



THIRD WORLD SYMPOSIUM  
ON SUSTAINABILITY  
SCIENCE AND RESEARCH

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Sustainability Futures: Challenges  
and Opportunities Towards a More  
Sustainable World

April 8

# Waste generation and management at the University of A Coruña

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## OBJECTIVES OF THE PAPER

Recent evolution of waste management at UDC

- Laboratory hazardous waste managed by authorized company since 2000
- Attention to municipal -like waste management after 2010
- Starting the decentralized composting program in 2011 for organic canteen waste
- First waste management plan drawn up in 2013, aiming to improve the separate collection
- After 2017, separate collection of biowaste at general areas of centers

## APPROACH USED

Revision and validation of **available information**, gathered from:

- Containerization and collection frequencies by the municipal waste service
- Information from authorized waste managers for different waste streams
- Information from the on-site biowaste composting program
- Data from inspection of collection systems, waste composition and generated amounts carried out by scholarship students at source

# KEY RESULTS

Waste streams with the **municipal service** as final agent:

Type of waste		Agent	Waste origin and management
Paper/cardboard	PC	CS, Center	Academic and administrative activity + cardboard packaging. Cleaning service (CS) intervention Separate collection (SC) in inside/outside center containers
Organic fraction of municipal waste (biowaste, food waste)	OFMW	CRS	Cafeteria and restaurant services (CRS) + dispersed generation in centers. SC for composting in situ or at municipal plant
Glass	G	SCR	Cafeteria and restaurant services (CRS) SC in outside center containers
Lightweight packaging & similar (LP&S) + Other waste (OW)	NOFMW	CS,SCR	Cafeteria and restaurants, vending services, dispersed generation SC as dry or Non-organic Fraction MW (NOFMW)
Batteries	B	Center	Academic activity + domestic origin

## KEY RESULTS

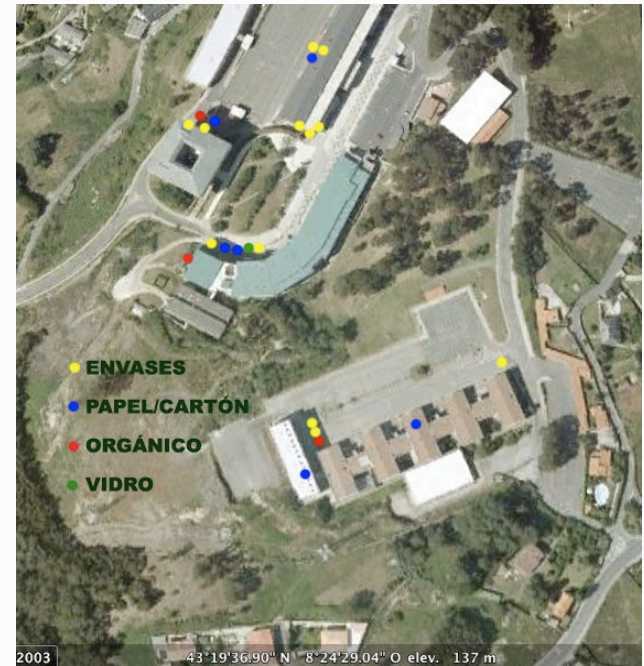
Waste streams with authorized waste managers (AM 1-AM 6) as final agent :

Construction and demolition waste	CDW	Center → AM1	Academic activity in specific centers Not included RCD from new constructions or refurbishment.
Cooking oil waste	COW	CSR, Center → AM2	Cafeteria and restaurant services + domestic origin (SC at UDC clean points)
Waste from electrical and electronic equipment	WEEE	Center → AM3	Academic activity SC in UDC centers (defined areas)
Printing waste (used toner and cartridges)	PW	Center → AM4	Academic activity SC at UDC clean points
Hazardous waste	HW	Center → AM5	Teaching and research in labs (chem ...) SC at laboratory level
Green and gardening waste	GW	AM6	Pruning waste on campus Excluded other service waste

# KEY RESULTS

Collection containers at main campus (collection frequency) :

PC: blue (once full), G: green (once full), red : OFMW (daily ), yellow : NOFMW



## KEY RESULTS

Total waste generation at UDC **main Campus** (70% of UDC community)

