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# Turkey Composts!

## SELECTIVE COLLECTION OF ORGANIC WASTE AND ITS TREATMENT IN TOURISTIC AREAS



Ramón Plana  
*Organic Wastes Management Consulter*

*plana.compost@gmail.com*  
*www.maestrocompostador.com*  
*@RPlanaCompost*

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**TURKEY COMPOSTS!**





## WHAT IT WAS THE SCOW PROJECT?



**SCOW**- Selective collection of organic waste in tourist areas and valorisation in small-scale composting plants

- **ENPI CBC MED PROGRAMME**
- **I-A/2.2/231 – SCOW**
- **Type of project:** Strategic project –first call.  
Topic: waste
- **Financing:** total budget of 4,97 million; 4,47 million Euro (90%) financed by the EU. 50% of the budget used by Partner Countries (non EU).
- **Duration:** January 2013-December 2015 (3 years).

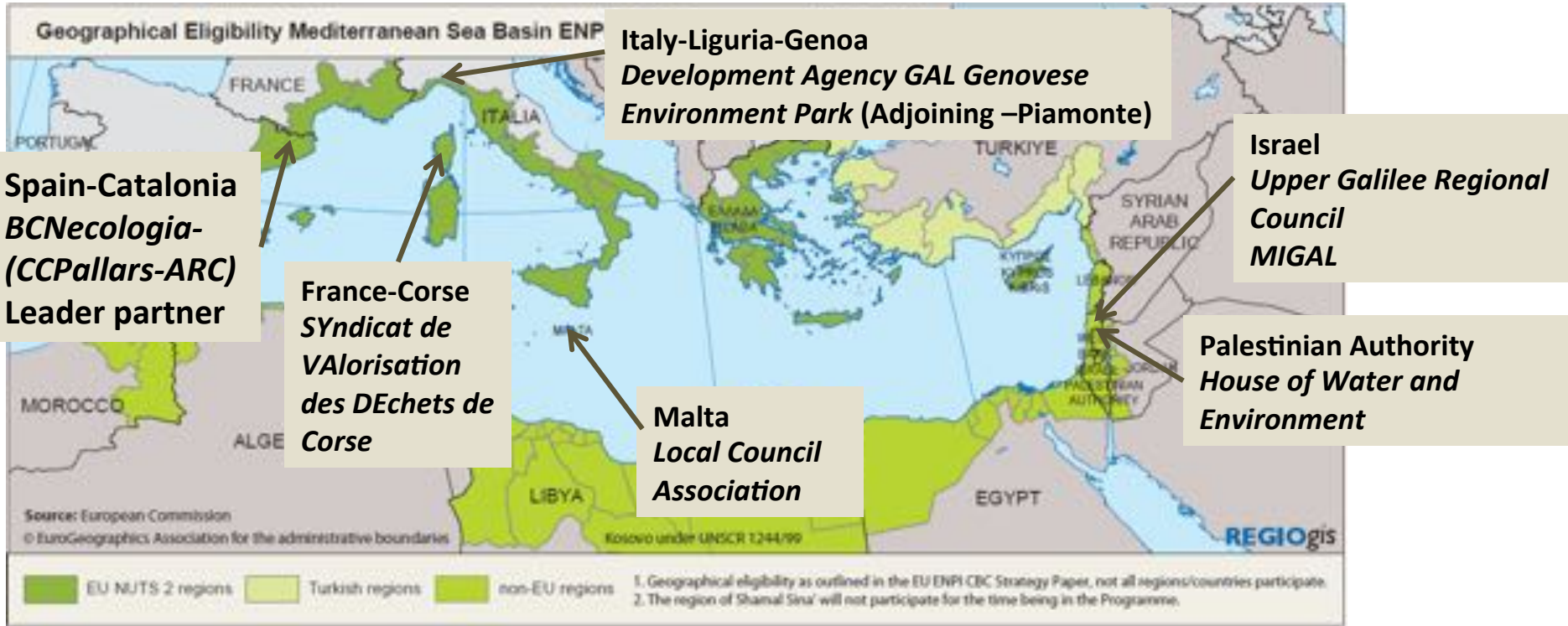




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# Partnership

# SCOW PROJECT



**8 partner from 6 different countries.  
 6 EU Mediterranean Countries and  
 2 Mediterranean Partner Countries.**





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# SCOW PROJECT

Number of model implemented		Large/singular producers involved	
<b>14 (14 for 2016)</b>		<b>601</b>	
Tons of Biowaste managed		Farmers involved	
<b>1,300(8,185 in 2016)</b>		<b>61</b>	
Quality of the biowaste		Training sessions	
<b>&lt;10% of impurities</b>		<b>94</b>	
Tons of Compost produced		Communication activities	
<b>69 (2,292 in 2016)</b>		<b>82</b>	
Municipalities involved		People informed	
<b>50</b>		<b>29,269</b>	
Citizens involved		Jobs generated	
<b>17,719</b>		<b>29</b>	





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# SCOW PROJECT

## Reports and outputs

- Guidelines defining the SCOW model and monitoring
- Handbook for small scale composting facility management
- Handbook for compost marketing
- Final *Vademecum*



Find all this info on the SCOW website  
<http://www.biowaste-scow.eu/>





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# WHY DO WE SHOULD CARE ABOUT BIOWASTE?

