

# Socioeconomic baseline on waste for the non-domestic waste sector in Condeixa-a-Nova, Portugal

Beatriz Bringsken, Álvaro Fernández Braña, Catarina Sousa, Celia Dias-Ferreira

May 2020



Title Socioeconomic baseline on waste for the non-domestic waste sector in Condeixa-a-Nova, Portugal

Authors Beatriz Bringsken, Álvaro Fernández Braña, Catarina Sousa, Celia Dias-Ferreira

Date May 2020

ISBN 978-989-8649-40-9

**Politécnico de Coimbra** Instituto Politécnico de Coimbra – Serviços Centrais Rua da Misericórdia, Lagar dos Cortiços – S. Martinho do Bispo 3045-093 Coimbra Telefone: +351 239 791250 E-mail: ipc@ipc.pt Internet: www.ipc.pt

Project LIFE PAYT – Tool to reduce waste in South Europe (LIFE 15 ENV/PT/000609) Co-funded by the LIFE programme of the European Commission





© 2020 LIFEPAYT. Available under the international licence Creative Commons Attribution-NonCommercial-NoDerivatives 4.0. (http://creativecommons.org/licenses/by-nc-nd/4.0/)



# Contents

1. Introduction	4
2. Methodology: Key Aspects and Limitations	5
3. Results and discussion	6
3.1. Economic Indicators	7
3.2. Social Indicators	9
3.2.1 Social indicators SE7 to SE 12	9
3.2.2 Extra data extracted from the questionnaires	12
4. Conclusions	13
5. Annexes	14
Annex 1: Model of the questionnaire issued for the Condeixa-a-Nova survey a	•
commercial sector	14

# **Tables**

Table 1: Set of environmental indicators for LIFE PAYT project; MSW: Municipal	Solid
Waste	4
Table 2: Results of the 12 socioeconomic indicators	7
Table 3 : Economic Indicators for the baseline	8
Table 4: Social Indicators for the baseline	10

# 1. Introduction

This baseline report aims to assess the impact of the project actions done within the framework of LIFE PAYT project, to establish a socioeconomic context as the starting point for the monitoring system in Condeixa-a-Nova. This document, prepared in April 2020, intends to provide information regarding the set-up of a baseline for the twelve socioeconomic indicators to establish a preliminary analysis.

As shown on Table 1, every indicator is identified by an assigned code, ranging from SE1 to SE12, and they were defined on the *"Report on the development of socioeconomic indicators"* (LIFEPAYT, 2017). For this report, the indicator SE3 presents a small difference, as it is focused only on the non-domestic sector.

	INDICATOR		UNITS	CALCULATION FORMULA
SE1	MSW management cost for municipality		€ / year	Cost in target zone per year
SE2	MSW management revenue from domestic and non- domestic sectors		€ / year	MSW tariff paid value in target zone per year
	Individual cost	Non- domestic	€	Hourly salary • Necessary hours
SE3	of MSW management	Domestic	Degree of effort (mean score between 1– 5)	$\frac{\sum individual\ scores}{\sum total\ answers}$
SE4	Coverage of MSW management costs		%	MSW tariff revenue Cost of MSW management · 100
SE5	Economic revenue due to increased recycling		€ / year	$\sum_{i}$ (Units of recovered MSW i fraction · Unitary price of MSW i fraction)
SE6	Potential employment creation		Nr. jobs	$\sum_{i} \left( \begin{matrix} \text{Units of recovered MSW i fraction } \cdot \\ \text{Nr. jobs created by unit MSW i fraction} \end{matrix} \right)$
SE7	Satisfaction v collection s		%	$\frac{\sum positive \ answers \cdot 100}{\sum total \ answers}$

Table 1: Set of environmental indicators for LIFE PAYT project; MSW: Municipal Solid Waste



	INDICATOR	UNITS	CALCULATION FORMULA
SE8	Acceptance of MSW management pricing	%	$\frac{\sum positive \ answers \cdot 100}{\sum total \ answers}$
SE9	Population percentage who separates MSW at source	%	$\left(1 - \frac{\sum \text{ answers "I don't recycle"}}{\sum \text{ total answers}}\right)$ . 100
SE10	Population percentage practicing home composting	%	$\frac{\sum positive \ answers \cdot 100}{\sum total \ answers}$
SE11	Population perception on the importance of recycling	Mean score between 1–5	$\frac{\sum individual \ scores}{\sum total \ answers}$
SE12	Project visibility	%	$\frac{\sum positive \ answers \cdot 100}{\sum total \ answers}$

The initial values calculated for the set-up of indicators defined in sub-action C2.1 constitute an assessment of the socioeconomic situation regarding MSW management in target zones prior to the implementation of the LIFE PAYT project. This initial assessment will be used as a baseline against which the progress achieved by the project in socioeconomic dimension will be evaluated.

