



# GUIDELINE OF BEST PRACTICES FOR SUCCESSFUL BIOWASTE RECYCLING

Italian Composting and Biogas Association + project partners

Spain | Greece | Palestine | Jordan | Lebanon | Tunisia | Italy



## GUIDELINE OF BEST PRACTICES FOR SUCCESSFUL BIOWASTE RECYCLING

- This document lists **best practices** linked to the separate collection and management of organic waste.
- It refers to activity 5.1.1 and has been prepared by CIC with the support of all PPs in order to define innovative management plans and NEETs and women engagement in biowaste collection and treatment.

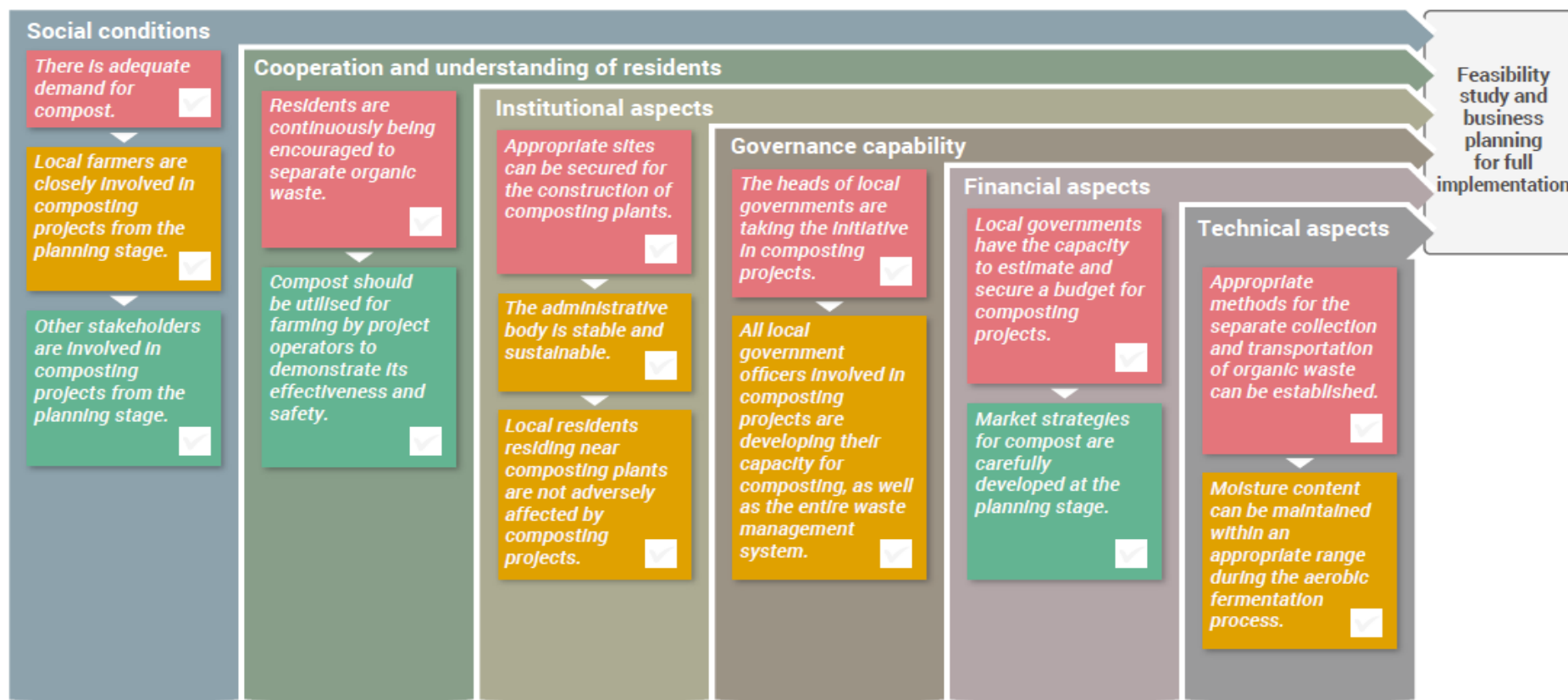
<b>Activity title</b> Measures to separate collection and high-quality recycling of biowaste in the targeted areas	<b>Starting Month</b> 6	<b>Ending Month</b> 9
<b>Activity description</b> Good practices in separate collection & high-quality recycling of BW will be discussed in order to define innovative management plans & key sensibilisation actions involving NEET & women in the targeted areas. Socioeconomic specificities & technical constraints discussed with policy actors & other stakeholders will be taken into consideration to implement a suitable model for the involved regions. PPs will deliver a simple Guideline of Best practices for a successful biowaste recycling.		

## Guideline preparation

- Format: long PPT with additional downloadable references
- Draft canvas presented on September monthly meeting by CIC
- Sept – Oct: Suggestion of other of local good practices by PPs in an excel sheet with links
- Webinar to present the PPT with a full list of good practices by CIC to PPs in **mid October**
- Final adjustments requested by PPT with more case studies related to all SIRCLES countries and delivery of the final PPT **end October**

# Key elements for successful biowaste collection





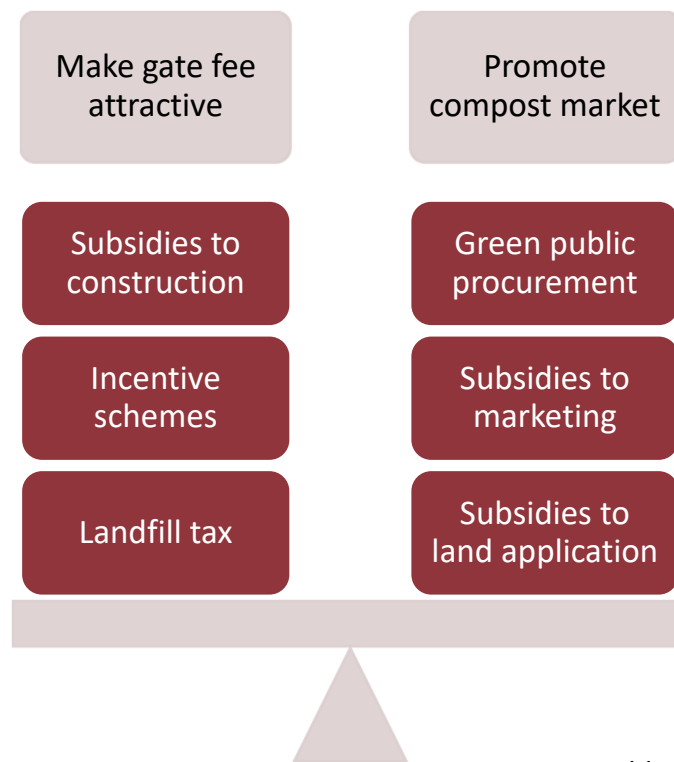
<input checked="" type="checkbox"/> <b>Mandatory key criteria</b>	in cases where mandatory key criteria are not met, suspend the evaluation or re-evaluate after improvements are made
<input checked="" type="checkbox"/> <b>Strongly advisable key criteria</b>	in cases where strongly advisable key criteria are not met, consider improving the situation through support measures or alternative proposals
<input checked="" type="checkbox"/> <b>Advisable key criteria</b>	in cases where advisable key criteria are not met, consider it risky to implement

