

ISWA Working Group  
**Biological Treatment  
of Waste**



24 March 2022, Seminario de cierre Reciclo Orgánicos  
Presenter: Dr Jane Gilbert, Chair ISWA WGBTW

# Compost & Soils



# OVERVIEW



1. ISWA Soils Project
2. Biowaste & soils in Chile
3. What this may mean for Chile?

# WHY BIOWASTE?

## Sources



Green waste



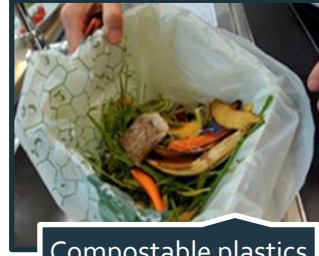
Food waste



Food waste



Green waste



Compostable plastics  
& paper



Manures

## Uncontrolled disposal/burning



Methane  
Black carbon  
Odours  
Pathogens  
Leachate

# WHY SOIL?

- Source of **95% of our food**
- Takes many thousands of years to form but can be **destroyed within decades**
- Over the last 40 years **about 30% of the world's cropland has become unproductive**, with an estimated 10 million hectares/year of agricultural land being lost through soil erosion
- **Link between organic wastes and soils largely lost over past century**



# ISWA SOILS PROJECT

**‘Quantify the Benefit of Organic Matter in Compost and Digestate When Applied to Soils’**

Started in 2018 & completed in 2020



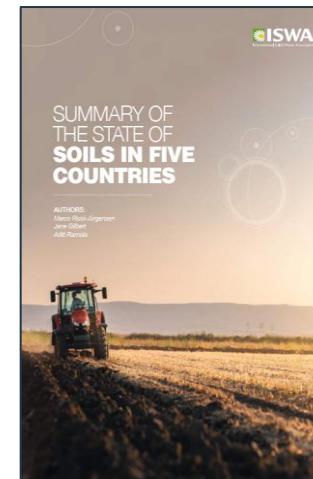
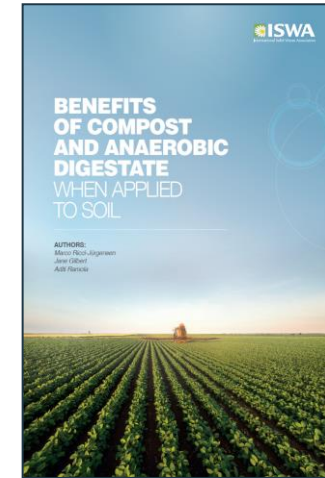
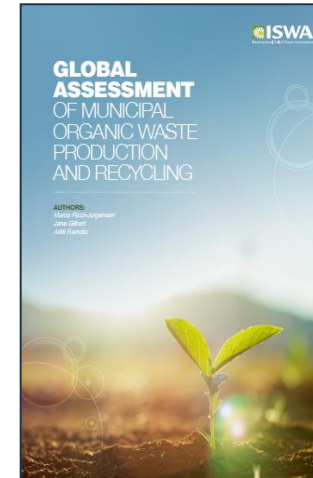
**Marco Ricci-Jürgensen**, CIC, Italy



**Jane Gilbert**, Carbon Clarity, UK



**Aditi Ramola**, ISWA, NL



# KEY MESSAGES (1)

## REPORT 1 – BIOWASTE ARISING

~ 1 Billion tonnes biowaste annually  
~ One-third not managed sustainably



MSW generation - million tpa: 2'017  
Organic waste - million tpa: 935

Compost could be used to **restore soil fertility to 31 M ha agricultural soil** (about 2% of global agricultural soil)



agricultural soils with compost - ha: 31 million  
world cultivated land area - ha 1.30 billion

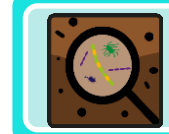
## REPORT 2 – BENEFITS OF COMPOST ON SOILS



IMPROVES SOIL AGGREGATION



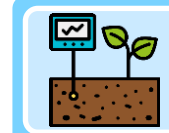
INCREASES WATER HOLDING CAPACITY



INCREASES SOIL BIODIVERSITY



IMPROVES SOIL FERTILITY



ACTS TO BUFFER SOIL & ADJUST pH

## KEY MESSAGES (2)

### REPORT 3 – STATUS OF WORLD'S SOILS

- Soils are losing organic carbon (SOC)
- Climate change and unsustainable land use practices is eroding soils
- Agricultural productivity is being reduced