# 2. Methodology: Key Aspects and Limitations

This assessment focuses on social aspects (as the perceived attitude of the population towards the waste issue) and on economic implications (derived from MSW data of the target area). Therefore, it was necessary to use primary and secondary sources of information.

As primary source, a survey was performed in the form of questionnaires answered by a sample of <u>122 respondents</u> among the non-domestic sector established as a target population affected by the project. The questionnaire answered by the commercial waste producers had some limitations concerning difficulties to meet representatives from industries as one of the typologies. The number of achieved interviews was 122, which gives a 95% confidence interval and 7,7% margin of error. The survey ended up performed through field interviews in six categories of commercial establishments of the involved

area: 1. HORECA (n=28), 2. Private social welfare entities and associations (n=2); 3. Health care services (n=7); 4. Business (n=44), and 5. Services (n=41). The commercial version questionnaire issued for the survey in Condeixa-a-Nova is herewith this report

The field interviews were conducted for five days: on the 16<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> of January and on the 4<sup>th</sup> and 5<sup>th</sup> of February of 2020 with the target population (479 commercial establishments).

As a secondary source, the values of the economic indicators (as for instance, the information related to costs and revenues) were obtained from the municipal authorities responsible for the MSW management. The information was found on official documents provided by the municipality and agencies, or other kinds of communication materials.

As a baseline process, this same survey - performed before the implementation of the project - will be conducted as well after the implementation, to check the possible improvement comparing it with the initial situation.

# 3. Results and discussion

This section shows the initial values of the socioeconomic indicators, which form the baseline for the project area. The data presented on Table 2 will be used as reference in the end of the project, when the final situation in each target area will be compared with this baseline previously established.



#### Table 2: Results of the 12 socioeconomic indicators

	INC	DICATOR	RESULTS Condeixa
SE1	MSW management cost for municipality		181478 €/year
SE2	MSW management revenue from non-domestic sectors		58739 €/year
SE3	Individual cost of MSW management	Commercials (17 min)	Min. hourly salary (4.15 €/hour) 1.24 €/week
SE4	Coverage of MSW management costs		32,3%
SE5	Economic revenue due to increased recycling		47015 €/year
SE6	Potential employment creation due to recycling		1,13 jobs
SE7	Satisfaction with MSW collection system		91%
SE8	Acceptance of MSW management pricing		29,7%
SE9	Population percentage who separates MSW at source		90%
SE10	Population percentage practicing home composting		3%
SE11	11 Population perception on the importance of recycling		4.5 (0 to 5)
SE12	Project visibility		6.6%

#### **3.1. Economic Indicators**

As shown on Table 3, the economic indicators for the baseline assessment focuses on: costs, revenues, tariffs, degree of efforts, economic profits, and employment creation. These financial indicators are important for PAYT systems, since the population that correctly separates their waste expects a reduction of the tariff. In Portugal, for example, the amount charged is linked to the water bill and as shown in the surveys the tariff is not known by the majority.

Socioeconomic baseline on waste for the non-domestic waste sector in Condeixa-a-Nova, Portugal

Table 3 : Economic Indicators for the baseling	Table 3 :	Economic	Indicators f	for the	baseline
--	-----------	----------	--------------	---------	----------

