities which are the most appropriate for the local situation;
- identify the appropriate partners for the strategy and operational plan development of the project.

Phase 2: Definition of the Strategy and Operational Plans

After having completed the analysis of the local situation one moves to the detailed identification of the objectives, activities and resources which are necessary for the development of the project, elements which will then come together in the drawing up of a **project proposal** and the relative budget which must be shared and validated by all the partners. In this phase, it is absolutely necessary to adopt a global vision in the waste management consisting of envisaging an integrated waste management system and then developing the most appropriate services and infrastructure for the management of such a system.

The waste management model shall be planned so as to ensure a certain degree of flexibility in terms of technologies and strategies that can be adapted to possible future changes caused by economic and legislative conditions. The objective is that of optimizing the management of solid urban waste by maximizing efficiency and minimizing the environmental impacts and the relative financial costs. In this phase, the individual operational plans shall be drawn up (technical and management work modules). The project proposal shall be developed as follows:

Technical Assistance:

From the technical point of view there is the definition of the strategy within the overall waste management system. In particular:

- identify the necessary equipment and vehicles;
- define the actual implementation modalities such as the determination of the characteristics of the collection, treatment and recycling characteristics;
- project the necessary installations keeping in mind the concept of flexible, modular structures which allow growing quantities of collected waste to be managed thanks to the involvement of a growing number of citizens;
- define the financial support mechanisms for the service;
- plan the technical training activities to support the local operators in the management of the model.

***Communication**:*

Communication must increase awareness in the target population so as to motivate and support citizens' commitment in adapting their behavior and customs to the needs of the new waste management service. The community shall learn the management mechanisms in its entirety and shall be informed of the causes and consequences of an incorrect waste management and its environmental and health implications. Attention is paid particularly to the promotion strategies of the project, the dissemination modalities of the information and stakeholder awareness vis-à-vis the issues of the project in addition to the dissemination of the results. The awareness campaign can be developed in several ways depending on the context with the use of advertising, billboards, radio messages, newspapers and can also include the organisation of information events.

***Training**:*

The development of training activities shall promote the transmission of new skills and shall thus lay the foundations for the creation of "green jobs" in the future. In particular, the "train the trainers" approach (which has already been experimented by Contarina) envisages training sessions with the local educators. Thanks to the trust and common knowledge shared with the population, they will positively tackle the cultural obstacles and create increased awareness among citizens and other stakeholders. The training instruments used include workshops, seminars, conferences, focus groups, guided tours, laboratories etc...

***Future Sustainability of the Integrated Waste System**:*

Moreover, in view of an integrated cycle, it is necessary to plan the priority actions supporting the technical project and the transition towards a circular economy. This includes political-legislative, organisational and economic instruments. In particular, legislation regarding waste management must be able to tackle the new developments and future challenges. The strict application of the law is fundamental and one must also envisage its continuous updating.

***Monitoring and Assessment**:*

This phase also includes the definition of the monitoring indicators highlighting the execution and success factors for each activity within the project and shall allow indications to be obtained on the efficiency of the strategy and activities which have been introduced.

Phase 3: Preparation of the Instruments

Once the activities have been planned, the working group enters the executive phase and establishes all the necessary instruments to carry out the different activities envisaged in the project, including:

- the acquisition of the necessary material for waste collection (such as: vehicles, equipment, bins for separate waste collection) and waste treatment (for example the composting and/or biogas plant components);
- preparation of information material (project logo, brochures, posters, press releases, events etc.) and training material (handbooks, teaching instruments, laboratories, conferences etc.);
- preparation of instruments for the authorities and local experts regarding the legislative adjustments and the economic and management mechanisms of the waste management models.

Phase 4: Project Execution

Once the instruments are ready, the onsite intervention can begin:

- transport of the material to the project implementation area;
- support during the introduction of the collection model and the installation and startup of the installation (biogas, compost etc.);
- specific training for the technicians-operators;
- training meetings with the local educators (train the trainers) entrusted with the organisation and implementation of a series of training/information meetings, public events, programmed conferences to disseminate information material/brochures etc.;
- transmission to the local governments of the instruments supporting the technical project and a transition towards a circular economy;
- monitoring activity by each partner.