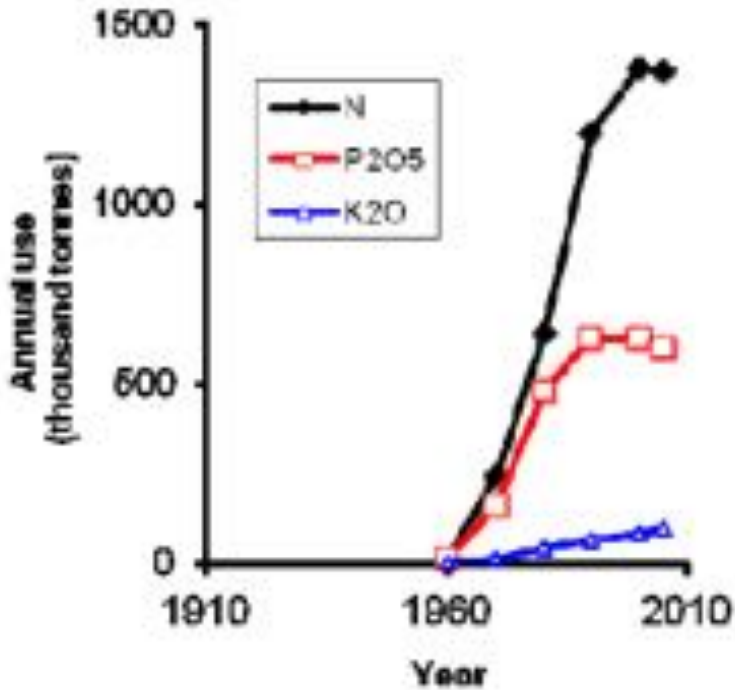




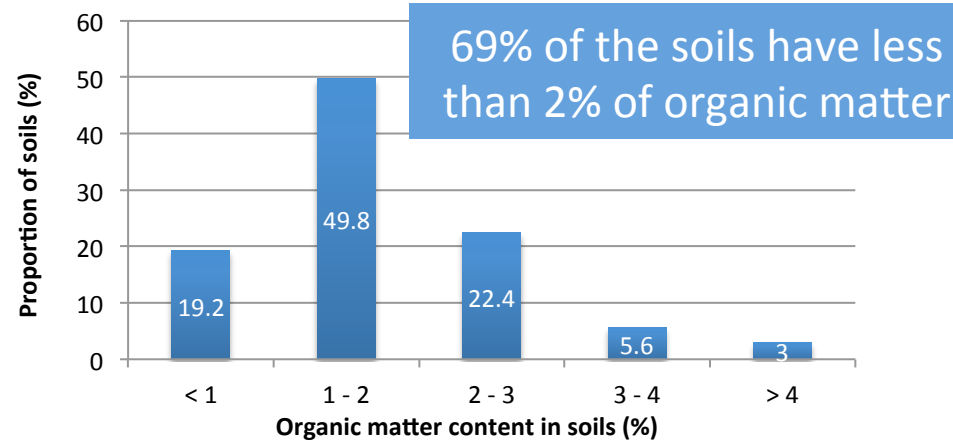
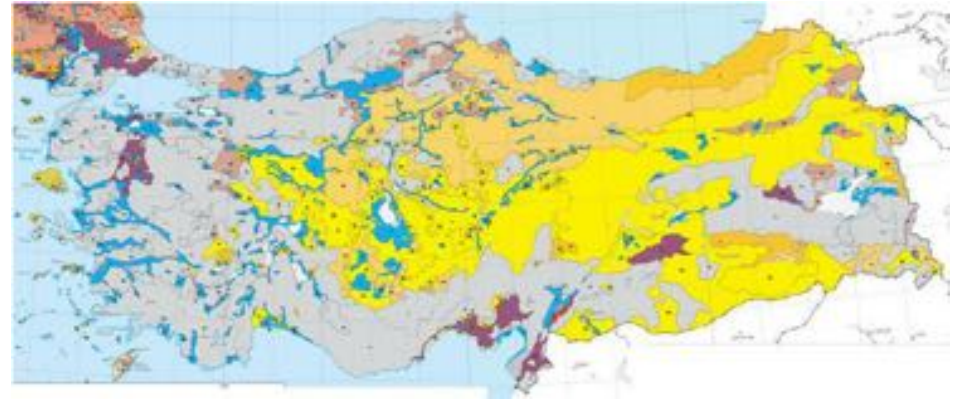
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# SOIL FERTILITY IN TURKEY

### Annual consumption of chemical fertilisers in Turkey



Source: Kuk & Burguess (2010)





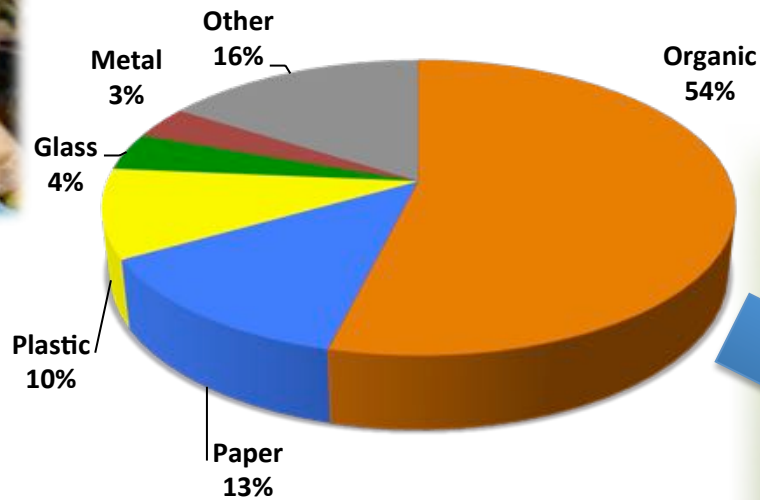
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# WHAT DO WE WANT TO DO?: OUR TWO GOALS

In most of the countries organic fraction is the main component of the MSW.



Characterization of Turkey's MSW



1<sup>st</sup> goal: Separate collection of biowaste with high quality.



Source: WorldBank, 2012

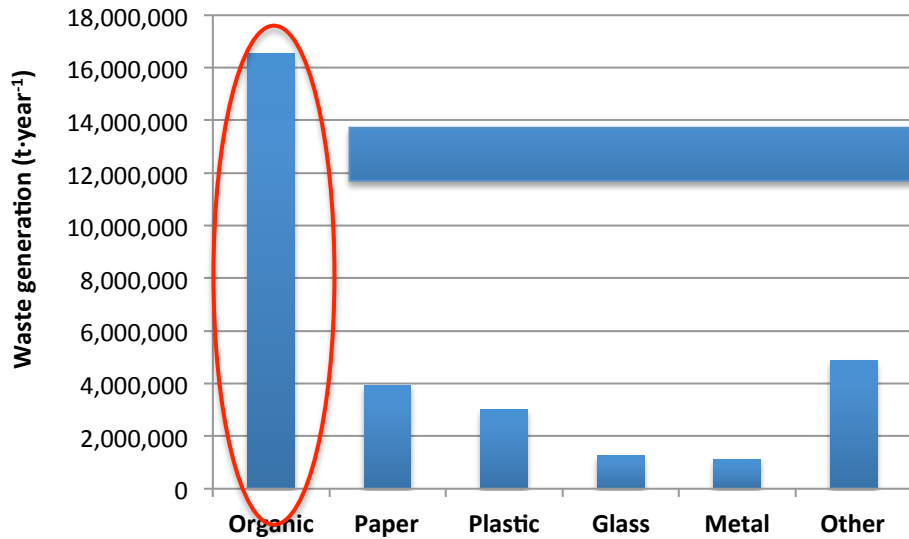




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# WHAT DO WE WANT TO DO?: OUR TWO GOALS

## Characterization of Turkey's MSW



Source: WorldBank, 2012

2<sup>nd</sup> goal: Transform this biowaste collected in compost that could be returned to the culture soils.





