



360.come

An integrated initiative to reduce food waste in urban and school environments

Carlos A. Ribeiro

Diretor Executivo | Laboratório da Paisagem

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29 setembro 2025

Laboratório da Paisagem



MUNICÍPIO DE
GUIMARÃES



REPÚBLICA
PORTUGUESA

AMBIENTE E
AÇÃO CLIMÁTICA

FUNDO AMBIENTAL



LANDSCAPE LABORATORY

AREAS



RESEARCHERS/
TECHNICIANS

dedicated team

1.2 M

budget (2024)



FINANCE AND POLICY
(NEW)



BIODIVERSITY



WATER RESOURCES



GREEN AREAS
AND SOIL



CLIMATE



HEALTH AND
WELL-BEING



CIRCULAR ECONOMY



EDUCATION FOR
SUSTAINABILITY

Context

- In Guimarães, 2018 data showed that food accounts for around **30% of the municipality's ecological footprint**.
- **Childhood obesity** is a growing concern, with data from the Portuguese Association Against Childhood Obesity (APCOI, 2018) indicating a high prevalence among children aged 2 to 10 years.
- Great potential for **local food production** - **still underused**.
- 360.come designed to **educate, empower, engage, transform**.

GLOBAL GOALS



Promote
healthy eating



Reduce food
waste



Stimulate local
consumption



Foster circular
economy



Enhance soil
and territory

**MUNICIPAL
ECOLOGICAL
FOOTPRINT**



2.28 Planets

**INDIVIDUAL
ECOLOGICAL
FOOTPRINT**



3.18 Planets



3D APPROACH



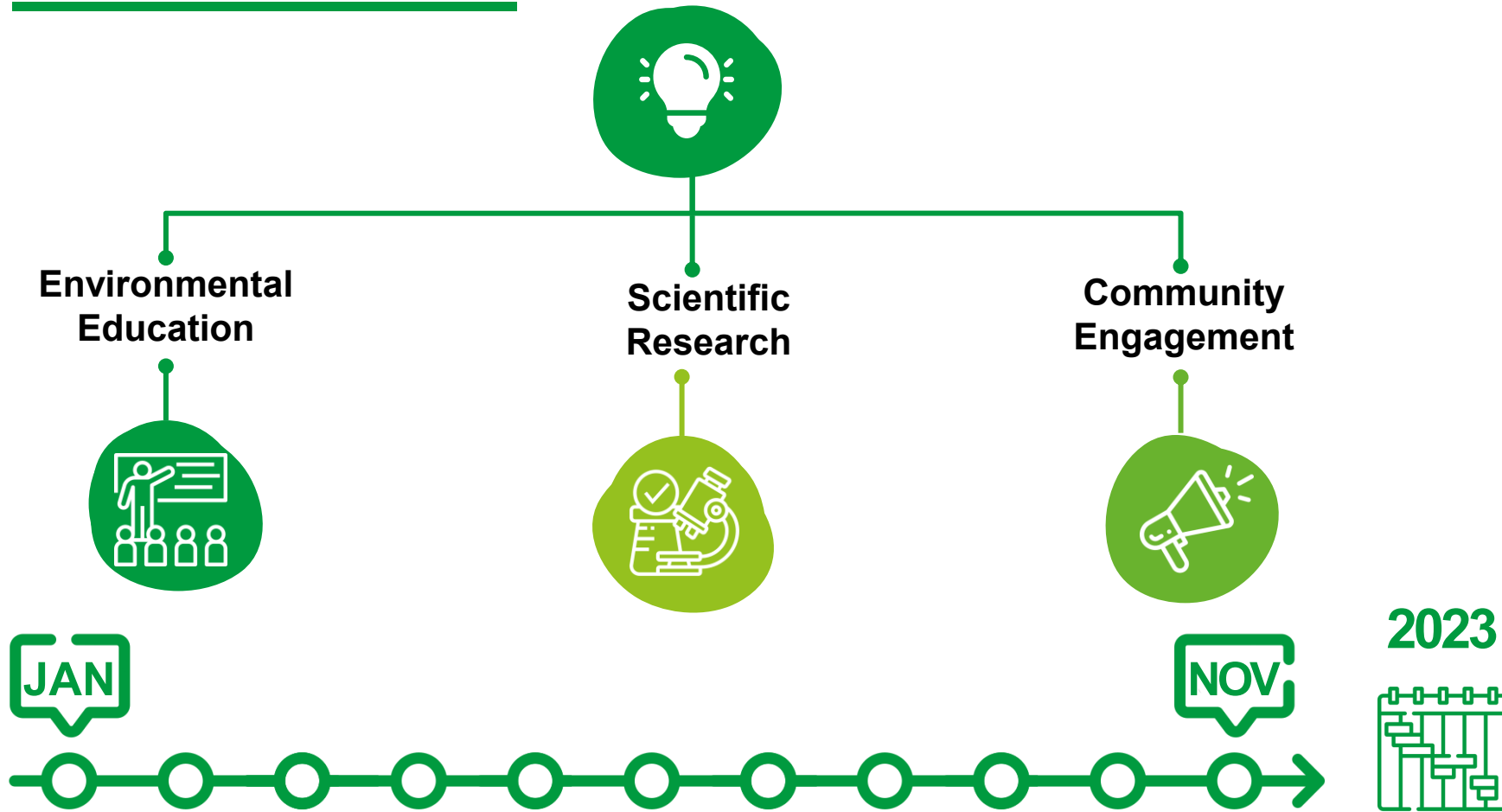
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graph TD; A[3D APPROACH] --> B[CREATING IDENTITY]; B --> C[TRANSFORMING THE LANDSCAPE]; C --> D[BUILDING THE FUTURE];
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CREATING IDENTITY