Table 3 : Economic Indicators for the baseline			
Economic Indicators	Condeixa Baseline Summary		
SE1. MSW managemen	t cost for target population (2017)		
$\frac{441885 \text{ CC} + 148806 \text{ TC} + 27991 \text{ LT} (\textbf{€})}{5459 \text{ (yearly ton waste produced)}}$ $\frac{618682 \textbf{€}}{5459 \text{ t}} = 113.33 \textbf{€}/t$ $\text{MSW management cost per ton =} 113.33 \textbf{€}/t$ $\text{MSW produced target population:} 1606 \text{ t}$	To calculate this indicator: First, all the costs associated to the MSW management in the municipality were considered to determine the cost per ton. The collection cost (CC) calculation already includes in the value the administrative costs (AD*) from Condeixa Municipal Council, this information is also reported to the Portuguese regulatory body (ERSAR). Secondly, the MSW cost focused on the target population is based on the quantity of waste produced by this group only multiplied by the cost/t. paid by the municipality. After the implementation of PAYT, if there is a reduction of mixed waste produced, the MSW collection and treatment costs could decrease as well, leading to		
<ul> <li>= 182012 € / target population (2017)</li> <li>AD*: administrative costs</li> <li>CC: collection costs</li> <li>TC: treatment costs</li> <li>LT: landfill tax</li> </ul>	a reduction in the municipality's costs and tariffs.		
SE2. MSW management revenu	les for domestic and non-domestic sectors		
<b>58739 €</b> in the target area (2017)	Although the municipal revenue with the MSW tariffs should cover the costs, a possible reduction of mixed MSW fraction due to PAYT, hopes to reduce even more the price paid by the population. The expected variations in the MSW revenues allows us to understand the influence of the LIFE PAYT project.		
SE3. Individual of	cost of MSW management		
Considering that the employee responsible for the waste receives the minimum salary of $557 \in \text{per } 40 \text{ h/week}$ , the hourly salary is equivalent to $4.15 \in$ . The average time spent per week on waste management is 18 min (although, the median was 10 min), considering the minimum hourly salary of $4.15 \in$ , the proportional salary is <b>1.24</b> $\in$ .	Based on <u>question 7</u> of the survey, this indicator aims to understand the evolution of the cost/effort bear by target population in MSW management. It is expected that throughout the project, participants will increase their time in MSW management, by separating, composting, etc., to produce less undifferentiated waste. On the survey (question 2), the answers related to the employee responsible for the waste management influenced the hourly salary. The answers were, namely: 18 specific cleaning-persons; 79 average employee non-related with cleaning; and 25 company owners. As the higher number of responses indicated an average employee non- related with cleaning.		



SE4. Coverage of MSW manage	ment costs (only for the area of the project)
$\frac{SE2}{SE1} \cdot 100 = 32,3\%$	This indicator represents the percentage of MSW management cost covered by the charged tariffs. The municipality does not cover all the costs and still lacks a revenue of 67,7%. In this case, the municipality can take advantage of the change of tariff induced by PAYT adoption to correct the balance between costs and revenues, as it is expected to have less mixed MSW production and increasing recycling.
SE5. Economic reve	nue due to increased recycling
Price of recovered material (€/t) X Quantity collected (t) = 47.015 €	The purpose of this indicator is to understand if there are economic benefits derived from PAYT, a result of increased recycling. If separation increases, the revenues associated to the sale of recovered materials for recycling has a potential to increase. The value of the three streams of recyclable materials were obtained by Dispatch n <sup>o</sup> 14202-C/2016, while the quantities in tons of the material collected were informed the Municipal Council of Condeixa-a-Nova.
SE6. Potentia	al employment creation
Non-domestic sector generates 231 tons of recyclables, that implies: <b>0.23 direct jobs</b>	Literature review pointed that job creation is greater than the potential decrease resulting from employment loss in alternative MSW treatments (e.g. landfills) and in the production of new raw materials. According to the report "More jobs, less waste" (Friends of the Earth, 2009), estimations of potential job creation by recycling show that for every 204 tons of recycled waste 1 direct job is created with an economic value of € 72,500 per year. Specific factors were applied to each material.