# BIOWASTE - WHAT DO WE WANT TO DO WITH IT?

## Just get rid of the biowaste



- Non-separated collection (impurities).
- Transportation (long distances).
- Centralised – Big-size facilities (MBT plants).
- High management costs.
- Efficiency (material and energy) is highly questionable.

## To transform “waste” into a resource



- Separated Collection (impurities < 5%).
- Transportation (very short distances).
- Decentralised – Small-size facilities.
- Improve management and environmental costs.
- Know-how about biological process of composting.
- Final product of high quality.





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# BIOWASTE MANAGEMENT

## Collection

- Biowaste is characterized by its **high moisture content** (> 70%).
- It is **easily biodegradable**.



## It means...

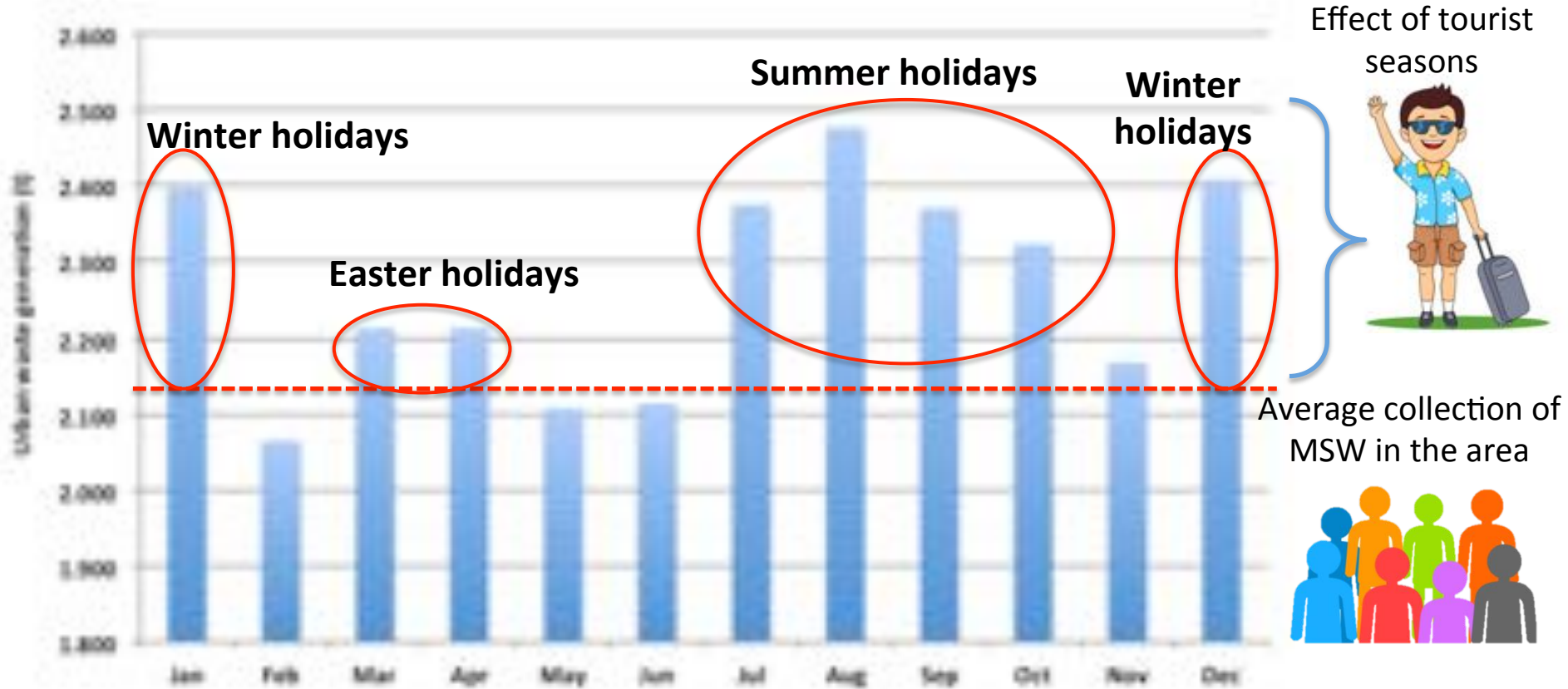
- Transportation of biowaste means move water.
- It must be collected with certain frequency to avoid environmental affections (odours, leachates, animals attraction,..)





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# WASTE GENERATION AND TOURISTIC INFLUENCE



Source: MSW collection during 2014 in La Palma (Canary Islands, Spain)





# WASTE GENERATION AND TOURISTIC INFLUENCE

The tourist impact in waste management means:

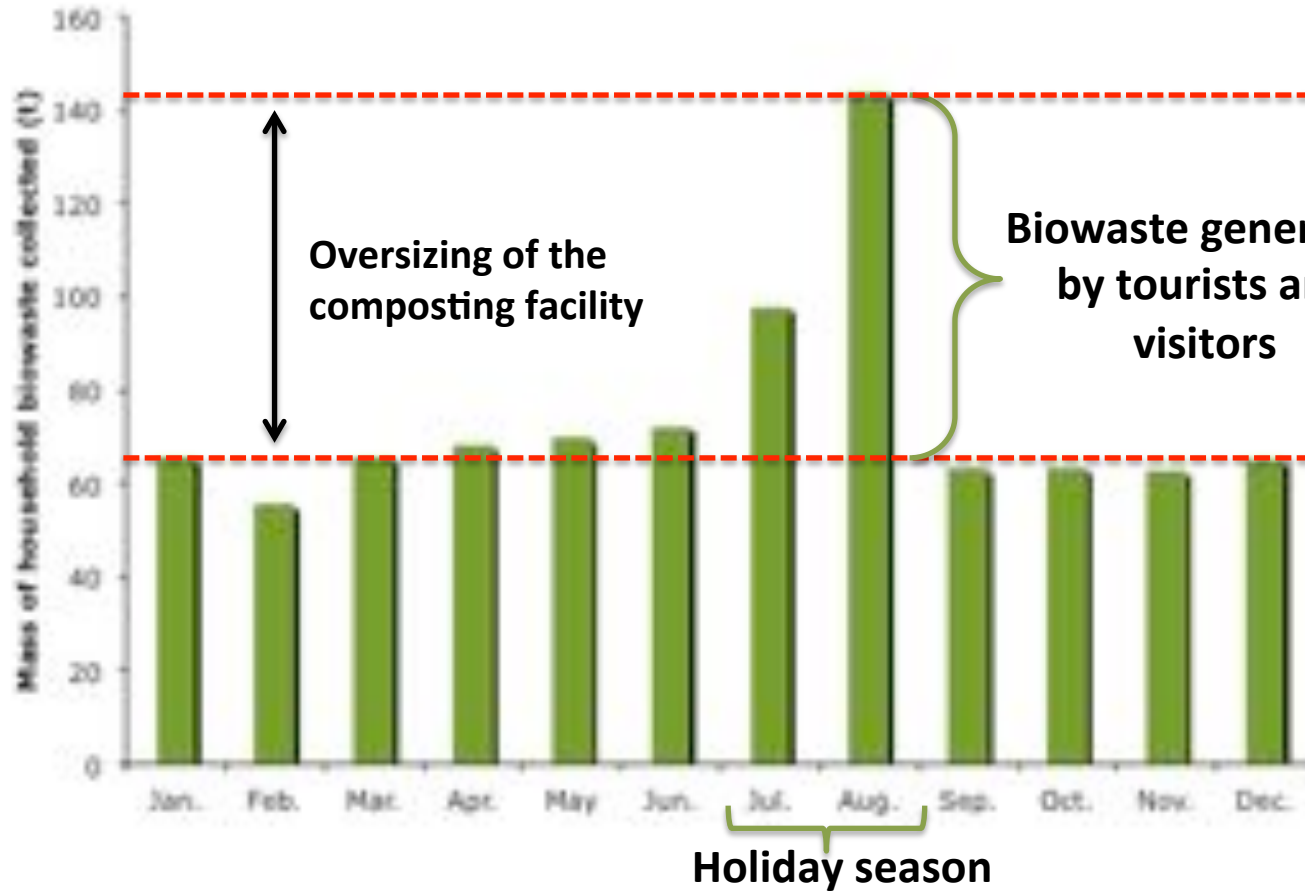
- Higher generation of MSW in certain periods of the year.
- This generation is mainly focused in specific and big generators (hotels, campsites, residential areas, restaurants,...).
- The design of any waste management system have to consider that it is not easy to explain how it works to these tourists (separate collection system, schedule collection in door-to-door systems,...).
- The touristic industry is highly concerned about “how it looks” and poorly about “how it works”. But they must be part of the strategy and participate in any plan.





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# BUT TOURISTS ALSO AFFECTS TO THE BIOWASTE TREATMENT



Monthly capacity for sizing the facility



Biowaste generated by tourists and visitors

Average collection of biowaste in the area





## THE CHALLENGES

1. **Reduction** must be always the first step and the first goal.
2. Achieve **efficient separate collection** of biowaste.
  - a. Capturing (kg by inhabitant).
  - b. Quality (with zero or minimum presence of non-organic materials or foreign materials).
3. Developing the **adequate logistics** for this collection:
  - a. Collection system (road containers, door-to-door collection).
  - b. Collection schedule/calendar (frequency of collection).
  - c. Resources and elements necessities (containers, collection trucks, compostable bags).
4. Design the **adequate treatment system/s**:
  - a. Identify the local circumstances and characteristics that determine which is the most adequate strategy for treatment (demography, climatology, orography, environmental awareness, social aspects,...).
  - b. Design the facilities (even the smallest) considering the biological process of composting and its needs.
  - c. Transform all the collected biowaste in compost that could be safely returned to the culture soils.





# THE CHARACTERS

## 1. Local administrations.

- a. Politicians: waste management should be over any political issues or manipulation.
- b. Technicians: may need specific training (theory and practice) in waste management issues. Do not trust all the marvellous and fancy technologies that will knock your door.

## 2. Tourist industry.

- a. Local business (B&B, small hotels, restaurants,...):
- b. Hotel chains (national and international)
- c. Tour operators and travel agencies.
- d. Owners of apartments/houses for rent.

## 3. Citizens.

## 4. Primary sector.

- a. Local farmers => agrocomposting
- b. Organic food producers
- c. Other compost users (professional gardening, soils recovery....)





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## SOURCES OF BIOWASTE



### HOUSEHOLDS

Food waste  
Garden waste

Easy fermentable

Moderate generation

Awareness campaigns

Decentralized generation



### BIG GENERATORS

Food waste  
Green waste (gardens)

Easy fermentable

High generation

Awareness campaigns

Centralized generation

Economic tools



### MUNICIPALITIES

Green waste

- Woody (prunings)
- Non-woody (grass, leaves...)

Seasonal generation

Low density

Source of bulking material





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# EFFICIENCY OF BIOWASTE COLLECTION MODELS

The quality of the model is reflected in the collection rate and in the presence of non-organic materials.

	Door to door	Road container	Commercial	Mixed
Capturing index (g·hab <sup>-1</sup> ·d <sup>-1</sup> )	282	128	27	128
% non-organic materials	5,2	14,7	5,6	10,3
Best captation results (% organic collected)	50,17	20,16	-	-
Lower % non-organic mat.	0,48	8,4	-	-

Source: Catalan Waste Agency

For door-to-door collection, higher collection cost is offset by a lower cost of treatment and higher incomes, in addition to achieving higher rates of selective collection, from 65 to 85%. Moreover, the generation of waste is 13% lower than the conventional container system.

Source: F. Giró, 2015





# KEY FACTORS IN COLLECTION MODELS

## Information and education

Previous and parallel work of information, awareness and training of users on the importance of source separation, as well as the classification of different materials.

## Instruments

The users must be equipped with the best instruments to carry out the separation, collection and temporary storage of the biowaste before depositing them outside for collection.



The combination of compostable bag+ aerated bin have been scientifically and practiced proved how they increase the efficiency of the collection, contribute to the reduction of improper presence and facilitate the treatment.





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# KEY FACTORS IN COLLECTION MODELS

## Demography and sociology

Density of population, distribution, type of households, age, habits, seasonality, .... They are factors that affect the implementation model of separate collection.

## Equipments

Vehicles, installations, training workers, maintenance, ...

## Legislation and taxation

Development of municipal ordinances.

Fees adjusted to the reality of costs







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# LOCAL COMPOSTING FOR RESTAURANTS

Restaurants in rural and/or dispersed areas can compost their own biowastes reducing collection costs. Example: Vilaboa, Pontevedra (Spain).