TRANSFORMING THE LANDSCAPE

BUILDING THE FUTURE

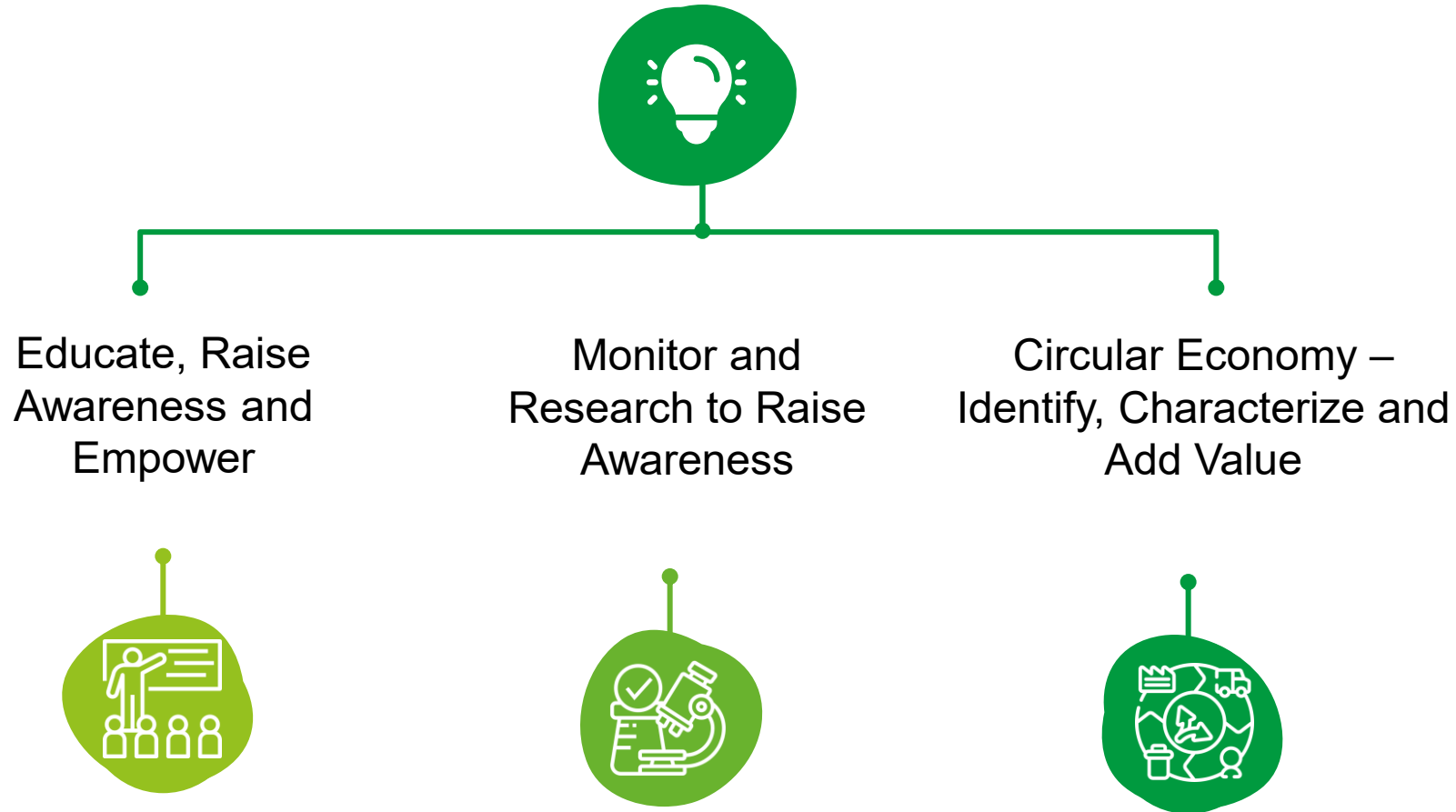
Pillars for transformation



No literacy, no action. No science, no trust. No community, no future.