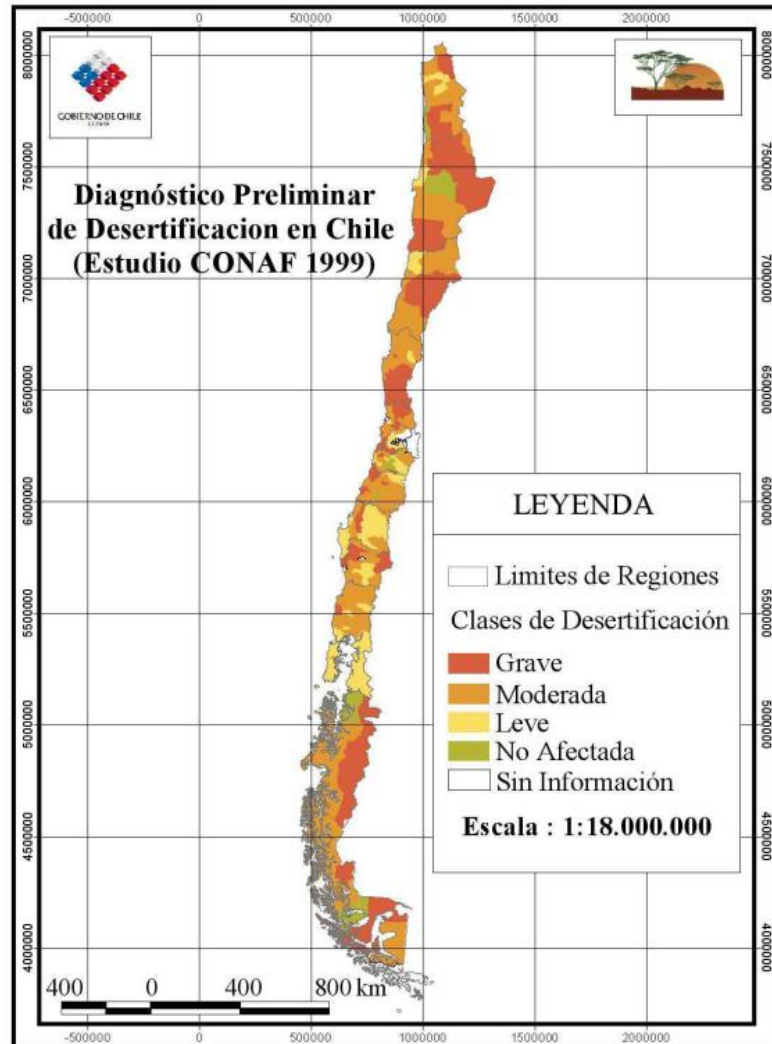
SOC levels, FAO

### REPORT 4 – BENEFITS OF COMPOST ON SOILS

- Compost can sequester C in soil
  - ~60-150 kg CO<sub>2</sub>eq/tonne compost (FM)
- Compost contains plant nutrients (NPK)

VALUE	RANGE CLP/tonne compost (FM)
C-sequestration	3,050 - 7,100
Plant nutrients	15,500 - 17,600
<b>TOTAL</b>	<b>18,550 - 24,700</b>

# BIOWASTE & SOIL IN CHILE



## WASTE

- MSW: 8.1 million tonnes per annum
- ORGANIC WASTE: 58% of MSW  
4.7 million tonnes a year

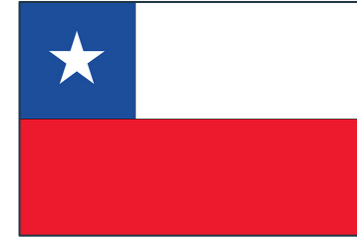
## COMPOST PRODUCTION

- Current = ??? tpa
- Potential = 2.3 million tpa

- 75% of productive land suffers from erosion
- Of this, 34% suffers from severe to very serious erosion
  - They have lost 60% - 100% of soil depth suitable for cultivation
- Resulted in a 32% reduction in agricultural productivity in less than 10 years!



# WHAT THIS MAY MEAN FOR CHILE



Agricultural surface area in use	Estimated area of degraded land	Estimated percentage of degraded agricultural land	Estimated compost to degraded soil applied at 1 t/ha/year	Equivalent amount of organic waste to recycle to manufacture compost	Organic waste potential in Chile	Fraction of the potential supply of organic waste out of potential demand	Potential value of the compost (Carbon & Nutrients)
(km <sup>2</sup> )	(km <sup>2</sup> )		(million tpa)	(million tpa)	(million tpa)		Billion CLP (CLP * 10 <sup>9</sup> )
460,000	117,300	26%	12	35	4.7	13%	43 - 57

# SUMMARY



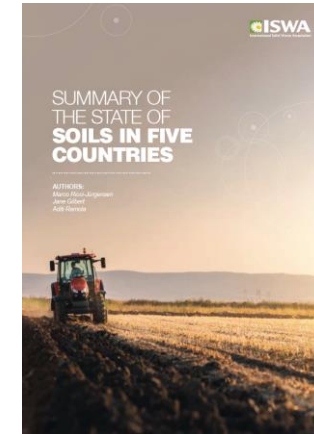
- Compost benefits soil by adding organic matter



- Chile's soils are suffering from erosion through loss of organic matter
- Threatening food security



- Value of potential compost is significant
- Demand outstrips supply



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**ISWA**  
International Solid Waste Association

**THANK YOU  
MUCHAS GRACIAS**