This restaurant has a place for composting the biowastes he generates. It means that the collection frequency has been reduced. Local authorities gives them technical support (master composters and bulking material).





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## LOCAL COMPOSTING FOR CAMPSITES



Some campsites are like small villages in terms of waste generation and management.

The main biowastes are:

- Green wastes
  - ✓ Grass
  - ✓ Pruning
- Food (fresh and cooked)

And other wastes like:

- Packages
  - ✓ Bottles
  - ✓ Cans
  - ✓ Bags
- Paper





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# LOCAL COMPOSTING FOR CAMPSITES



Food waste



Pruning, leaves



Grass

**TREATMENT *IN SITU* BY COMPOSTING**



**COLLECTION WITH LOW FREQUENCY**

Plastic, glass, paper





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# LOCAL COMPOSTING FOR CAMPSITES

## Before the project:

Their **expenses** in waste management were related to:

- Renting of a waste compactor = 420 €·month<sup>-1</sup>
- Collection of the waste compactor = 105 € each
- Fee for waste treatment = 73,5 €·t<sup>-1</sup>
- Collection and treatment of green waste have no cost for the campsites



Moreover they buy **compost** for maintenance and conservation of the campsite

## With the project:

Local management of  
biowaste through composting  
in small facilities **saves costs**  
**up to 30%**



**Environmental benefits** are not considered:

- Reduction of transport
- Energy-saving
- Reducing the use of agrochemical fertilizers
- etc





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# LOCAL COMPOSTING FOR CAMPSITES

Campsites have composting facilities for green wastes that are managed by the campsite's personnel specially trained.



Pruning is shredded and used like bulking/ complementary material.

Food waste is treated in community composting areas.





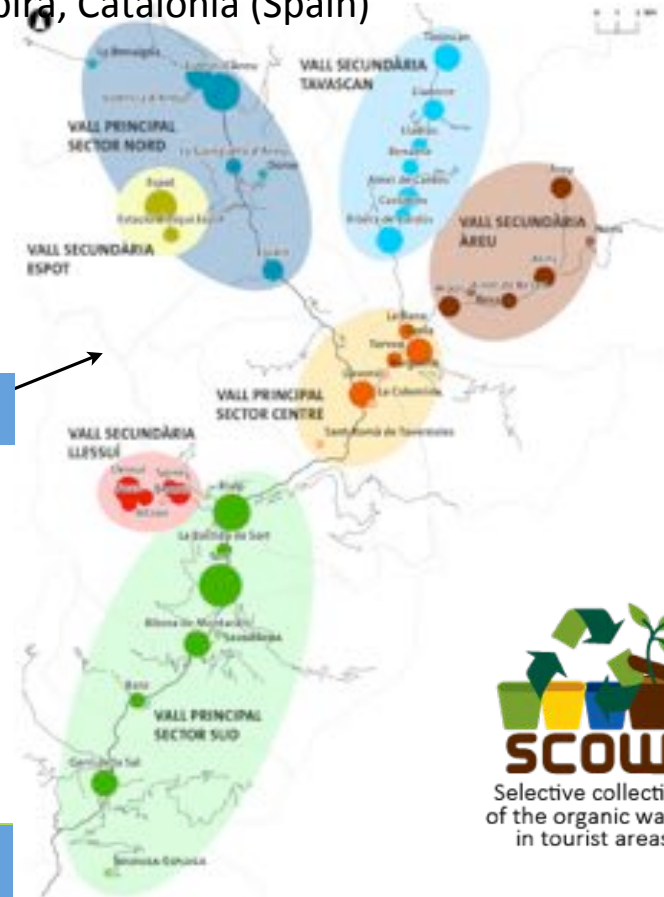
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# COLLECTION MODELS ADAPTED TO THE AREA

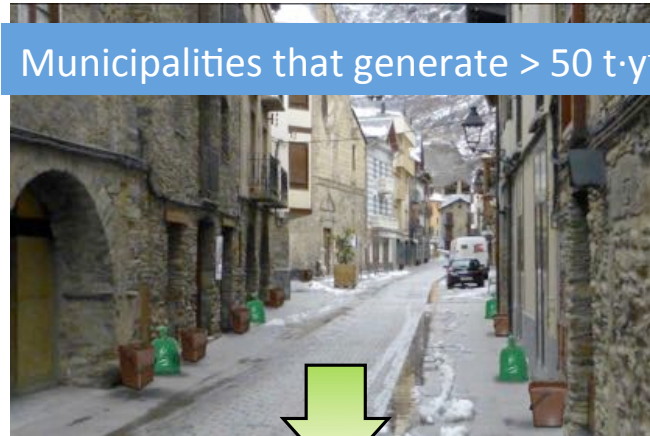
Example: Pallars Sobira, Catalonia (Spain)



Municipalities that generate < 50 t·y<sup>-1</sup>



Municipalities that generate > 50 t·y<sup>-1</sup>



Small composting facility (700 t·y<sup>-1</sup>)



The collection models must be adapted to the reality and circumstances of each area.





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# WASTE GENERATION AND TOURISTIC INFLUENCE

## Strategy hint

The environmental benefits of source separate collection and treatment of biowaste must be put in value for this touristic sector: green-friendly recognition, organic food, use of local resources, zero-kilometre products...



Ecolabel



\*\*\* Michelin Restaurant who promotes that they produce compost from their food wastes

2016 2015

[www.azurmendi.biz/azurmendi-creates-compost-out-of-organic-waste](http://www.azurmendi.biz/azurmendi-creates-compost-out-of-organic-waste)



**Azurmendi creates compost out of organic waste**

Azurmendi's engagement with sustainability is total, the opportunities that are identified are not wasted. In this sense and in co-operation with Larrabetzu's town council within the 'Larrabetzu Zero Zabor' (Larrabetzu Zero Waste) initiative, we have been working on this for quite a while now to generate compost. Then we use it for the vineyards for the Txakoli Gorka Izagirre and the vegetable gardens.