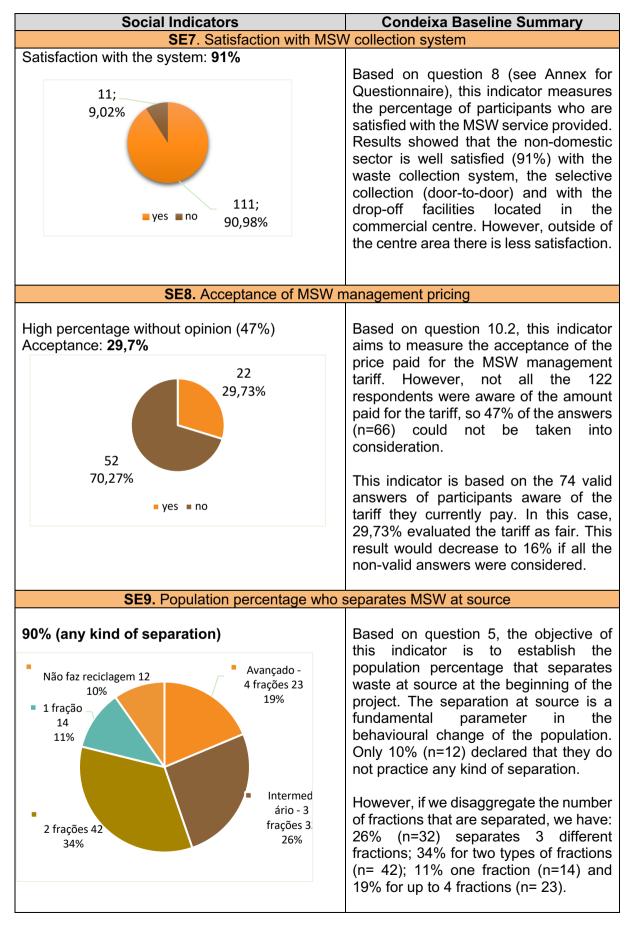
#### 3.2. Social Indicators

These social indicators are important to monitor the outcomes and acceptance of the project.

#### 3.2.1 Social indicators SE7 to SE 12

The six social indicators for the baseline assessment, shown on Table 4, focuses on: satisfaction with collection system, management pricing; separation at source, practicing composting, importance of recycling and project visibility.

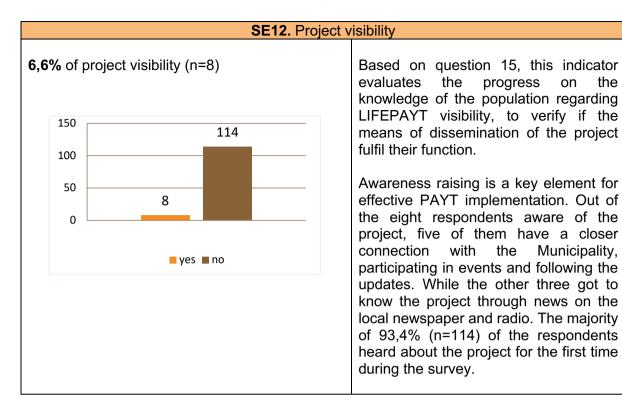
Table 4: Social Indicators for the baseline





Social Indicators	Condeixa Baseline Summary
SE10. Population percentage pra	
<b>3%</b> composting <b>6</b> 118 97% • yes • no	Based on question 6.2, organic waste is the main component of urban waste, so composting is a strong factor to be raised by identifying the branch of target population that already practices composting. Coincidently, the municipality has another project (Bioverde) to promote composting among the domestic sector, which may have contributed to raise awareness among the target population. The four participants (3%) in target population that already practice composting will function as a control population, establishing the base level for this indicator. Other 19 participants declared that they practice organic waste valorisation by separating oil (n=13), and/or feeding animals (n=13). The majority of 81% (n=99) develops no good practice for organic waste.
SE11. Population perception on t	he importance of recycling
Likert scale with five levels: <b>4,5</b>	Based on question 4, the perception of the importance of recycling is an indicator that points also to the commitment of the population to give the correct destination to waste.
100 50 <u>2</u> 6 0 low (1, 2) average (3) high (4, 5)	Although, 93,5% (n=114) respondents gave the highest scores (5 and 4) for importance of recycling, and only 6,5% (n=8) the lowest ones (1,2 and 3), these results in practice are not aligned with the results shown on SE 9 about separation at source.