Key measures

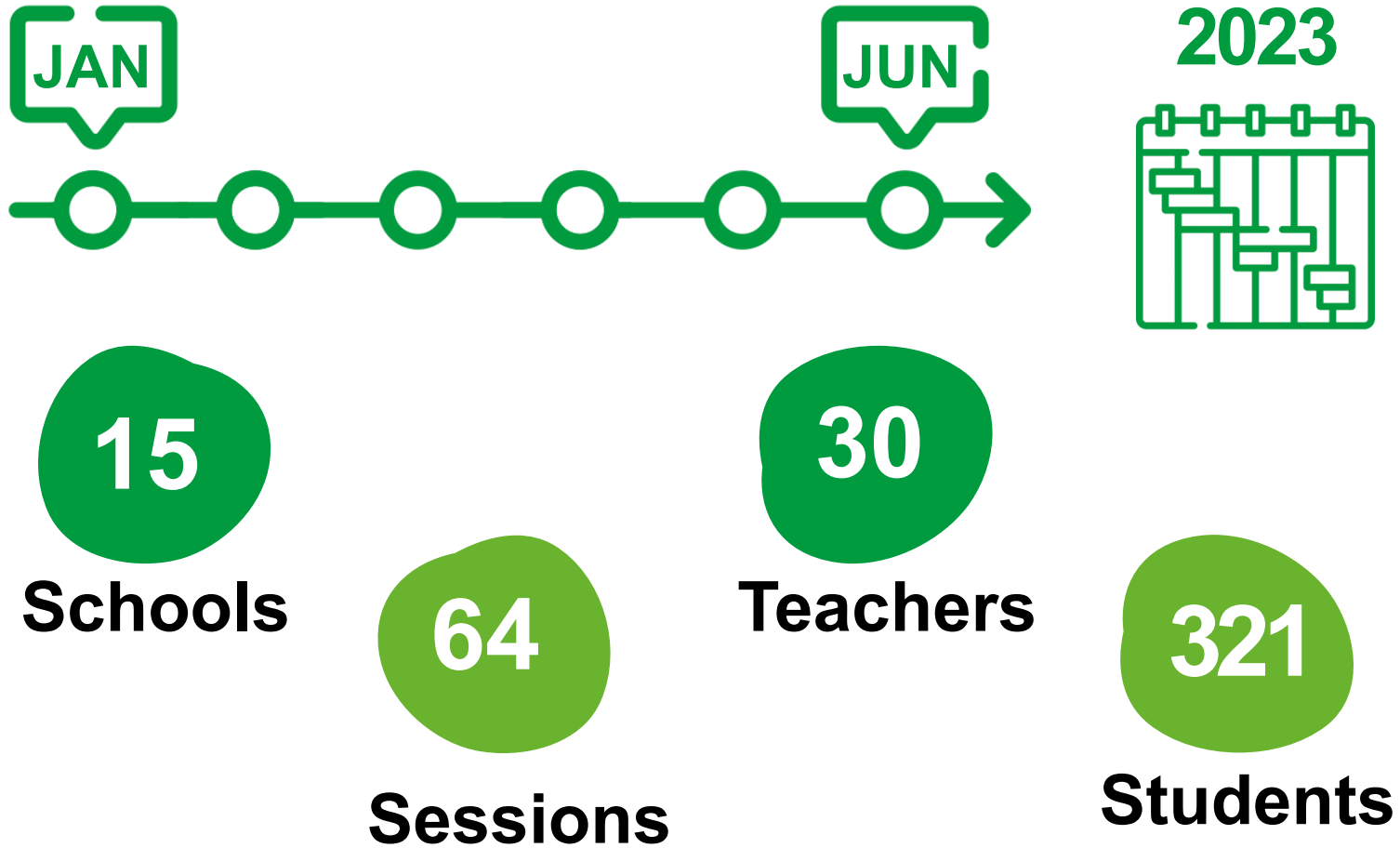




Educate, Raise Awareness and Empower

- Empowering to transform.
- Young people as agentes of change.