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# TOURISM AND AGROCOMPOSTING

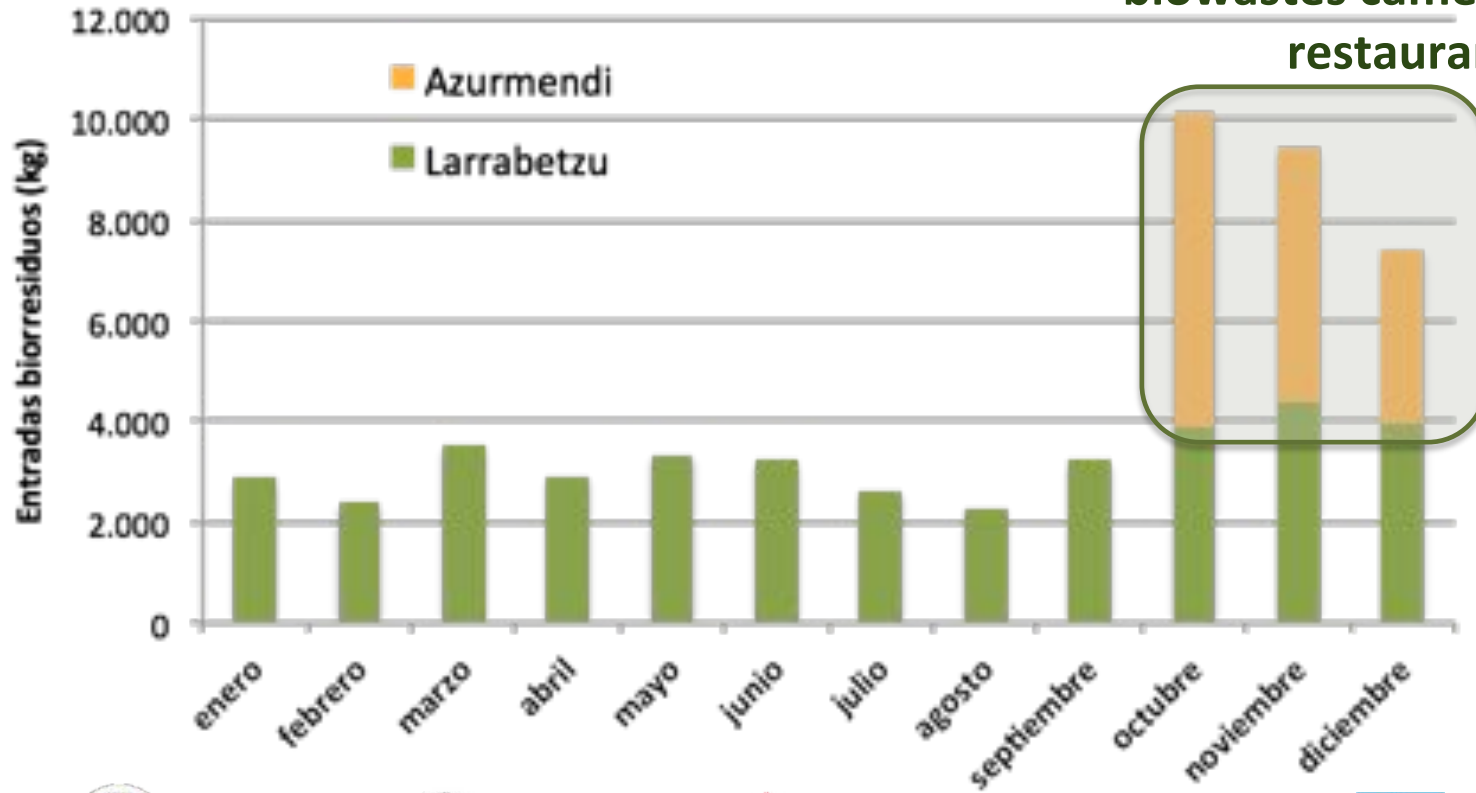
Biowastes from the town and the restaurant are collected and composted by local farmers (agrocomposting).





# TOURISM AND AGROCOMPOSTING

27,6% of the composted biowastes came from the restaurant





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# TOURISM AND AGROCOMPOSTING





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# AN EXAMPLE OF CIRCULAR ECONOMY OF BIOWASTE-COMPOST AND TOURISM



The MSW management in the island of Mallorca (Spain) is focused mainly in the separate collection of light packaging, paper/cardboard, glass and rest fraction (organic + others). This rest fraction goes to incineration.

At the end there is few sources of organic matter in the island so there is not compost for developing organic farming.





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# AN EXAMPLE OF COMPOST AND TOURISM



Organic buffet

Hotel's food waste



120 t·year<sup>-1</sup>

To composting

Social integration company



Compost (organic certif.)

Organic products from local farmers

Association of Agrarian Production of Mallorca





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# HOW DO WE GET TO PRODUCE GOOD COMPOST?



Biological process

Requirements

Bulking material

Investment

Location

Desing

Market

Scaling

Training

Monitoring





# WHAT IS COMPOSTING?

“Process of treatment / stabilization of the organic wastes, based on a complex **microbiological activity**, carried out under controlled conditions (aerobic and thermophilic) obtaining at the end a stabilized and sanitized product with nice odor and usable as fertilizer, amendment or substrate.”

**BIOLOGICAL PROCESS!!!**

**Releases heat**

**Consumes oxygen**





# ISSUES AND PARAMETERS THAT ARE KEY FOR THE EFFICIENCY AND SUCCESS OF COMPOSTING PROGRAMS:

## Technical issues

- **Clear criteria** about what, how and why do you want to do it.
- **Bulking** material:
  - ✓ Availability / mixture proportion
  - ✓ Particle size
- Group of **technicians** with adequate training.

## Social issues

- **Education and communication.** Participants must know why they are doing composting and how it works. They also have to see results.
- **Direct contact** with the users. Listen to their comments and suggestions.
- Voluntary programs only reach the population with highest environmental education and are not a real alternative. The new model has to be for **all the inhabitants.**





# COMPOSTING IMPLEMENTATION

We could talk about different kinds of composting facilities attending to:

- **Location**

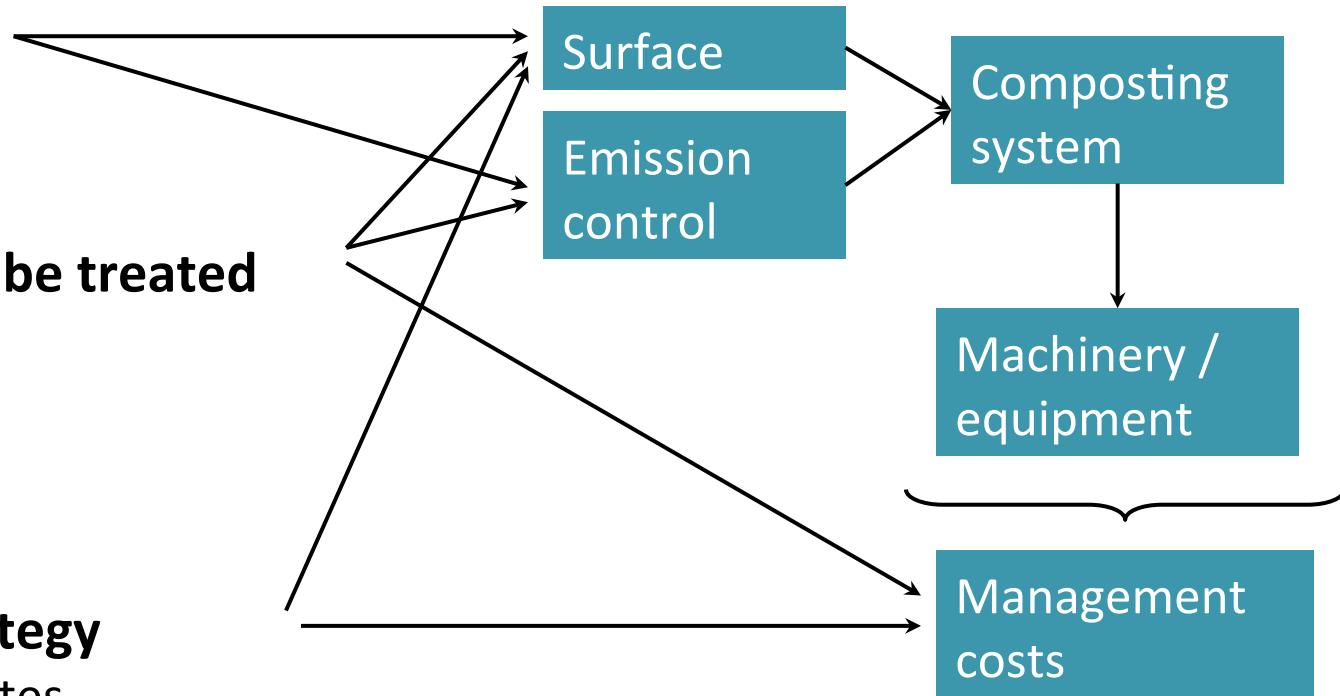
- Rural areas
- Urban areas

- **Main biowaste to be treated**

- household
- big producers
- manures
- green wastes

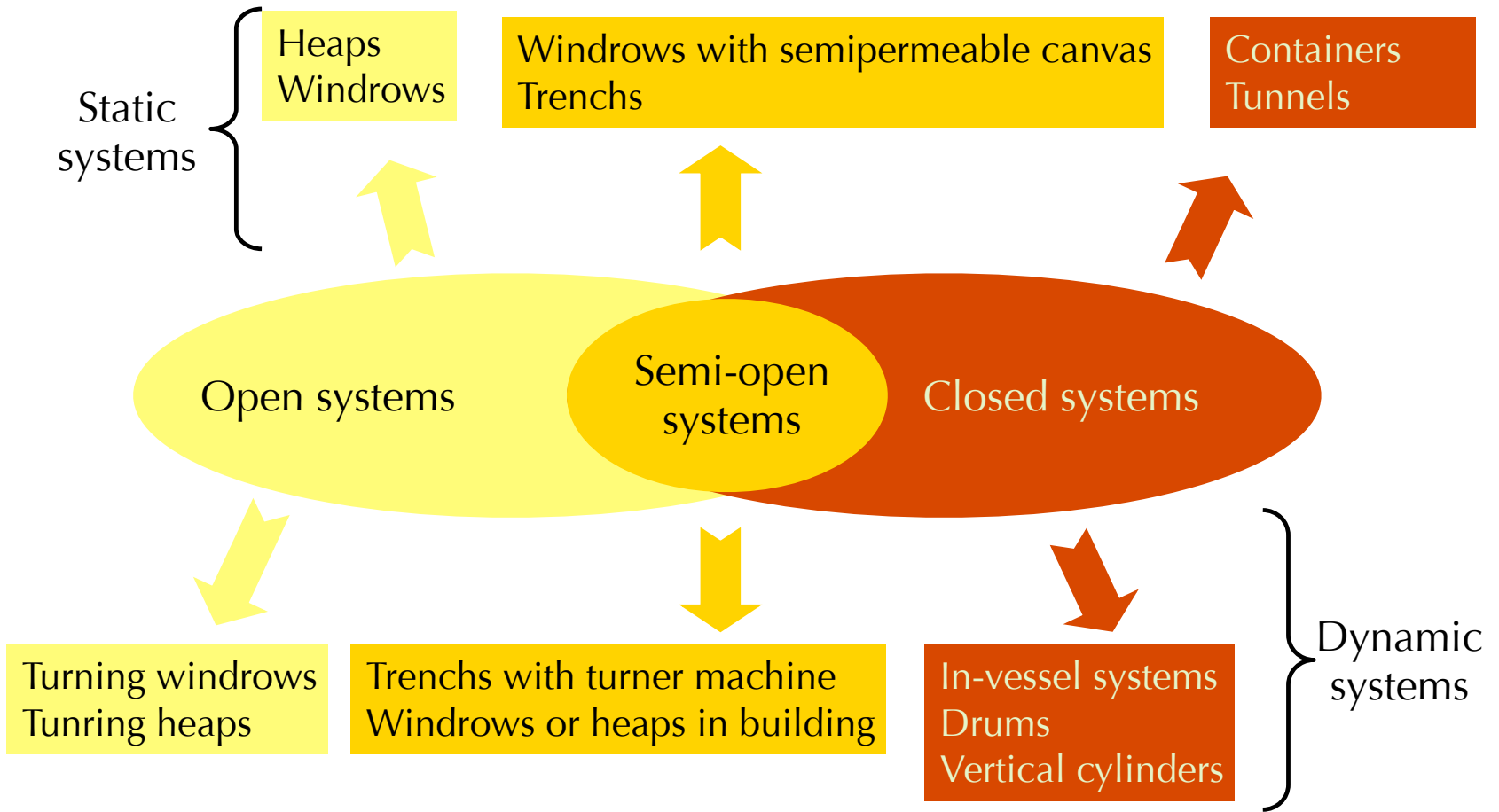
- **Management strategy**

- To treat biowastes
- To produce a good quality compost





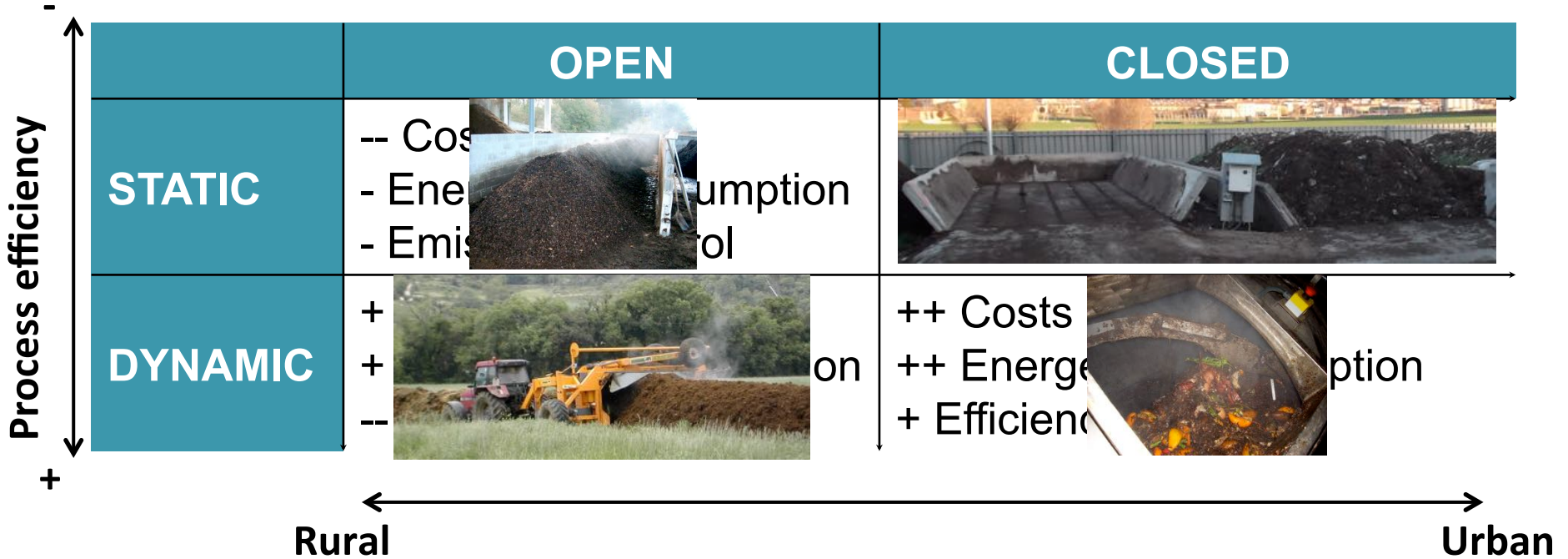
# COMPOSTING SYSTEMS





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# COMPOSTING SYSTEMS





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## BULKING MATERIAL

- Correction of the initial moisture of the mixture.
- Gives porosity to the mixture (facility the pass of outside air to the inside of the heap).
- Correction of the biodegradable C/N ratio.

All these factors mean a higher quality compost (macronutrients, pH, microbiota,...) and a more efficient process (length in time, economical costs and environmental impacts).



It is extremely important to achieve an optimal mixing ratio between the organic waste and the bulking material to get these benefits. If there is not enough or adequate bulking material extreme difficulties and potential problems are guaranteed.





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# BULKING MATERIAL



One of the key factors is that the characteristics of the bulking or complementary material are adapted to the process scale and the composting system used.

Another key factor is the logistics of the shredding machinery (own or rented) and the collection points of the prunings and green wastes.





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## SOURCES OF BULKING MATERIAL

The main source of bulking materials are the vegetal/green wastes:

- Remains of urban pruning (public and private).
- Clearing of forests.
- Remains of the biomass production for burning.
- Remains of agricultural pruning.
- Remains of harvest (cereal straw, olive leaves, ...).
- Other wood wastes (pallets).





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## COMPOSTING IMPLEMENTATION

### Climatology of the area:

- It has a great importance in the maintenance of the moisture conditions of the material to be composted. So the design of the facility must take it in account the weather conditions of the area during the year.
- Prevent excess or deficiency of moisture in the material.
- Decide the most adequate composting system and its size.
- Collection and treatment of leachates and “clean” water from rainfall.