Socioeconomic baseline on waste for the non-domestic waste sector in Condeixa-a-Nova, Portugal



#### 3.2.2 Extra data extracted from the questionnaires

- Question 1: A representative of the commercial sector throws away on average 140 litres of waste per week.
- Question 5: As 90% declared on the survey to practice waste separation at source, the most separated material among the commercial sector is Paper and Cardboard - as 82% separates.
- Question 9: 91% is satisfied with the MSW collection system, but when asked what could be improved in the MSW system, there were 58 complaints concerning: a perceived "unfair" tariff (6), improve organization and neatness (26), requesting more drop-off facilities (22), and asking for more social control and education (4).
- Question Q10.1: The majority (82% // n=101) were not aware of the amount paid for the municipal waste tariff. Only 22 were informed, but often the shop owners were the ones aware of the tariff. As those positive respondents were also asked to inform the regular price paid for the tariff, on average this amount was €18.
- Question 11: 74% (n=91) knew that the waste tariff is based on water consumption.
- Question 12.1: 77% (n=94) would prefer to pay the waste according to the waste volume thrown away, as it is with the PAYT system (Q12). The other 28 respondents who declared no preference for the alternative tariff gave the following reasons: depends on the new price paid (n=12+3) plus 3 people answered "yes,



to prefer the new tariff", but later doubted; it would be more expensive - for hotels, for instance (n=6), distrust on the new system measure to be fair or accurate (n=4).

- Question13: 64% (n=78) did not know that the recyclable waste put in the drop-off facilities has no tariff to be paid. Only 36% (n=44) were informed about this free service.
- Question 14: 74% (n=91) thinks that companies that separate waste should be benefited, the other ones (n=31) think the benefit is not necessary.

# 4. Conclusions

The only problem faced during the survey among the non-domestic sector was to contact the representatives of the industry, but as they are large producers of waste they already have a different set of tariffs, performing a very different situation from the other categories interviewed. Although there is a great satisfaction with the MSW system, there are some minor complaints faced by the non-domestic sector of Condeixa-a-Nova. The waste collection company together with the municipality offers a door-to-door collection of recyclable materials to the non-domestic sector, which makes it easier to identify the acceptance and impact of the separation at source among this group. Out of these preliminary results, it was possible to identify some contradictions as the population of the target population is divided in different parishes, the one concentrated in the centre (downtown) is well served with waste bins and drop-off facilities, but there are other establishments that complaints about the lack of facilities.

The interviewed representatives of the non-domestic sector in Condeixa-a-Nova seems to be consistent in their positive characteristics, with a high score for importance of recycling (SE11) - 4.5/5, as well as for the satisfaction (SE7) with the MSW system – 91%, as well as for the perception of separation at source (SE9) - 90%. The reason might be because the municipality carries with a lot of responsibility campaigns and activities among the population to bring more attention to good practices for the individual waste management.

Although there were about five articles published on the local news about the PAYT project in Condeixa, it seems like the non-domestic sector was not well informed, only 6,5% have heard about the project.

The acceptance of the MSW management price (SE8) was low, about 70% were not satisfied with the tariff. On the other hand, the coverage of the MSWM costs (SE4) is below

the optimum balance. Both results indicate a need of developing good business strategies to financially attract the commercial sector.

## 5. Annexes

Annex 1: Model of the questionnaire issued for the Condeixa-a-Nova survey among the commercial sector.

**Esclarecimento inicial:** O Projeto LIFE PAYT, do qual faz parte a Câmara Municipal de Condeixa-a-Nova, tem neste município como população alvo o setor não doméstico. Pioneiro na redução dos resíduos urbanos produzidos, o projeto pretende diminuir a produção de resíduos indiferenciados e fomentar a recolha seletiva dos materiais de embalagem. A sua opinião é muito importante e por isso gostaríamos que nos respondesse a umas perguntas simples, que demoram apenas alguns minutos.