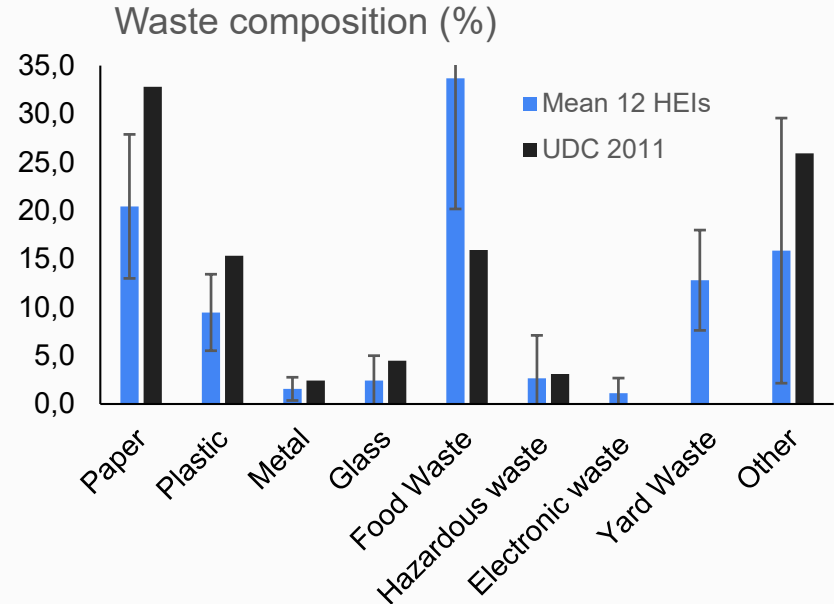
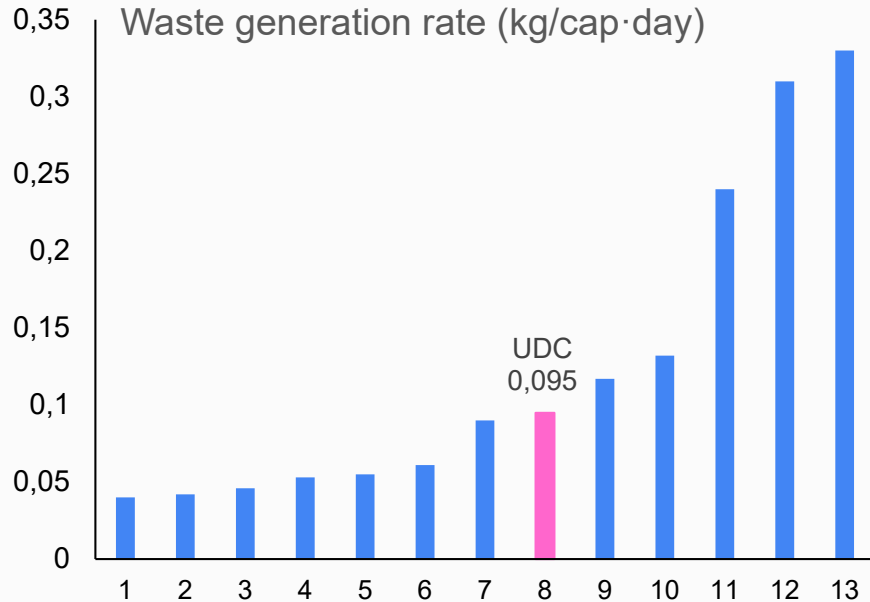
MMW: Mixed municipal waste (i.e. low quality content of OFMW and NOFMW containers)

Year 2011 (t: tonnes)	MMW (t)	SC (t)	Total (t)	Fraction (%)	SC (%)
PC	79.1	44.5	123.58	32.9	36.0
CDW	0.0	66.0	66.00	17.6	100.0
OFMW	48.2	10.6	58.77	15.7	18.0
COW	0.0	2.32	2.32	0.6	100.0
B	0.0	0.43	0.43	0.1	100.0
RAEE	0.0	0.34	0.34	0.1	100.0
PW	0.0	0.83	0.83	0.2	100.0
LP&S	75.5	0.00	75.47	20.1	0.0
G	3.6	13.23	16.83	4.5	78.6
HW	0.0	11.70	11.70	3.1	100.0
OW	19.1	0.00	19.15	5.1	0.0
<b>Total</b>	<b>225.5</b>	<b>149.9</b>	<b>375.4</b>	<b>100</b>	<b>39.9</b>
CSW & HW excluded	225.5	72.2	297.7	79.3	24.3

# KEY RESULTS

Per capita waste generation rate and waste composition at UDC

Comparison with data from 2008 -2019 for 12 higher education institutions (HEIs)

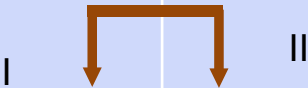













# KEY RESULTS

UDC management plan (2013). Main aims :