Source: [CCET guideline series - composting](#)

## Key elements for successful biowaste composting

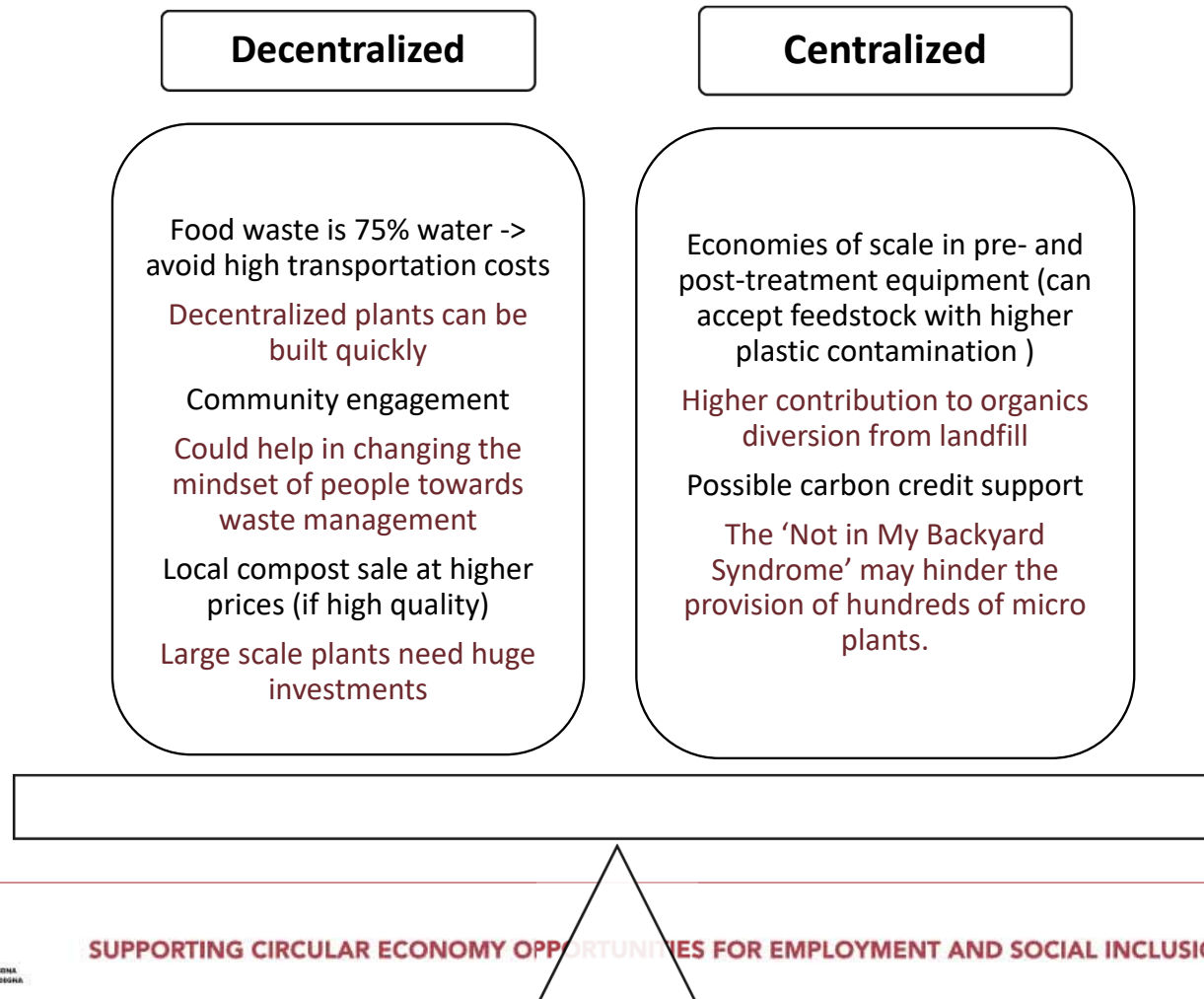
- Regulatory framework
- Visibility of compost as a valuable product
- In low income countries: low cost facilities
  - Second hand machinery, rental, network of facilities sharing equipment
- No impurities in biowaste collected

## Key factors, an insight: gate fee, compost value



*Additional information: EAWAG, marketing compost in low and middle income countries, [link](#)*

# Composting: the proximity conundrum





## Reward and inform citizens

- Citizens must be **informed and sensitized**, even not economically, just about the final destination of their waste.
- Final treatment plants / areas must be visible and visited
- The misconception that an **end-of-pipe facility** can separate all fractions generating high quality end product is dangerous when it comes to explain citizens the role of their behaviour in **separating at home**



Compost give-out days in Italy



Community composting in Spain

## Convenient tools

- Highest participation is ensured when citizens have the feeling that separate collection of food waste is, first of all,
  - Convenient
  - clean
  - easy
- E.g. door to door collection
- reduce collection frequency of residual waste, increasing frequencies for food waste



## Promote separate collection at source

- Act on landfill gate fee, introducing a tax to be returned to municipalities with the specific purpose of supporting **source separation of organics**.
- **Set up incentive schemes to support pioneer experiences** keeping municipalities challenged
  - E.g. Catalonia, Sardinia
- Look for international funding only if there is a local governance support and willingness to increase landfill gate fee