#### **RESÍDUOS E RECICLAGEM**

1. Qual a quantidade de resíduos indiferenciados que a sua empresa produz semanalmente?						
Nº de sacos/volume /	Nº de contentores/volume		_/			
2. No seu estabelecimento, qual o cargo/fu	nção da pessoa que coloca	os resí	duos	no	cont	tentor?
3. Diga, numa escala de 1 a 5, se concorda con resíduos é uma responsabilidade social de too também responsáveis". (1 significa "discordo em absoluto")	dos e, enquanto empresa, somo	s	2	3	4	5
4. Numa escala de 1 a 5, na sua opinião, co separação de resíduos e reciclagem? ( <u>1 - nada importante e 5 - muito importante</u> )	mo classifica a importância d	a <b>1</b>	2	3	4	5
5. Que materiais recicla? (assinalar com X)	6.Relativamente aos <u>resí</u> aplicável ao seu estabelec			<u>cos</u>	(case	o seja
Papel e Cartão	6.1. Valoriza os bioresíduos	5	Si	m		Não
Vidro	produzidos no estabelecimento?					
Plástico e Metal	<b>6.2.</b> Se sim:				•	~
Resíduos orgânicos e resíduos verdes	– Quais resíduos valoriza?	Que tip	o de	valo	oriza	çao?
Equipamento elétrico e eletrónico	() Restos alimentares	( ) Cor	npos	stage	em	



Pilhas	( ) Óleos alimentares	( ) Restos alimentares p/ ahimai
Óleos alimentares usados	( ) Borras de café	( ) Outros
Outros	( ) Outros	
Não faço qualquer reciclagem		
7. Por semana, quanto tempo gasta na gestão do (do momento em que foram produzidos até que foram colo		oras )

# SISTEMA DE GESTÃO DE RESÍDUOS

8. Considera que o sistema de recolha de resíduos funciona bem?	Sim	Não
9. Há alguma coisa que gostasse de ver melhorada no sistema atual de recolha de resíd	luos?	

### TARIFA

<b>10.</b> Sabe que existe uma tarifa municipal destinada a cobrir os custos resíduos?	Sim	Não		
10.1. Sabe quanto paga mensalmente pelos resíduos que produz?	Sim	Não	Quanto?	(€/mês)
<b>10.2.</b> Considera que a tarifa que paga atualmente é justa?	Sem opinião			
11. Sabe que essa tarifa depende da quantidade de água consumida	Sim	Não		
12. Preferia pagar a tarifa em função da quantidade de resíduos que	Sim	Não		
<b>12.1.</b> Se respondeu não, explique porquê				
13. Sabia que não paga os resíduos recicláveis que coloca no ecopon	Sim	Não		
14. É de opinião que as empresas que fazem separação dos resíduos beneficiadas?	Sim	Não		

# PROJETO LIFE PAYT

<b>15.</b> Alguma vez ouviu falar no Projeto LIFE PAYT de Condeixa-a-Nova?					Não	
15.1. Se sim, por que meio?	Jornal	Site (CM /	Redes Sociais	Panfleto/ Cartaz		

Socioeconomic baseline on waste for the non-domestic waste sector in Condeixa-a-Nova, Portugal

	LIFE	(Faceb	
	PAYT)	ook)	
Outro: gual?			

Para terminar, gostaríamos que nos indicasse alguns dados referentes à sua empresa, para análise sociológica do estudo. Pedimos ainda que nos forneça um contacto telefónico para o caso deste inquérito ser escolhido aleatoriamente para controlo de qualidade e ser validada a sua participação neste estudo.

A. Tipo de atividade do setor não doméstico (assinalar com X)					
Hotelaria	Restauração e similares	Comércio	Indústria		
Serviços	IPSS/adm. central e local	Saúde	Agrícola/ Pecuária		
Outra, qual?					

B. Número de anos de funcionamento:	C. Número de
trabalhadores:	

Nome da empresa:					
Inquirido:	(	) Proprietário do estabelecimente	0	(	) Funcionário
do estabelecimento					
Nome do inquirido:					
Nome do proprietário	<b>D</b> :				
e-mail do proprietário	0:				
Morada:			Contacto (ob	riga	atório):
Freguesia:					



AGRADECIMENTO:	MUITO	OBRIGADO(A)	PELA	SUA Hora de fim:
COLABORAÇÃO!				

O projeto LIFE PAYT cumpre integralmente o	Assinatura:
Regulamento Geral de Proteção de Dados (RGPD Lei nº	
26/2016, de 22 de agosto) no que concerne à recolha e	
manutenção dos dados. Os dados recolhidos destinam-se	
exclusivamente para análise estatística no âmbito do Projeto	
LIFE PAYT. Autorizo a utilização dos dados nos termos	
expostos anteriormente.	



# Tool to reduce waste in South Europe Co-funded by the LIFE programme of the European Union

LIFE15 ENV/PT/000609