# KEY FACTOR: SOURCE SEPARATE COLLECTION FOR BIOWASTE

## SOURCE SEPARATED COLLECTION IS NEEDED

- Treatment costs are lower:
  - ✓ Less machinery requirements
  - ✓ Less treatment stages
  - ✓ Composting system can be more efficient
- Compost will have a higher quality
  - ✓ ↓ Heavy metal content
  - ✓ ↑ Balance of macronutrients
  - ✓ Better physical characteristics
  - ✓ ↑ Market value





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# KEY FACTOR: SOURCE SEPARATE COLLECTION FOR BIOWASTE

The impropers (non-organic) content of biowaste (influenced by the collection model and awareness campaigns) has a large impact on the treatment plant model and on investment and management costs.

Improprs	Operation	Equipment
0 – 2%	<ul style="list-style-type: none"> <li>• Biowaste can enter directly into treatment</li> </ul>	Mixer/turner
2 – 6%	<ul style="list-style-type: none"> <li>• It is necessary to open/break bags.</li> <li>• In the sieved compost can be small plastics pieces.</li> <li>• The bulking will storage improprs that will affect its possibility of reuse.</li> </ul>	Mixer/turner Sieve
6 – 15%	<ul style="list-style-type: none"> <li>• In addition to the above it is necessary to introduce systems of separation of improper materials in the screening (compost and bulking)</li> </ul>	Mixer/turner Sieve Table separator Plastics extractor





## FINAL RECOMMENDATIONS

- Biowaste is the easiest waste fraction to be transformed and recycled. The key is a good separate collection. Investment in collection means savings in treatment, reducing the total management costs.
- Separate collection must be designed according to the circumstances and characteristics of each area. Door-to-door collection gives the best results but it means a big effort in awareness campaigns and communication.
- Collection is not always needed. Biowaste can be treated where is generated.
- Touristic industry could be an ally if they understand that their image will improve.
- For any composting plan it is essential to considering the sources, management and logistics of bulking material. If not there will be problems.
- Local farmers and the primary sector could be also agents in the management plans.
- Compost is a product not a waste. Quality parameters must be demanded. First, adequate separate collection of biowaste.





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# THANK YOU VERY MUCH FOR YOUR ATTENTION



**Ramón Plana**  
*plana.compost@gmail.com*  
[www.maestrocompostador.com](http://www.maestrocompostador.com)  
 @RPlanaCompost