Composting plant Mabwepande η dr. Kolsch

### Annual operation costs (calc)

	Input	compost	residuals
amount [t]	18.250	10.220	4.380
normalized water content			
	unit costs	total costs	revenues
	[€/t]	[€]	[€]
O+M costs	11,89	216.928	
depreciation	7,12	129.920	
disposal of residuals	2,00	20.440	
gate fee	1,50		27.375
compost sales	<b>33,26</b>		339.913
		<b>367.288</b>	<b>367.288</b>

Source [Florian Kolsch, CCAC meeting Berlin, 2021](#) , composting plant Dar Es Salaam, Tanzania

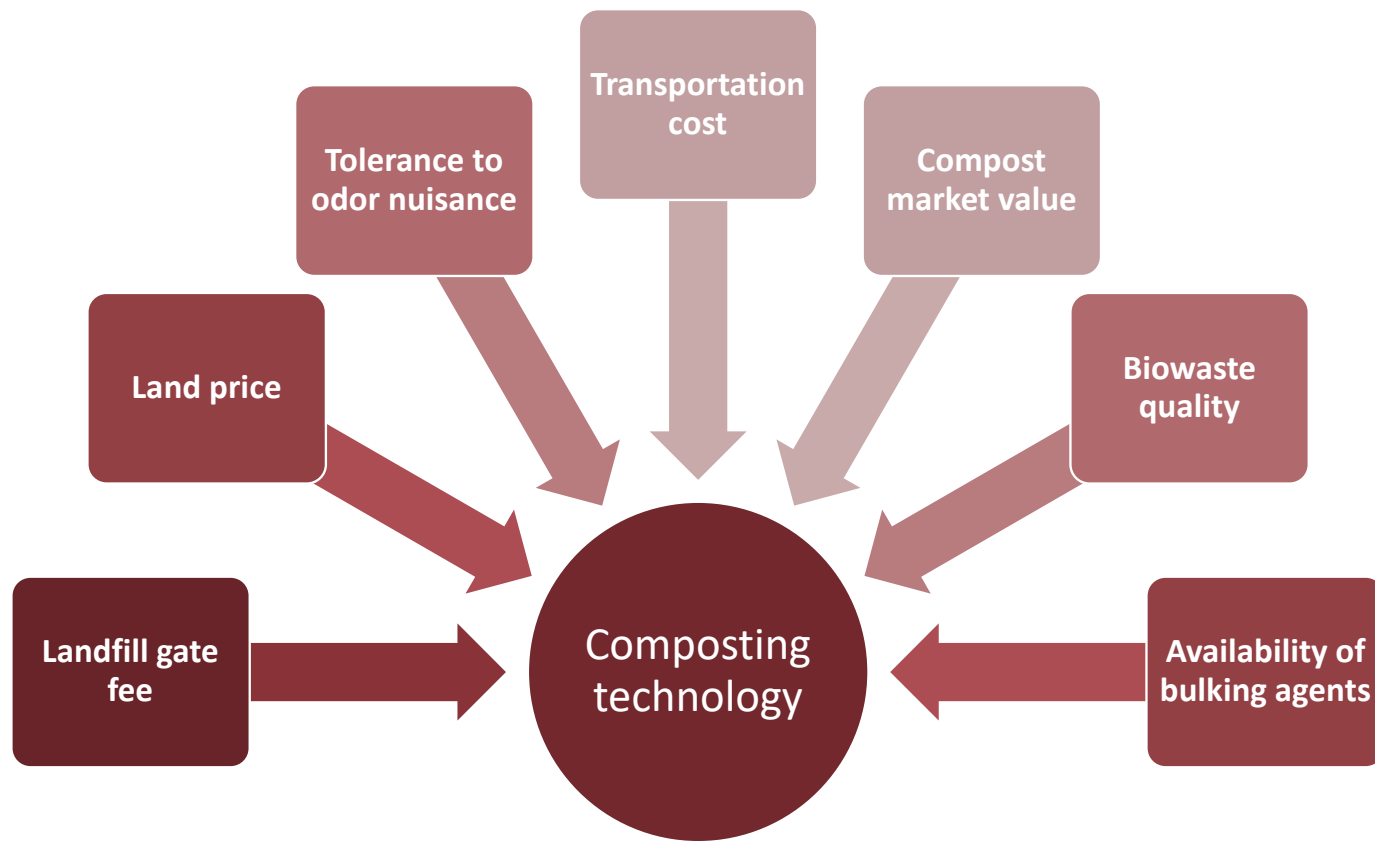


**Michele Giavini** @mgiavini · 29 set

Hoy inicié un debate en Berlín en el foro de Latino América sobre [#residuos orgánicos](#). Para qué sirve financiar el [#compostaje](#) con fondos internacionales si los gobiernos no se atreven a subir la tarifa de entrada en rellenos sanitarios?

[umweltbundesamt.de/en/document/la...](https://umweltbundesamt.de/en/document/la...)

# Composting technology: boundary conditions



# Composting at different scales



Home composting 1



Home composting 2



Community based composting



Decentralized plants



Modular industrial plants



Centralized industrial plants

# Case studies



SUPPORTING CIRCULAR ECONOMY OPPORTUNITIES FOR EMPLOYMENT AND SOCIAL INCLUSION



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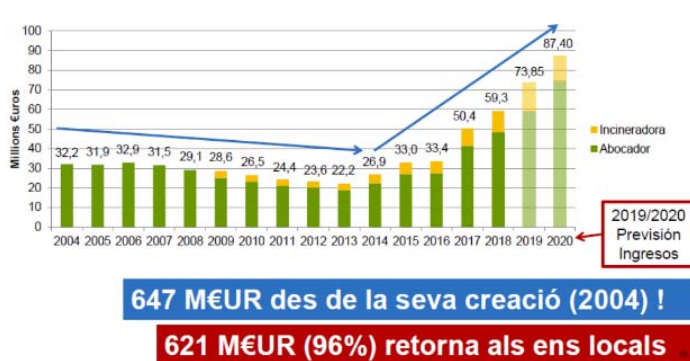
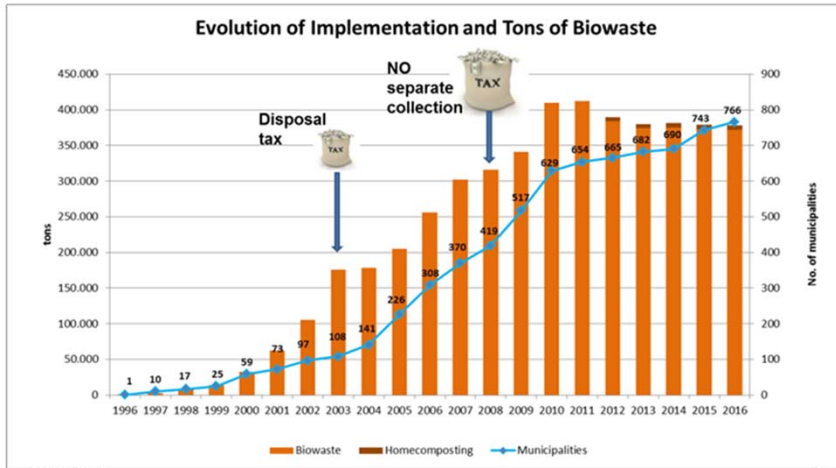
## Case study: Catalonia government, Spain