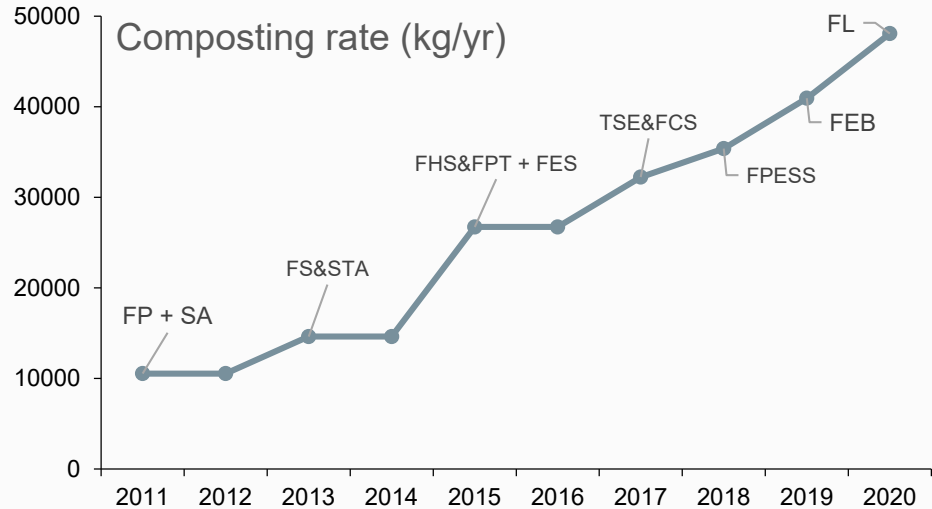
- a) to expand the on-site composting of OFMW from canteen services,
- b) to improve the separate collection of waste streams in the centers .

Stream	OFMW		G	PC		NOFMW (LP & OW)
Option						
Model						
Destiny	Compost-biogas (Nostián MBT municipal plant)	On site composting (UDC campus)	Recycling (municipal service)	Recycling (municipal service)	Recycling (municipal service / NGO)	Nostián MBT municipal plant

# KEY RESULTS

Evolution of on-site composting of organic waste from canteen services (OWC):

-Aprox . 48 t OWC /year (2020 before COVID, ≈70% of all OWC) at 9 composting sites (10 out of 13 canteen with service)



Centre acronyms: FP: Faculty of Philology. SA: School of Architecture. FS: Faculty of Science. STA: School of Technical Architecture. FHS: Faculty of Health Science. FPT: Faculty of Physiotherapy. FES: Faculty of Education Sciences. TSE: Technical School of Engineering. FCS: Faculty of Computer Science. FEB: Faculty of Economy and Business. LL: Faculty of Law. FPES: Faculty of Physical Education and Sport Sciences

## KEY RESULTS

2015: improvement of **PC collection** in the first Green Campus centers using the model of the Faculty of Sociology (A)

- PC reduction in MMW (n=4): from 29.7% (2014) to 11.2% (2015).



2017: **PC-OFMW -NOFMW** model . General collection of OFMW at source (not just for canteen food waste) with models B or C. Creation of clean points for other waste streams (D)

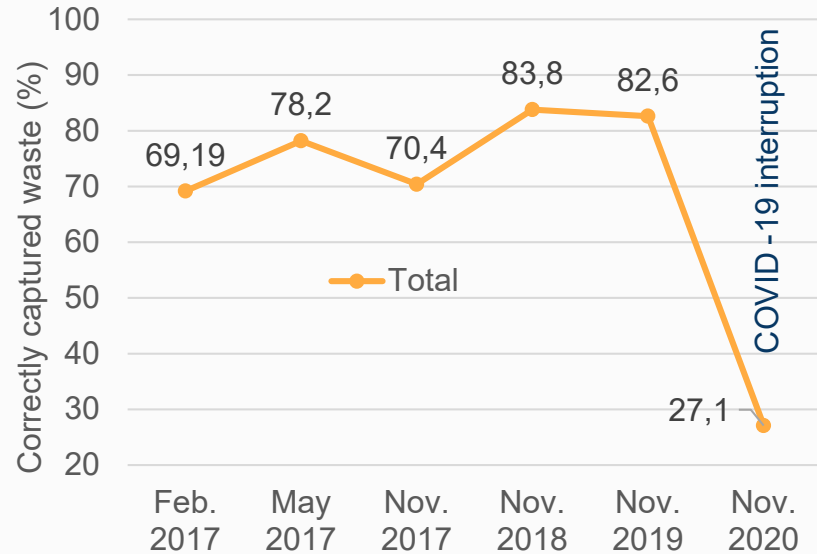
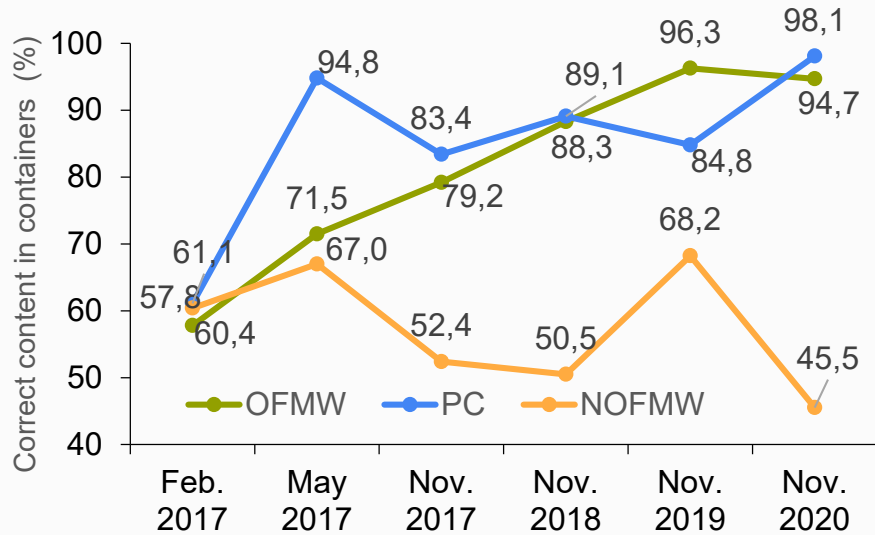