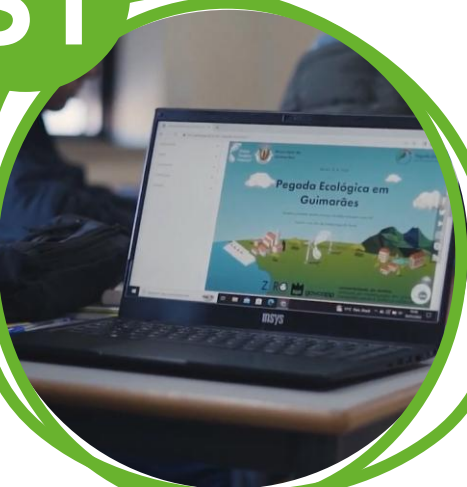
Actions within the school community



Sessions

Each class took part in **5 themed sessions**:

S1



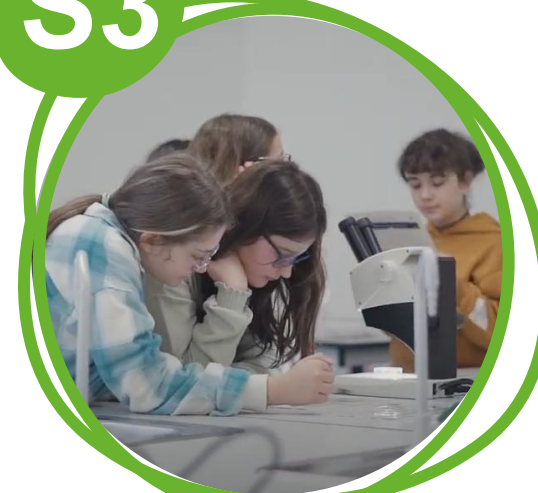
Ecological footprint

S2



Healthy eating

S3



Soil health

S4



Circular economy and
microgreens
cultivation

Growing kits

- 100% Recycled kits.
- Food growing as a fun, hands-on learning tool.

400
KITS
DELIVERED

Study on textile waste in household garbage in Guimarães.

Waste Disposal & Sustainable Energy
<https://doi.org/10.1007/s42768-023-00137-3>

ARTICLE



Study on textile waste generation in the undifferentiated municipal solid waste stream in Guimarães, Portugal

Alona Perebynos¹  · Dalila Sepúlveda² · Carlos Ribeiro¹

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Abstract

Guimarães is a middle sized city and municipality located in northern Portugal. The municipality has committed to reducing the annual amount of undifferentiated municipal solid waste (MSW) from 371 kg/capita in 2021 to 120 kg/capita by 2030 under the Zero Waste Cities Certification process. In the municipality of Guimarães, one of the constant fractions of MSW composition is textile waste (TW), which the revised EU Waste Framework Directive requires separate collection by 1 January 2025. Therefore, two indicators of TW generation were analysed to identify waste collection routes with a high level of textile waste generation for the priority implementation of separate collection: TW composition in the undifferentiated MSW stream and TW generation per capita. Basic statistical analysis methods were used to process the source data of TW composition in the undifferentiated MSW stream. Cluster analysis was applied to the data set on TW generation per capita, considering the area typology (urban, rural or mixed) of collection routes. It was considered that 39% of the industrial sector of Guimarães consists of textile and clothing production and represents small- and medium-sized enterprises, which can affect TW generation in the undifferentiated MSW stream. Causal-comparative research was used to define the correlation between TW generation per capita and the economic activity of the textile and clothing industry in the municipality. As a result, applying a multi-disciplinary approach, a project of the Textile Waste Generation Map was presented.

Keywords Textile waste · Municipal solid waste · Waste generation indicators · Waste management · Circular economy

S5

- Showcooking: Students + Chefs = unforgettable experience.
- Cooking with leftovers and homegrown greens.
- Recipes for the whole community.

Chef António Loureiro



Chef Tiago Silva



Chef Dinis Mendes e
Chef Liliana Duarte



12
EASY
RECIPES

360.come recipe e-book and vídeos.