- Landfill and incineration tax, steadily increasing over years. Refund system to municipalities to promote high quality biowaste collection
- Since the introduction of the tax, municipalities with biowaste collection increased from 17 to 766 in 13 years. More than 600M€ returned to local municipalities since its creation
- Compulsory food waste characterizations every trimester
- Incentives for continuous improvements in composting plant and innovation in biowaste separate collection
- A lot of promotional campaigns on biowaste

Source: [ARC](#), [ARC](#), [Urbanwins](#)

# Case study: Catalonia government, Spain

## Impact of the Waste Disposal Tax

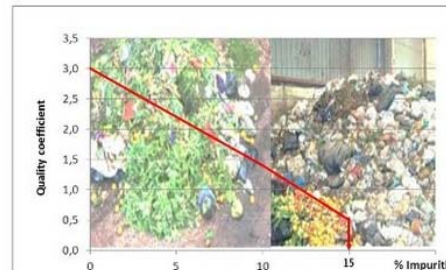


### Refund criteria

- **Separate Collection of Bio-waste 10,- €/t**

Refunding is subject to a **quality coefficient** applied per ton, based on **periodical characterisations**.

At **15 % of impurities** the refunding is 0.



### Refund criteria

- **Biological Treatment of Net Biowaste**

Type of activity	Beneficiary	2004 €/t	2011 €/t	2015 €/t
Biowaste (Organic Fraction of MSW)	Local authority performing separate collection	32,50	33,50	34,00
Green Waste	Local authority performing separate collection			3,00
Home composting	Local authority that has installed composting units		20,- per unit	20,- per unit
Community composting	Community composting units		60,- per unit	60,- per unit



## Case study: Pune, India

- India's ninth-most populous city - >4 million people
- Best practice of informal waste pickers organized in a cooperative (SwaCH): 2,200 workers-members, More than 80% are women. 80% of the city served.
- Door to door collection, sensitization, separation, income from selling recyclables, composting
- Users pay a fee to SWaCH
- Network of small scale composting plants

Source: [UNESCAP](#), <https://prizeforcities.org/project/swach-pune-seva-sahakari-sanstha>, [WIEGO](#), [Down2earth](#), [Youtube](#)

## Case study: Pune, India



‘स्वच्छ’ के कर्मचारी हर घरों में जाकर निवासियों के बीच यह जागरूकता फैलाते हैं,



## Case study: Dhaka, Bangladesh

- 14 million people
- First case of a large scale composting facility in low income country
  - Financed partly with carbon credits
  - Primarily market waste
- Multilevel models, from small scale to large scale composting

Source: [Waste Concern](#) and others

## Case study: Dhaka, Bangladesh

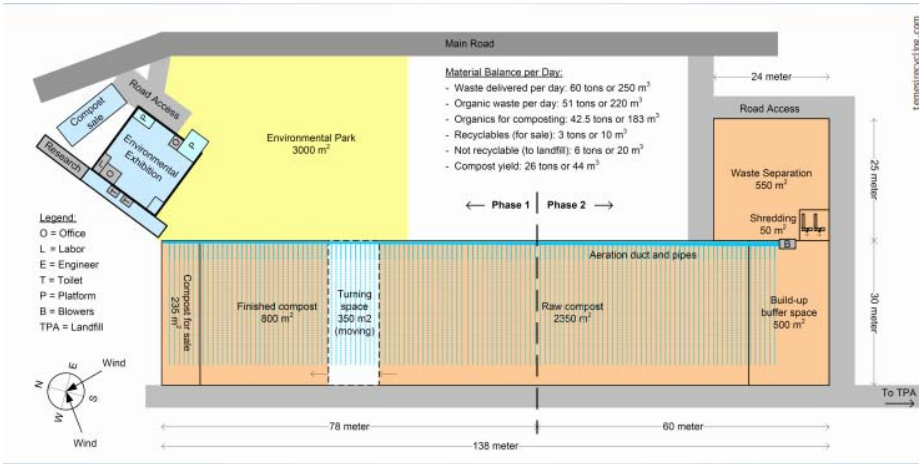


## Case study Temesi, Bali, Indonesia

- Large scale low cost composting facility (about 60 tons per day) operating since 2007
- Highlights:
  - Ownership transferred to village foundation
  - Employment opportunity for marginalized women
  - High importance given to quality control
  - Carbon credits for methane avoidance
  - Compost sold mainly to tourism industry
  - Extends landfill lifespan by factor 10
  - Environmental park

Source: EAWAG, course on MSW management in low income countries, and [www.temesirecycling.com](http://www.temesirecycling.com)

# Case study Temesi, Bali, Indonesia



Source: EAWAG, course on MSW management in low income countries, and [www.temesirecycling.com](http://www.temesirecycling.com)

## Low cost / small scale: Boadella i les Escaules, Spain

- Small scale 150 t/y plant
- Simple door to door collection
- Low cost equipment
- Small compost piles 2x1,5x1,5 m
- Overall collection and management cost 80 €/t
- Prime grade compost («A» quality)
- Very low contaminants in biowaste (0.32 %)
- Compost given back to citizens
- Pioneer Plant then improved with cement modules

Source: [Spanish Ministry](#), and ARC - [Mancomunitat La Plana](#)

# Low cost / small scale: Boadella i les Escaules, Catalonia, Spain

ON HO PODEM LLENÇAR

A la cuina...