Phase 5: Follow up

The last phase includes an overall assessment of the project relevance, efficiency, effectiveness, impact and sustainability starting from the analysis of the monitoring data collected during the different phases of each activity. The activities include:

- highlight any and every criticality and strength of the project vis-à-vis the initial objectives to disseminate the results;
- improve and adapt the work plan with a view to replicating the project in another region within the country.

EXPECTED GENERAL RESULTS

A project's expected results are reflected in real terms in a more sustainable management of the social, environmental and economic life in the area of interest.

In particular, it concerns:

- a significant reduction in the quantity of solid waste disposed of in landfills;
- citizen and stakeholder awareness on the need of starting such a system and their responsibility in the correct management of waste;
- the involvement of different actors and/or stakeholders in the development of solid municipal waste collection, reuse and recycling policies;
- the efficient control of waste pollution under way;
- the reduction of social and health problems linked to bad waste management;
- the improvement of the aesthetical quality of the areas in which the project develops;
- the introduction and/or extension of structures for the collection and treatment of recyclable waste;
- the significant increase in material recycling;
- the improvement in the organisational skills of the institutional actors involved in the management of solid waste;

- the introduction of a management and information system for the control and planning of an integrated waste model (such as policies, regulations and laws regarding the collection, disposal and management of solid waste implemented and/or applied to the interested municipalities;
- the creation of new employment opportunities ("green jobs").

POTENTIAL ENVIRONMENTAL, ECONOMIC AND SOCIAL BENEFITS

From the strictly environmental point of view, thanks to the different activities developed during the project it is possible to limit the conferral to landfills of certain types of waste thus reducing the quantity of land necessary for waste disposal. This helps improve the environmental conditions including the mitigation of the CO_2 emissions in the atmosphere as well as soil and water pollution caused by the dispersion of the leachate and other toxic substances. Bad smells are reduced, the hygiene along the roads improves and the spreading of illnesses is reduced. Additional advantages stem from the treatment and valorisation of the organic waste and other recyclable waste (plastic, paper, metals, etc.) allowing the conservation of limited natural resources and a reduction in the use of raw materials. Recycling allows energy and water savings in the production of new products.

For example, vast-scale composting can help improve soil quality and performance. This is particularly important in a country whose economy is based on agriculture. Moreover, the possibility of transforming organic waste in "briquettes", an energy source for cooking would also simultaneously reduce urban air pollution and deforestation. Furthermore, the lack of access to electricity seriously limits the economic development of rural areas. The putting into the energy grid of electricity produced using renewable sources (such as biogas stemming from the transformation of the organic fraction) can be considered a relevant technique bearing in mind the existing possibilities to attain a greater part of the poorer population and limit the use of wood for cooking and heating purposes. This would contribute to the green transition of the country's economy.

Lastly, the economic potential of the waste sector is important in the light of the financial resources and new jobs which it could generate. An integrated waste management model creates jobs for the local population since it requires the use of the community where the installations for the treatment, collection, valorisation and transport of material takes place. From this point of view, the model also stimulates new business startups and other initiatives for the valorisation of waste in the framework of a circular economy.

WHY CHOOSE CONTARINA?

Thanks to the commitment, involvement, determination and considerable experience of its team of professionals, Contarina bases its local, national and international projects on social and economic environmental sustainability principles. The company can count on its leadership role in waste management at national level and on a vast range of relationships with the institutions and academia, full knowledge of the chain and relationships with suppliers and partners. For many years now, Contarina has been executing consultancy projects for municipalities and territories interested in replicating the integrated waste management model.

In the international projects, Contarina has as its main objective that of making the community with which it collaborates independent in the entire integrated waste management process and transforming it into the protagonist of its own social and economic improvement while contributing to the creation of new employment opportunities (green jobs). At present, it is developing a project with the Union of the Comoros funded by the Italian Ministry for the Environment, the Protection of the Territory and the Sea (pictures below witness the last mission in the island).

During such projects, the company proposes and designs modular solutions to facilitate the adjustment of technology to future needs. Together with these solutions, Contarina organises training and information activities for the citizens and different stakeholders to support the community in adapting its behavior to the needs of the new waste collection service, increasing its awareness on environmental, social and economic issues linked to waste management.

The partner country receives support in the processing and development of strategies for waste management, acquires know-how, improves its level of technological innovation thus increasing its technical and organisational skills as well as its operativity and sustainability. This mechanism lays the foundations for a successful integrated waste management.

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