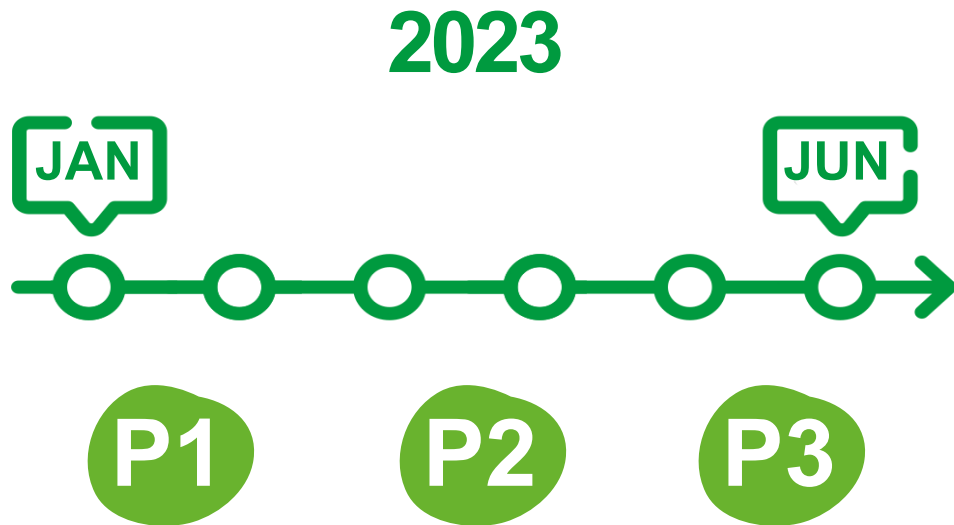
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LIVRO DE RECEITAS 360.COME

RECEITAS DE CHEFS
COM MICROVEGETAIS



Measure to make a difference



- **Monitored plate waste** from students in canteens at 3 different weeks.

- A significant and steady reduction in food waste in school cafeterias - **Awareness leads to change.**