Linceu les al dubsell així  
de poder mirar sempre amb  
una bossa compostable.



Ai carrer...

Linceu la bossa  
compostable ben tancada  
dels al contenidor marró.



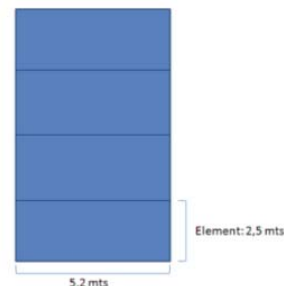
Sacs de compost repartits durant les jornades de portes obertes.



Pictures from Malla, MCP



Jornada de portes obertes, visitant les piles en fase inicial da compostatge.



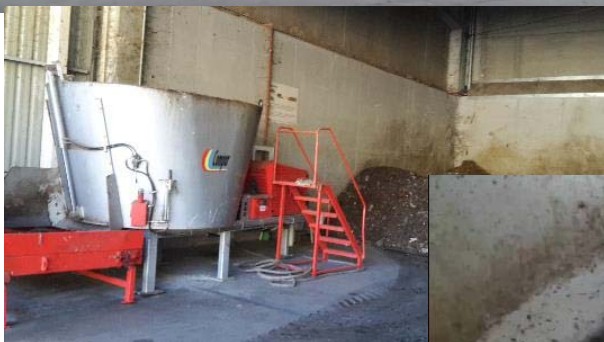


## Sort, Catalonia, Spain

- Result of the ENI CBC MED SCOW project
- Small scale – low cost facility for a rural area
- Some Machinery adapted from agricultural equipment
- High commitment from the County Council and managing technicians to promote and operate it

Source: [SCOW](#) ENI project

# Sort, Catalonia, Spain



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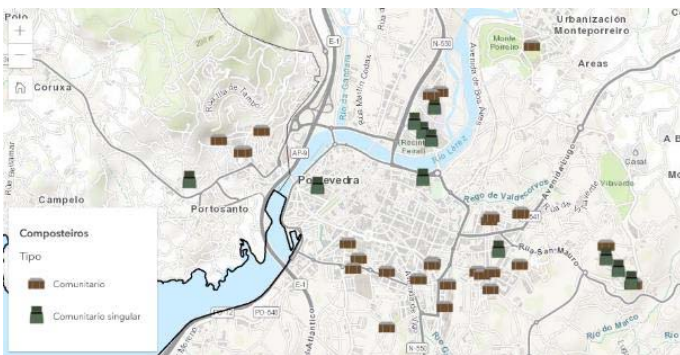
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## Pontevedra, Galicia, Spain

- Label and visibility (Plan Revitaliza)
- Community composting areas for 47 municipalities, even in urban areas.
- Unique EU experience in a training course for “master composters” supported by the Province. Job creation, continuous monitoring and citizens involvement
- Whole management cost kept at a minimum level, including the task of master composters
- High quality of feedstock
- Shredded wood is provided in big bags by the Province

Source: [County Pontevedra](#) and others

# Pontevedra, Galicia, Spain



## Houmt Souk and Grombalia, Djerba, Tunisia

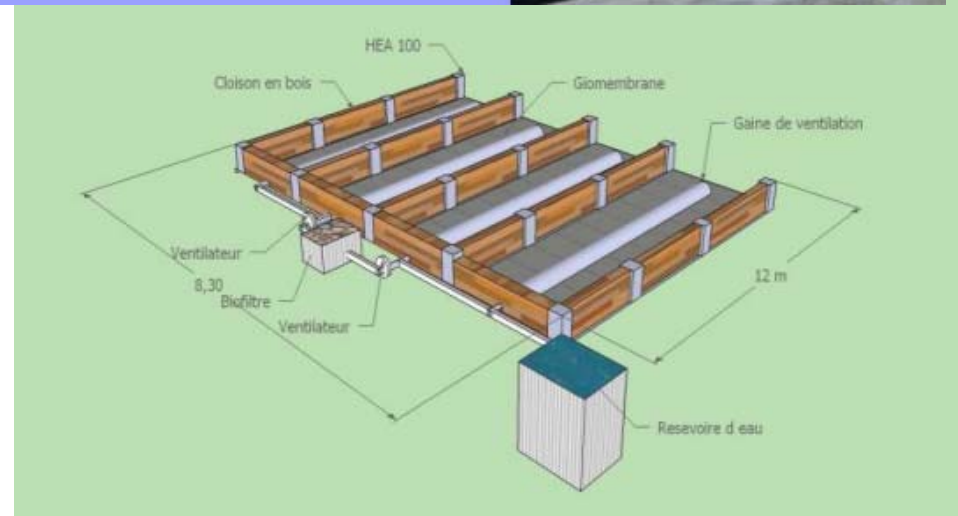
- Implement a strategic approach to waste management
- Increase the environmental sustainability of Djerba
- Generate a quality touristic label for the hotels
- Quality compost can be applied easily to most eroded land to recover it
- Biowaste collection
  - first stage: 8 hotels
  - Second stage: 18,000 people
    - 3/week biowaste, 1/week residual
    - 45 L bucket for biowaste, Green bags for packaging waste, blue bags for residual waste
- Low cost composting plant operating since 2012

Source: <https://www.youtube.com/watch?v=sRSYLZ5jPiE>

# Houmt Souk and Grombalia, Djerba, Tunisia



## Case study: Djerba, Tunisia



Source: ISWA 2013, BEN ABDALLAH MONGI  
Director of the Environment Municipality of Houmt Souk Djerba TUNISIA

## Irbid, Jordan

- Funded by GIZ (German Cooperation Agency). 2019-ongoing
- The project is operated by Irbid municipality and it was able to employ 60 Jordanian and Syrian workers with appropriate salaries, and contributed to the employment of youth and the reduction of poverty and unemployment in Irbid governorate
- Aerobic composting, project's production capacity is up to 20 tons per day
- Leftovers of fruits and vegetables are collected from Irbid's central vegs and fruits market
- The organic fertilizer produced by this factory is one of the best types of fertilizers in the region according to laboratory analyzes issued by the National Center for Agricultural Research, stressing that it is the only product in the North Region that relies on raw materials of plant origin only without any chemical treatments in its manufacture
- The fertilizer is available to farmers and citizens at an acceptable price and high quality and it got approved to be exported to other municipalities

Source: [Youtube](#), [local news](#) translated



# Irbid, Jordan



## Alkarak, Jordan

- Funded by MEDA – Global Affairs Canada. Enterprise Development for Women and Youth in the Jordan Valley
- 2019-ongoing
- Converting farm green waste into compost
- supported women entrepreneurs to pilot a green composting enterprise
- On-the-the-job training for green compost entrepreneurs
- Women members of the GNC started raising awareness among farmers in the area to persuade them to dump their green waste in the new composting facility. Following these efforts, a total of 100 tons of green waste was secured within two months
- a total of 25 tons of compost was generated in five months
- No gate fee: revenues from selling compost (20 JOD/ton) was enough to cover expenses related to transportation of green waste to the composting facility and the required manual labor.