✓ Why? Progressive increase of organic waste in the cleaning service waste stream : 9,0% (2011, overall central campus) → 14,7% (2015, n=5) → 24,4% (2019, n=4)

# KEY RESULTS

## Waste separation at source

Performance of the PC-OFMW -NOFMW model at the Faculty of Education Sciences

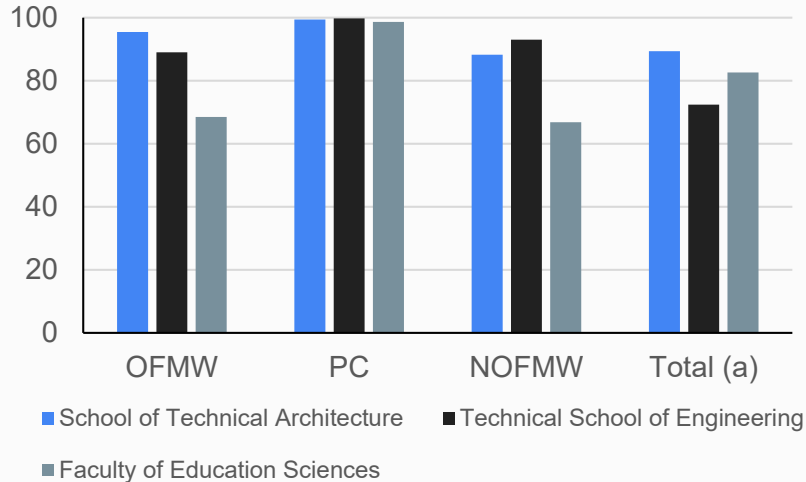


# KEY RESULTS

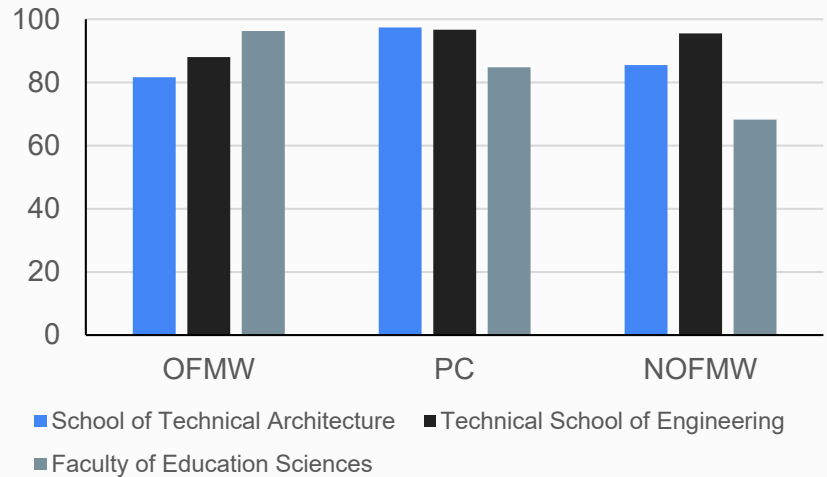
Waste separation at source

Performance of the PC-OFMW -NOFMW model at three centres

Correct content in containers (%), Nov 2019



Correctly captured waste(%), Nov 2019



## MAIN CONCLUSIONS

- For correct operation, waste management requires continuous attention
- Many agents and processes condition the generation and collection of waste : canteen staff, cleaning staff, reprographics service, gardening company, town hall, waste management companies, center staff, their current contracts and labor issues ...as well as the entire university community
- Waste generation at UDC main campus was estimated at 95 g/day per capita
- Organic waste in the cleaning service waste stream has increased in recent years, making it necessary to collect it at source in all areas of the center
- On-site composting of organic waste from canteens and general collection of the three main fractions (paper, organics and rest) allow recovery rates over 70%

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