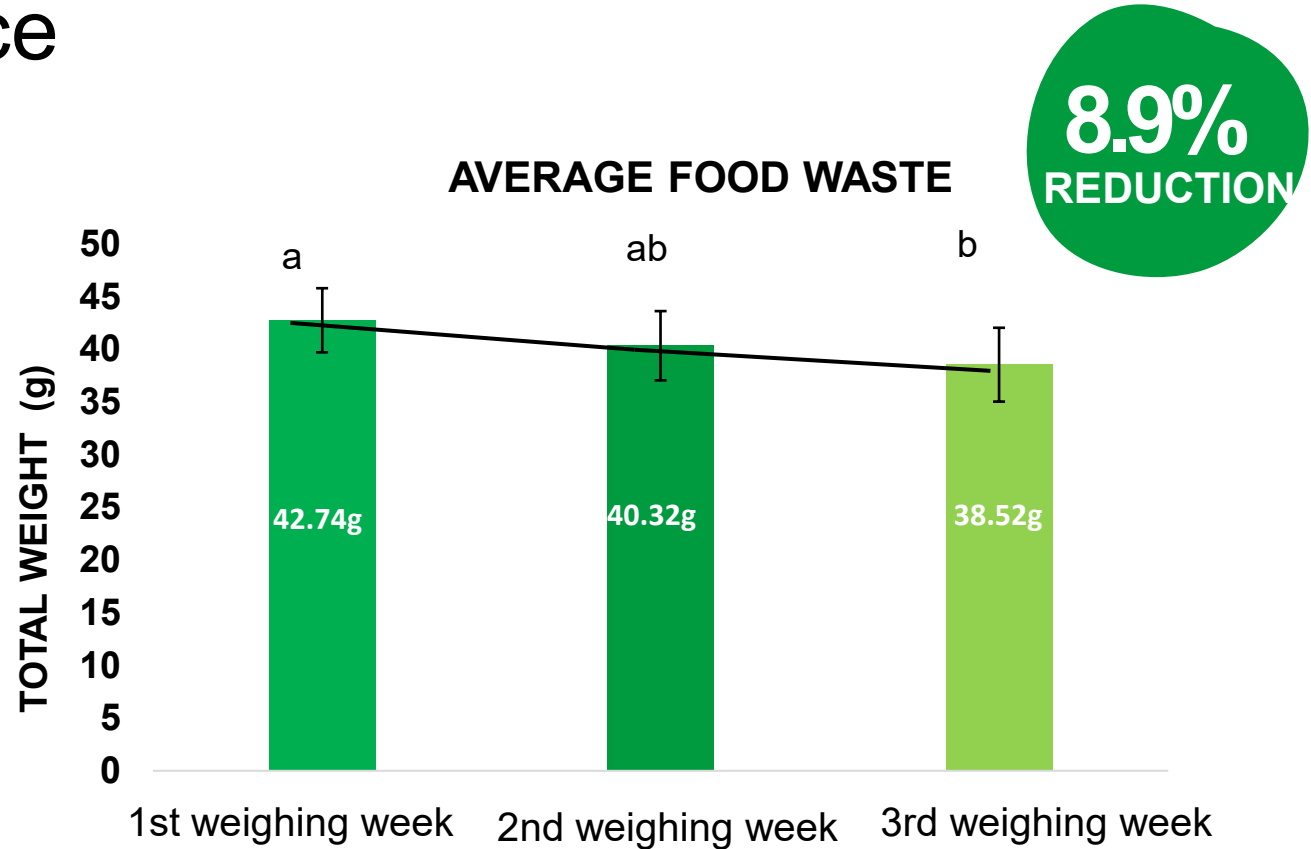


Figure 1. Average food waste per student per meal across the three weighing periods, with standard error bars. Statistically significant differences were observed between the 1st and 3rd weighing periods ($p < 0.05$).

More knowledge, more action



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Nome da escola: _____ N.º _____ Ano de escolaridade: _____

1. No final das refeições costumo deixar restos de comida no prato ou no tabuleiro.

Nunca	Raramente	Frequentemente	Sempre	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Em Guimarães, a área com maior impacto no ambiente é a produção e consumo alimentar.

Discordo totalmente	Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. A nível mundial, um em cada três alimentos é desperdiçado (vai para o lixo).

Discordo totalmente	Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Fazer compostagem é uma boa forma de reaproveitar os restos alimentares.

Discordo totalmente	Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. A compra de produtos alimentares locais e sazonais (da época) apresenta benefícios económicos e ambientais.

Discordo totalmente	Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Em casa, os excedentes das refeições vão para:

Alimentar os animais	O lixo	A Compostagem	Confeccionar novas receitas	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1

360.come

biológicos apresenta benefícios para a nossa saúde e para o ambiente.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

O peixe é saudável e sustentável.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

As proteínas de origem animal são as leguminosas e o grão-de-bico.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

O consumo de produtos de origem vegetal é considerado saudável e sustentável por ser mais sustentável do que os produtos de origem animal.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Os produtos locais melhoram a qualidade dos solos.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A diversidade de seres vivos é importante para a sustentabilidade da agricultura.

Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Os produtos locais não têm bactérias nem fungos.

Discordo totalmente	Discordo mais ou menos	Concordo mais ou menos	Concordo totalmente	Não sei
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2