Source: [MEDA JVL report in English](#)

# Alkarak, Jordan



## Mafrq, Jordan

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Source: [MEDA JVL report in English](#)

# Mafrag, Jordan



## Kaslik, Lebanon

- Holy Spirit University of Kaslik (USEK) cafeteria waste composting
- 700 students, 2017- ongoing
- Cafeteria waste approximately 350 kgs per day
- Carbon material supplied from landscape waste of the university
- Students were involved and taught the composting techniques
- Technology used is Aerated SP inside wooden boxes: Air is supplied from 2 central blowers into 10 1x1x1m boxes

Source: [Facebook](#), [Compost Baladi](#)

## Kaslik, Lebanon



Other low cost modules promoted by Compost Baladi

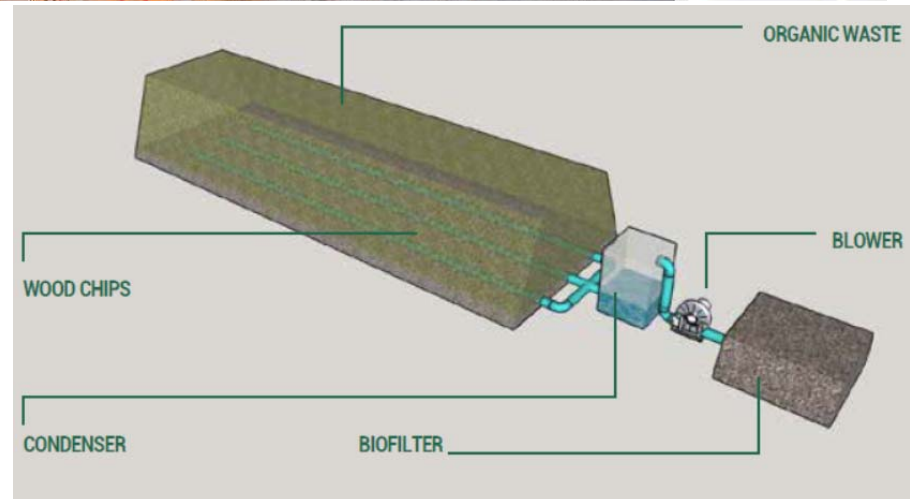
## Kawkaba, Lebanon

- Kawkaba Municipality organic waste + agricultural residues composting
- 1000 inhabitants + 100 farmers . 2021 – ongoing
- Source separated municipal organic waste 500kgs per day
- Carbon material supplied from olive trees pruning residues (Kawkaba is known for its olive farming)
- 2 wood chippers were supplied to the municipality to chip the residues on site to reduce transportation cost
- Technology used was the container composters, ASP inside shipping containers with leachate and odor management systems.
- Funded by Italian NGO CELIM
- NEETs and women involved

Source: [Elnashra news](#), [Facebook](#), [Compost Baladi](#)



# Kawkaba, Lebanon



## Manara, Lebanon

- Manara Municipality organic waste
- 4000 inhabitants. 2017 – ongoing
- Source separated municipal organic waste 2 tons per day
- Carbon material supplied from landscape and agriculture pruning waste
- The close follow up and constant monitoring from the municipality's officials were the key success factor in this case
- The end product is being sold in 25kgs bags for 4\$ a bag
- The revenues are contributing to the sustainability of the WM facility
- NEETs and women involved. Supported by Dutch cooperation (VNG)
- The Manara-system achieved a reduction of untreated waste by 84% in two years after initial adoption. The system was introduced as part of the Local Government Resilience Programme (LOGOReP)

Source: [Facebook](#), [Facebook](#), [Linkedin](#)

# Manara, Lebanon



## Halandri, Greece

- Municipality of Halandri, close to Athens
- Almost 1000 citizens. 2016 – ongoing
- Supported by the H2020 project Waste4Think, coordination by NTUA
- Source separated Household Fermentable Waste collection from almost 1000 citizens followed by drying and shredding for the production of a biomass called FORBI(Food Residue Biomass) .
  - FORBI valorized for 8 different valorization alternatives ( gaseous, liquid and solid biofuels).
  - Drying and shredding, aiming to evaluate the FORBI as a potential feedstock for the production of high TRL eco-products (biofuels, compost, alternative fuel for cement industry etc). FORBI is a high quality homogenized and dry biomass product with a weight approximately 25% of the original food waste, which may be stored for prolonged periods of time without deterioration. The FHW collection vehicles were equipped with a CNG system capable of running on both diesel and biogas generated from FORBI, for the evaluation and demonstration of a cyclic bioeconomy concept.
- % increase of food waste source separation and diversion from landfill (50% achieved within 6 months of operation for the the municipal sector where it was applied)
- % decrease in waste management costs (36% reduction in anticipated upon implementation for the whole city)
- % decrease in waste management environmental impact (up to 80% reduction in carbon dioxide emissions)

Source: [H2020 Waste4Think](#), [INCIRCLE](#), [Municipality of Halandri](#)

# Halandri, Greece

## FERMENTABLE HOUSEHOLD WASTE MANAGEMENT IN A CIRCULAR ECONOMY: THE MUNICIPALITY OF HALANDRI, GREECE CASE



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## Central Corfu and others, Greece

- Interreg E-HORECA WANET Efficient Hotel Restaurant & Catering Waste Network
- Collection of biowaste in the municipality of Central Corfu. 2020 – ongoing
  - Aims at identifying a network of local waste producers in Corfu and Saranda in order to identify the current waste management practices. 2. Having full knowledge of international best practices and of the current situation in waste management procedures new protocols will be prepared for the pre-separation stage for waste producers and waste collection stage from local authorities.
- New other pilots of separate collection starting in other places in Greece: [Aigaleo](#) , Peristeri ([link](#)), [Vari – Voula](#), *Koropi city, Agia Marina, Skarpiza, Kitsi, Karellas*, and many others listed on GIZ [Guide on biowaste](#) and <https://www.followgreen.gr/>
- Other projects: IFE-F4F, Crete (Greece), Food for Feed: An Innovative Process for Transforming Hotels' Food Waste into Animal Feed to evaluate an innovative, simple technology and low emissions process that allows the safe transformation of source separated food wastes, mainly from hotels (and generally from the hospitality and food service sectors), into animal feed, utilising an altered solar drying process.

