



## Integrated Food Waste Management in Quito: A Multidimensional Approach

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# Introduction

- The Global & Regional Challenge: Food waste is a widespread problem, squandering vital resources like land, water, and energy, contributing to climate change and harming the environment.
- Food Waste & Climate Change: Reducing food waste is essential in the fight against climate change. It conserves resources and prevents harmful methane emissions from landfills.

#### **Our Focus Today:**

- **Quantify:** Measure food waste in Quito households.
- **Identify:** Analyze the factors driving this waste.
- Evaluate: Assess the impact on soil, water, and energy.
- **Explore:** Investigate technological solutions for waste reduction.
- Multidimensional Approach: Unlimited economic growth is unsustainable.
- Nexus WEF: Historical food production has been resource-intensive.







# The problem of food household foodwaste in Quito

## **Key Findings**



Food Category	Rice (kg)	Pasta (kg)	Potato (kg)	Vegs. (kg)	Bread (kg)	Fruits (kg)	Meat (kg)	Fish (kg)	Milk (kg)	Total (kg)
Total weekly waste	12.33	8.6	18.44	30.83	15.59	40.9	19.4	16.32	39.11	201.51
Proportion (%)	6%	4%	9%	15%	8%	20%	10%	8%	19%	100%
Waste reports	346	221	282	392	306	398	176	159	225	
Average waste (kg/person)	0.04	0.04	0.07	0.08	0.05	0.1	0.11	0.1	0.17	
Total annual waste	641	447	959 1.60		810	2.127 1.009		848	2.034	10.479
Median	33.75	10.25	25.5	75	9.85	50	63	63	68	





## The problem of food household foodwaste in Quito

## **Key Findings**

**Environmental Pressures:** Food waste carries a significant environmental burden. In 2020, discarded potatoes and rice in Quito had the following impacts:

**Energy:** Potato: 1 403.42 MJ/ton & 204,673.95 MJ/hour Rice: 2 320.84 MJ/ton & 288,798.98 MJ/hour

Water: Potato: 4,207,589.80 m<sup>3</sup>/ton Rice: 4,873,017.06 m<sup>3</sup>/ton

Land: Potato: 499.64 hectares 313.98 hectares Rice:





## Factors Contributing to Food Waste in Quito

### **Bullet Points:**

- Socioeconomic: Higher income and spending on food are linked to increased waste.
- Behavioral: Lack of planning, improper storage, large portions, and low awareness contribute significantly.
- Technological: Limited access to technologies like smart refrigerators and food-sharing apps can hinder waste reduction. • Other: Perception of food quality and promotions can also lead to
- waste.



Food waste in Quito is a complex issue driven by a combination of these factors.





# A comprehensive look at the factors contributing to food waste in Quito

https://rpubs.com/xgoodyear/foodwaste



Apertura capacitación almacenamiento alimento

Apertura capacitación preparación alimentos





Apertura capacitación almacenamiento alimentos

Conocimiento productos tecnológicos advertencia

nmiento refrigeradores inteligentes Conocimiento banco de alimentos

Desperdicio compra promociones

Desperdicio compra alimentos baratos

## Food waste management initiatives in Quito at the household level









### **Composting Programs:**

- Community and home composting programs reduce organic waste in landfills.
- Generate organic fertilizer for gardens and urban gardens.

#### **Urban Gardens:**

- Encourage fresh food consumption and reduce food waste.
- "Huertos Urbanos Quito" provides support to households (seeds, tools, training).

#### **Food Banks:**

• Collect edible surplus food from households and distribute it to those in need.

### **Regulations:**

Law to Prevent and Reduce Food Loss and Waste and Mitigate Hunger among People in Situations of Food Vulnerability.



## Food waste management initiatives in Quito at the household level





# DIFERENCIA TUS RESIDUOS



## Master Plan for Comprehensive Solid Waste Management in Quito (PMGIRS):

• Promotes source separation and composting at the household level.

#### Metropolitan Ordinance No. 0222:

• Establishes responsibilities for citizens to reduce, reuse, and compost food waste.

#### "Quito a Reciclar":

• Provides free composting workshops and distributes composting guides to households.

#### **Environmental Education Program of the Municipality of Quito:**

• Offers workshops in schools and colleges about reducing food waste at home.





# Why a Multidimensional Approach is necessary?

## Unlimited economic growth is unsustainable due to the biophysical limitations of the planet:

- Entropy and Thermodynamics (the production and consumption of goods require energy and materials, and these processes generate entropy)
- Resources Finite or limited (natural resources are finite and cannot be regenerated at the same rate at which they  $\bullet$ are consumed)
- Environmental Impact (The increase in production and consumption tends to degrade the environment)  $\bullet$
- Inequality and Welfare (economic growth often benefits a few at the expense of many)  $\bullet$





Source (Georgescu-Roegen, 1971)

# Public policies with a unidimensional approach

At a global level since the green revolution in the mid-20th century, focused on increasing production.

An approach replicated at the local level (Ecuador) throughout history







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		Programs																	
	PROTECA PROMSA SITPA																		
	1984	1985	1986	1987	1988	1989	1990	1991 1	992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	2003	2004	2005	2006	2007	2008	2009	2010 2	011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Right Neoliberal Liberalism   Social democracy Populism XXI Century Socialism   Political tendencies of rulers Political tendencies of rulers											-•							
Figure 3. Agri development programmes and political tendencies of rulers.																			



Source: (Toledo et al., 2023) Rethinking Agricultural Policy in Ecuador (1960–2020): Analysis Based on the Water–Energy–Food Security Nexus







# Why a Multidimensional Approach is necessary?

## Nexus WEF, multidimensional approach useful for the application of sustainable food policies

- Determining the amount of food loss and waste is the starting point for applying a prospective and retrospective look.
- Looking back there are strong implications in terms of water, energy, land and labour hours used to produce food.
- The combination of several methodologies is possible to analyse this problem



Source: (Correa Cano et al., 2022)



Fig. 2. Conceptual structure of the WEFE modelling toolkit to assess sustainability pathways in agricultural development.

# Why a Multidimensional Approach is necessary?

## **GISAT research initiative**

- Finally, from the GISAT research initiative (Integrated Management of Food Systems and their Transitions) we have been developing different projects (2024-2026):
- Food System Management in Metropolitan Quito: Addressing Food Loss and Waste to Achieve the SDGs • 1.
- Sustainable Urban Agriculture in Quito: A Nexus Approach to Water, Energy, and Food Security • 2.
- Innovation and Impact: Assessing the Quito Food Bank's Contribution to Sustainable Development Goals • 3.









# **Conclusions: How Food Waste Mitigation Can Help Tackle** the Climate Crisis

- Food waste is not just an environmental problem, but a waste of valuable natural resources.
- Reducing food waste in households requires a multi-faceted approach that addresses economic causes and the various factors involved.
- Unlimited economic growth is unsustainable. Reducing food waste promotes resource efficiency and more conscious consumption.
- By addressing food waste, we contribute to a more sustainable food system and to mitigating the climate crisis









# **Q&A** Session





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