- **Before-and-after questionnaires:**

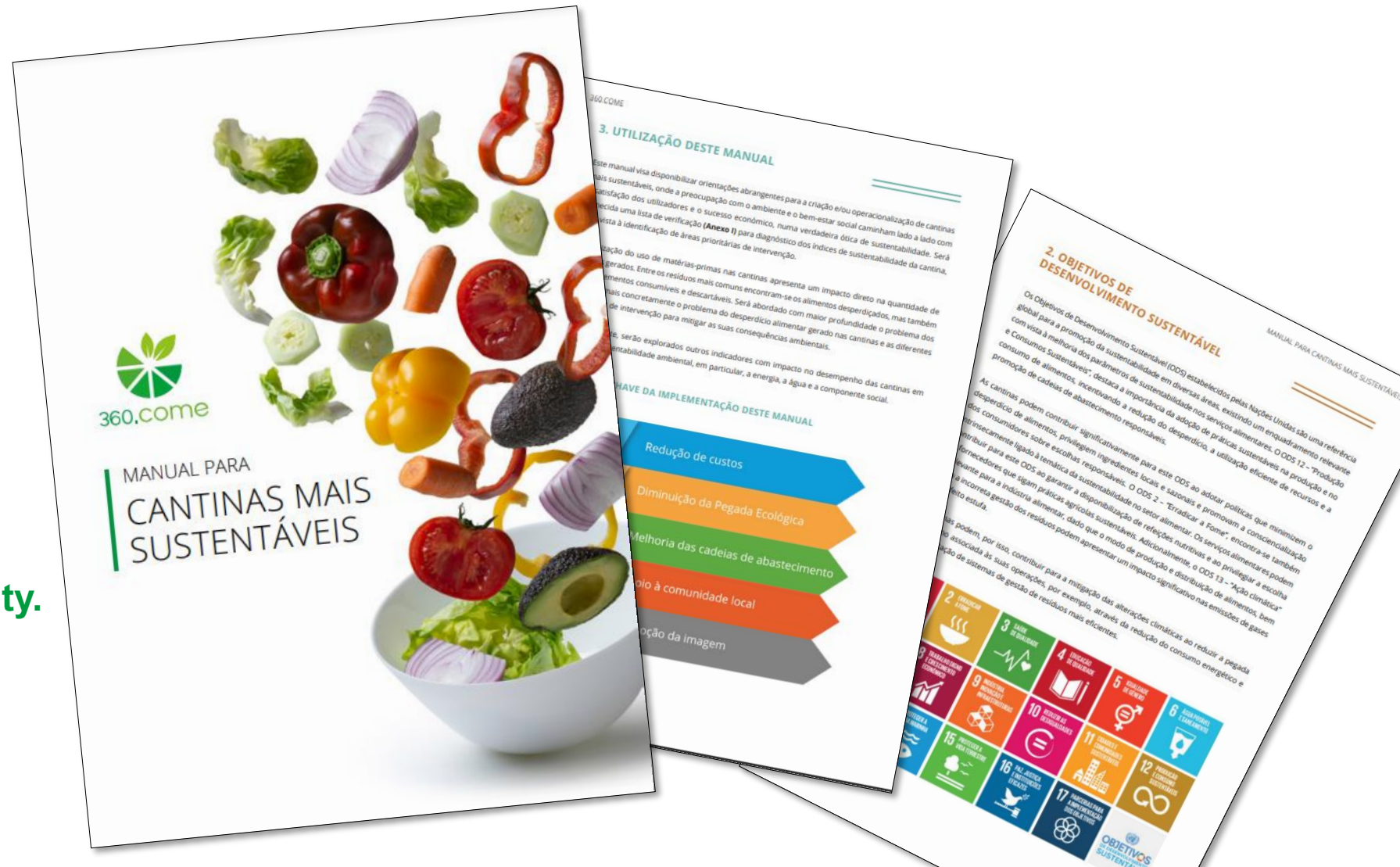
- Increased knowledge on healthy food, soil, and circular economy.
- Greater sense of responsibility.
- More sustainable actions in their daily lives.

Education works. Education transforms.

Tools for continuity

- **Digital manual for school cafeterias** (reduce food waste, manage resources better, make meals more sustainable).

Less waste, more sustainability.



Tools for continuity

- **Certified training course for teachers.**
- Each teacher received a **digital toolkit.**



26
TEACHERS



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SUSTENTABILIDADE E ECONOMIA CIRCULAR NO SETOR ALIMENTAR
CAPACITAÇÃO PARA A APLICAÇÃO DA METODOLOGIA

Opening to the community

- Public cooking shows, pedagogical games, public showcooking, talks with entrepreneurs, open workshops on circular economy and food, etc.
- Spring Festival (23-25 March 2023), Green Week Guimarães (15-17 June 2023), European Week for Waste Reduction (18-26 November 2023).



Eating well is an act of caring for the planet.