Source: [Interreg-IPA CBC](#), [Facebook](#), [FollowGreen](#), [food4feed](#)

# Central Corfu and others, Greece



Corfu, E-WANET project



«empty for full» collection in Peristeri, [Youtube](#)

Έντυπο οδηγιών καφέ κάδου

Καθαρά, μαζί  
ο δήμος  
ο δήμος  
ο δήμος

1. Επικρατεί τον διαχωρισμό των υπολειμμάτων τροφών από την κοζύνη μας.
2. Βυζούλιμα καθαρισμό τα υπολείμματα στον πλησιέστερο εξωτερικό κάδο.

**Σημαντικές σημειώσεις:**

- Αφήνουμε τα υγρά υπολείμματα υπολείμματα να στεγνώσουν πρώτα για λίγα λεπτά πριν τα απορρίψουμε στον κάδο ή τα τυλίγουμε με εφημερίδα ή χαρτί.
- Κρατάμε το κομμάτι των ελαστικών μας καθαρισμένο.
- Εάν έχουμε θανάσιμα απορρίμματα όπως ψαχίδια, ψαρούλια, αρρώστια τα βάζουμε εντός του κάδου για να απορριφθούν στη συλλογή και να απορριφθούν οι βελγία.

Επικοινωνήστε με τον Δήμο, εάν έχετε απορίες ή χρειάζεστε περισσότερες πληροφορίες:

☎ 15466 (εργασιές επικοινωνίας του Δήμου)  
 213 2020002 (Δ/νση Καθαριότητας & Ανακύκλωσης)  
 Email: [katharotata@nyc.gov.gr](mailto:katharotata@nyc.gov.gr)  
 Facebook: [cityofnyc](https://www.facebook.com/cityofnyc)

Vari – Voula leaflet



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## Beitello, Palestine

- Selective collection of the organic waste in tourist area (SCOW) in Ramallah city and the composting unit in Beitello village has been the main pilot of separate collection in Palestine
- 10 hotels from Ramallah city and one neighborhood from Betello village ( 50 household or 300 inhabitants) where the composting unit is located
- Started operation in 2015, irregular working, now to be renovates for SIRCLES
- Similar plant more focused on agricultural waste in Jericho

Source: [SCOW ENI-CBC MED](#), [local news](#), [news](#)



SUPPORTING CIRCULAR ECONOMY OPPORTUNITIES FOR EMPLOYMENT AND SOCIAL INCLUSION



SIRCLES



# Beitello, Palestine



## Asira, Palestine

- "Building a model for a society based on recycling": Waste Separation project in Northern Asira, in the city of Nablus .
- The project is implemented by PARCIC foundation in cooperation with Northern Asira municipality.
- This project targets 150 families located in Asira in the first year
- 2019- still ongoing
- Biowaste separation at household levels: waste is separated using colorful bins in 4 categories; organic waste, papers, plastics and bags. / Collection of organic waste from households as well as from 10 different grocery stores regularly, and then sending it to the compost center where decentralized composting takes place using "piles" methodology.

Source: [Progress of waste separation project in Asira | Palestine | PARC Interpeoples' Cooperation\(PARCIC\)](#),

[بلدية عصيرة الشمالية ASIRA Municipality - Posts | Facebook](#)

[بلدية عصيرة الشمالية \(1\) ASIRA Municipality - Posts | Facebook](#)

# Asira, Palestine



**مشروع فصل النفايات في عميرة الخالدية**

بتدعيم من : الصندوق الياباني للبيئة العالمية

تنفيذ : مؤسسة بارصوت.

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**المخلفات العضوية**

توضع القشاقع و المخمرات داخل الصندوق الأخضر و لمخام انتشار الروائح الكريهة و المخثرات يوضع القفل من المواد الأساسية داخل الصندوق

يتم إعادة تدوير القفايات التي تم جمعها إلى كمبوست "سدا عضوي"

**ملاحظة :**  
يتم وضع الخضراوات التي اصبحت عليها المتكسبات " شحبات " و اللحم و السمك و العفون و المعجنات و منتجات الحليب أو منتجات الحليب

---

**البلاستيك**

توضع الزجاجات البلاستيكية و العبب المعدنية داخل الصندوق الأحمر

يتم فرز المواد البلاستيكية التي تم جمعها إلى قطع صغيرة و إرسالها إلى مصنع إعادة التدوير في الضفة الغربية

**ملاحظة :**  
لا يوضع الزجاج

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**الاوراق المطبوعة**

الاوراق المطبوعة (بالأبيض و الأسود ) \* الاوراق المستخدمة \* في الصندوق الأصفر

يتم إعادة تدوير الاوراق التي تم جمعها إلى نوع جديد من الكمبوست " سدا كيميائي "

**ملاحظة :**  
لا يوضع بالاوراق الملونة و الخرافات أو المجلات

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**النفايات الغير قابلة لإعادة التدوير و القابلة للحرق**

أي نوع آخر من القفايات الغير مصنفة ضمن القفايات السابقة توضع في الصندوق الأزرق

القفايات القابلة للحرق سيتم جمعها و إرسالها مباشرة إلى موقع العلم في عميرة الخالدية

**ملاحظة :**  
قفاة القفايات الغير قابلة لإعادة التدوير

إذا كان لديك أي سؤال أو استفسار بخصوص المشروع لا تترددوا بالتواصل معنا عبر :  
 مهند واهب : 0598908425  
 فیسوفا : www.facebook.com/paric.palproject  
 إيميل : Paloffice@paric.org



## Anabta, Palestine

- Development and Implementation of the Waste Management System in Anabta Municipality in northern Tulkarm, Decost project
- 400 families of the residential area of Anabta, about 2000 inhabitants
- 2020- still ongoing
- Decost project is based on "Decentralized Composting in Small Towns" Concept. /
  - It aims to build a closed-loop system of organic waste valorization through integrating decentralized both home and community composting systems with urban agriculture.
  - As for home composting, approximately 2000 residents of Anabta will participate.
  - The target is 400 home composters. 90 units were distributed so far and the rest will also be distributed soon.
  - As for community composting, 2000 residents of Anabta will participate through separation of organic wastes at their houses. The municipality will collect them along with organic waste twice a week from grocery stores and commercial shops. It is then transferred to a composting unit in town where compost is produced.