Monitor to Raise Awareness

Na medida 2, monitorizar para consciencializar,

Food safety in urban community gardens

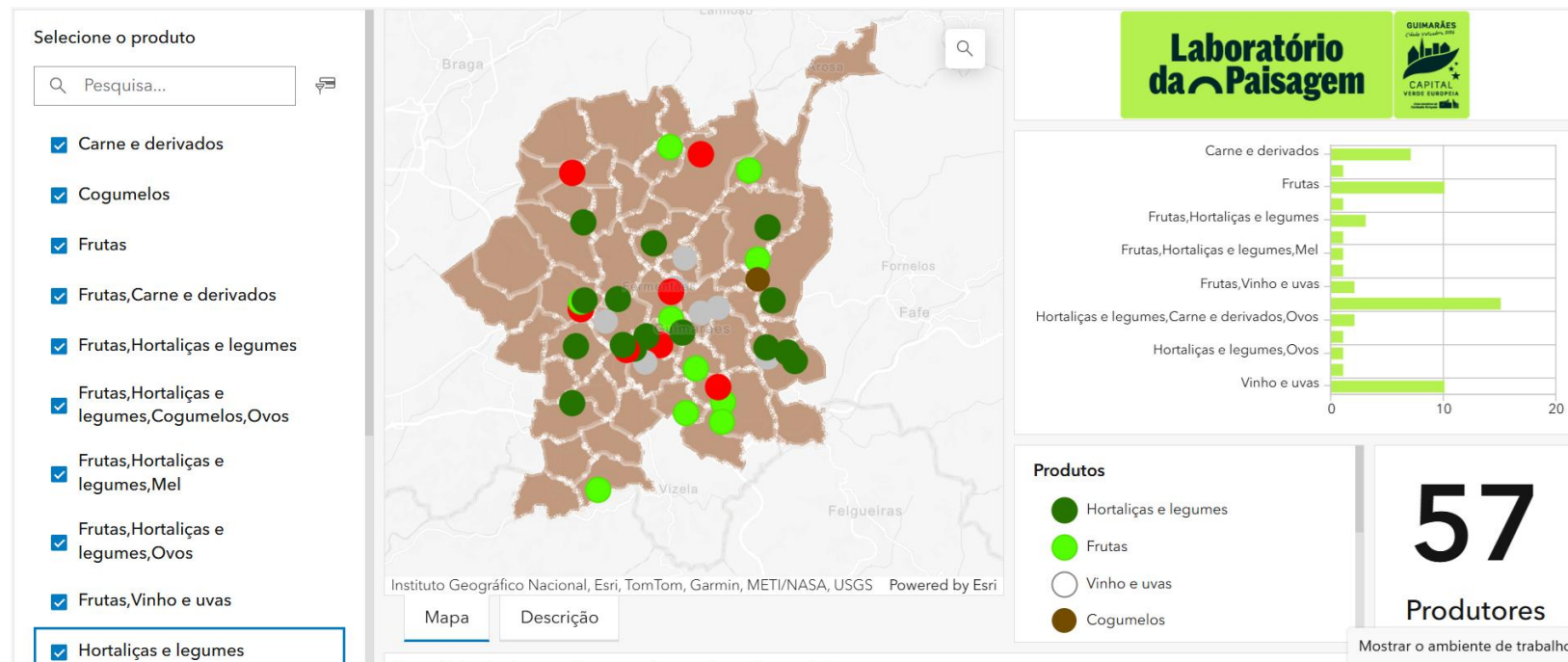
- Samples of soil and food (lettuce and cabbage) were collected in 20 different plots of the UCG.
- Various compounds were analysed. All pesticide levels were below legal limits.

	Compostos
OPP	Dimethoate
	Chlorpyrifos- methyl/Parathion-methyl
	Malathion
	Chlorpyrifos
	Chlorfenviphos
OPE	Tri-iso-butyl phosphate (TiBP)
	Tri(n-butyl) phosphate (TnBP)
	Tris(2-chloroethyl) phosphate (TCEP)
	Triphenyl phosphate (TPhP)
	Tris (2-butoxyethyl) phosphate (TBEP)
	Tris(2-ethylhexyl) phosphate (TEHP)
	Tri- cresyl phosphate 1 (TCP1)
	Tri- cresyl phosphate 2 (TCP1)
	Tri- cresyl phosphate 3 (TCP1)



Supporting local consumption

- **Mapped local producers and products** and created a database.
- Promotion of local products and sustainable choices.



+50 producers

+100 products

Good farming practices manual

- **E-book with local good farming practices**, in collaboration with local farmers.
- Helping farmers protect soil and nature.





Partnerships and alignment

- **Partnerships:** Municipality of Guimarães, CIIMAR – Interdisciplinary Centre of Marine and Environmental Research, University of Porto; CFE – Centre for Functional Ecology, University of Coimbra; Chefs; company ArtIn; producers.
- **Integration into local policies:** Action Plan for the Circular Economy (APCE), the Circular Economy Strategy of Guimarães (RRRCICLO).
- **Replicable model** for other cities.



**11,000 Ecoboxes
distributed**





LABORATÓRIO
DA PASAGEM
Guimarães

**MUNICIPAL
ECOLOGICAL
FOOTPRINT**



2.28 Planets

**INDIVIDUAL
ECOLOGICAL
FOOTPRINT**



3.18 Planets



A ONE PLANET CITY







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GUIMARÃES



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