*Source:* [Organic waste: DECOST project to implement community composting in the municipality of Anabta, Palestine | EU Neighbours](#), [Kadoorie and Anabta Municipality Kick-off First Phase of DECOST Project - Palestine Technical University \(ptuk.edu.ps\)](#) [DECOST involves influential women from Anabta, Palestine in waste reduction and recycling awareness campaign | EU Neighbours](#)

# Anabta, Palestine

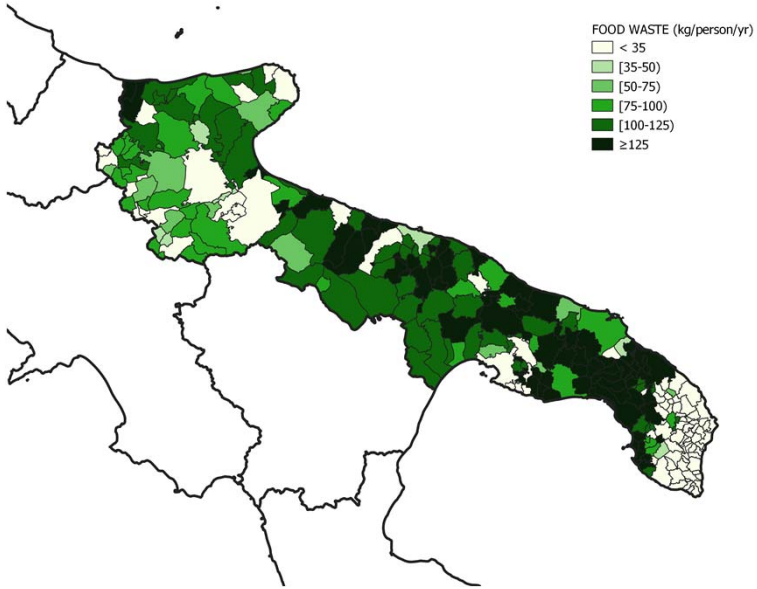


## Puglia, Italy

- Italy has a long list of best practices in separate collection of biowaste, more than 5,000 municipalities have implemented it even in mediterranean southern regions
- Separate collection of biowaste in Puglia started around 2010 and now got to good results
- Three best practices:
  - Capture rate of biowaste in the area. 370,000 t/year on 4 million people means 93 kg/capita/year, which is about 80% participation rate, even in large cities (Bari, Lecce) [data](#)
  - Large scale composting facility of [Progeva](#) (associate partner SIRCLES), female entrepreneurship, also managing soil improver production, and gourmet vegetables for restaurants
  - Project “[Compost Goal](#)” to promote the use of compostable bags instead of polyethylene

Source: [www.compost.it](http://www.compost.it), [www.compostgoal.net](http://www.compostgoal.net), [www.progeva.it](http://www.progeva.it)

# Puglia, Italy



## Compost Goal project

COMPETIZIONE ACCOGLIMENTO MANAGEMENT MULTIFUNZIONE PERFORMANCE SOSTENIBILITÀ COMFORT

NON GIOCARE SPORCO. **GIOCA SOSTENIBILE!**

Raccogli la sfida:  
scendi in campo per una frazione organica di **qualità** e sacchi di **legalità**.



PROGEVA composting plant



SUPPORTING CIRCULAR ECONOMY OPPORTUNITIES FOR EMPLOYMENT AND SOCIAL INCLUSION



SIRCLES

# References

- **Collection**
- [World Biogas Association \(2018\): Global food waste Management: an implementation guide for cities](#)
- Waste collection and transport
- [Collection of MSW in Developing Countries.UN HABITAT. 2010](#)
- [UNHABITAT \(2011\). Collection of Municipal Solid Waste, Key issues for Decision-makers in Developing Countries](#)
- GIZ (2020): [Guide on separate collection of municipal waste in Greece, with many insights on biowaste](#) and [Guide on biowaste](#)
- Shared container systems for megacities: [AIA webinar \(New York\), 2021](#)
- **Integrating the informal sector**
- [Integrating the informal sector for improved waste management. Sanjay Gupta](#)
- [Recovering resources, creating opportunities. GIZ. 2011](#)
- [The Economics of the Informal Sector. GIZ. 2010](#)
- **Financial comparison of collection and transport systems**
- [Collection of municipal solid waste in developing countriesUN HABITAT \(2010\). \(Annex 3, pages 165-172\)](#)
- **Economics of biowaste collection**
- [REA \(2016\) the real economic benefit of biowaste collection.](#)
- **Composting (low income countries)**
- [Decentralised Composting for Cities of Low- and Middle- Income Countries, Sandec \(2006\)](#)
- [The art and science of composting, Cooperband \(2002\)](#)
- [Supplementary material on Composting. I. Zabaleta](#)
- Equipment for small scale composting plants: [TEAMS folder](#) with material uploaded by ARC
- **Modules about anaerobic digestion (low income countries)**
- [Anaerobic Digestion of Biowaste. Sandec. 2014](#)
- **Vermicomposting of Biowaste**
- [Manual of On-Farm Vermicomposting and Vermiculture.Organic Agriculture Centre of Canada](#)
- [Training Material on Composting and Vermicomposting. Ecosan & seecon](#)
- [Vermicompost, the story of organic gold. A review. Sujit Adhikary. 2012](#)
- **Biowaste Processing with Black Soldier Fly (BSF) Larvae**
- [Black Soldier Fly Biowaste Processing - A Step by Step GuideDortmanns et al., 2017](#)
- **General (focus on low income countries)**
- [CCET guideline series on intermediate municipal solid waste treatment technologies: Composting](#) . CCET IGES/UNEP, 2020
- CCAC – US EPA, [Organic Waste Separation: Program and Policy Options](#), 2018





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