



WORLD BIOGAS  
ASSOCIATION

# Global Food Waste Management: an implementation guide for cities

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# Many Thanks!



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# Who is the WBA ?



- A global association for the promotion of the biogas industry
- Founded in 2016 by 4 major national associations and 16 major biogas companies
- Currently circa 70 members
- Collaborating with international organisations to drive the policies around climate change and SDGs and investments in biogas technologies
- Food waste, sewage, agriculture, small scale too
- Easy to join and participate, not expensive !



# The report in synthesis

There is no new research in this report

- wants to be a practical guide, not an academic study
- brings together lots of previously dispersed information
- wants to give examples and experiences to help cities find their way
- understands the constraints cities are under, politically and financially
- provides advice on various technologies and not just AD
- offers help and to bring cities together to support each other



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1. Sources and Impact of food waste
2. Food waste prevention
3. Food waste collection
4. Food waste treatment technologies
5. Anaerobic digestion
6. Products of anaerobic digestion
7. Policy recommendations, barriers and implementation



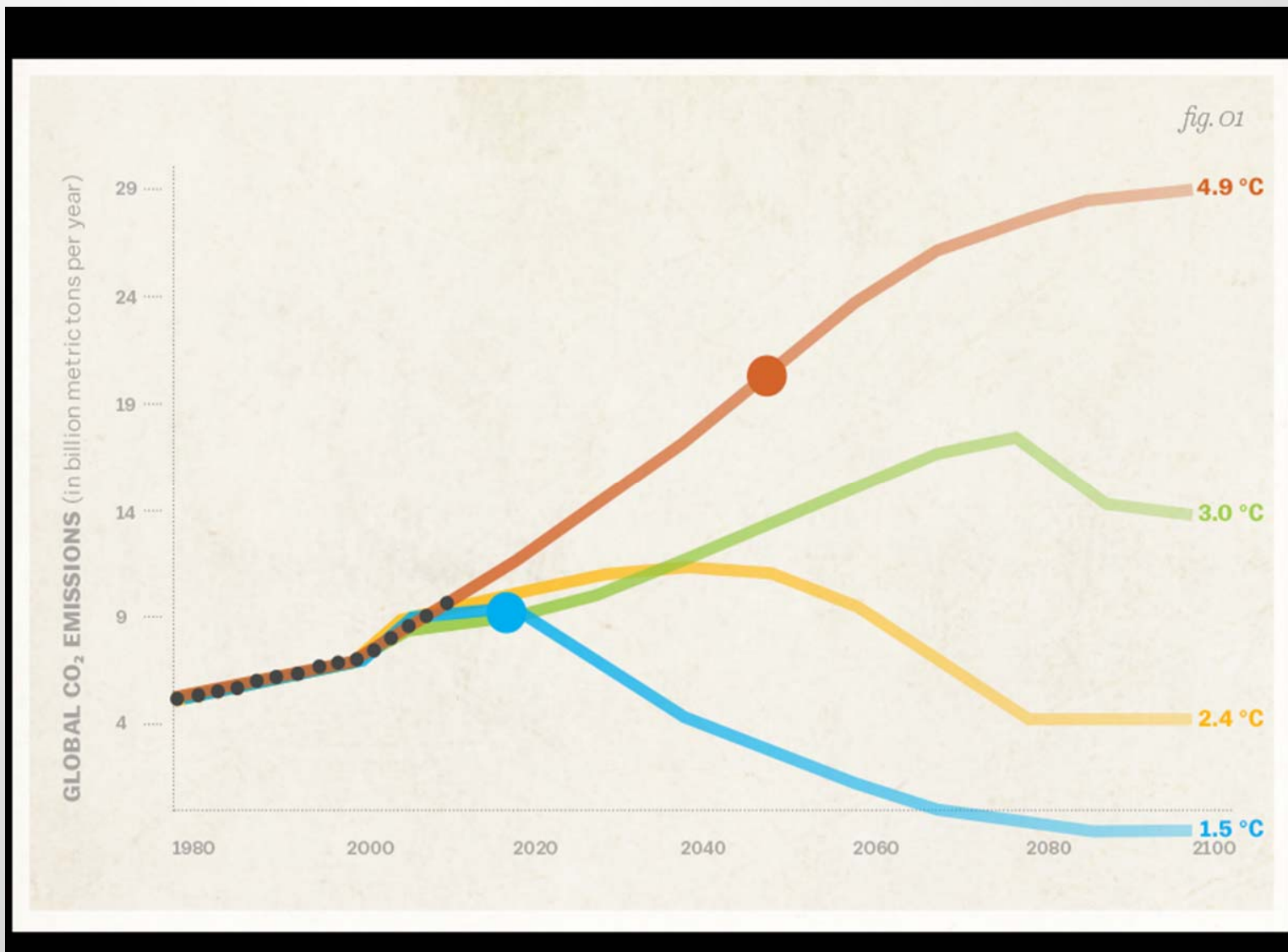
# Chapter 1: Sources and Impact of Food Waste



# Why is food waste a problem?

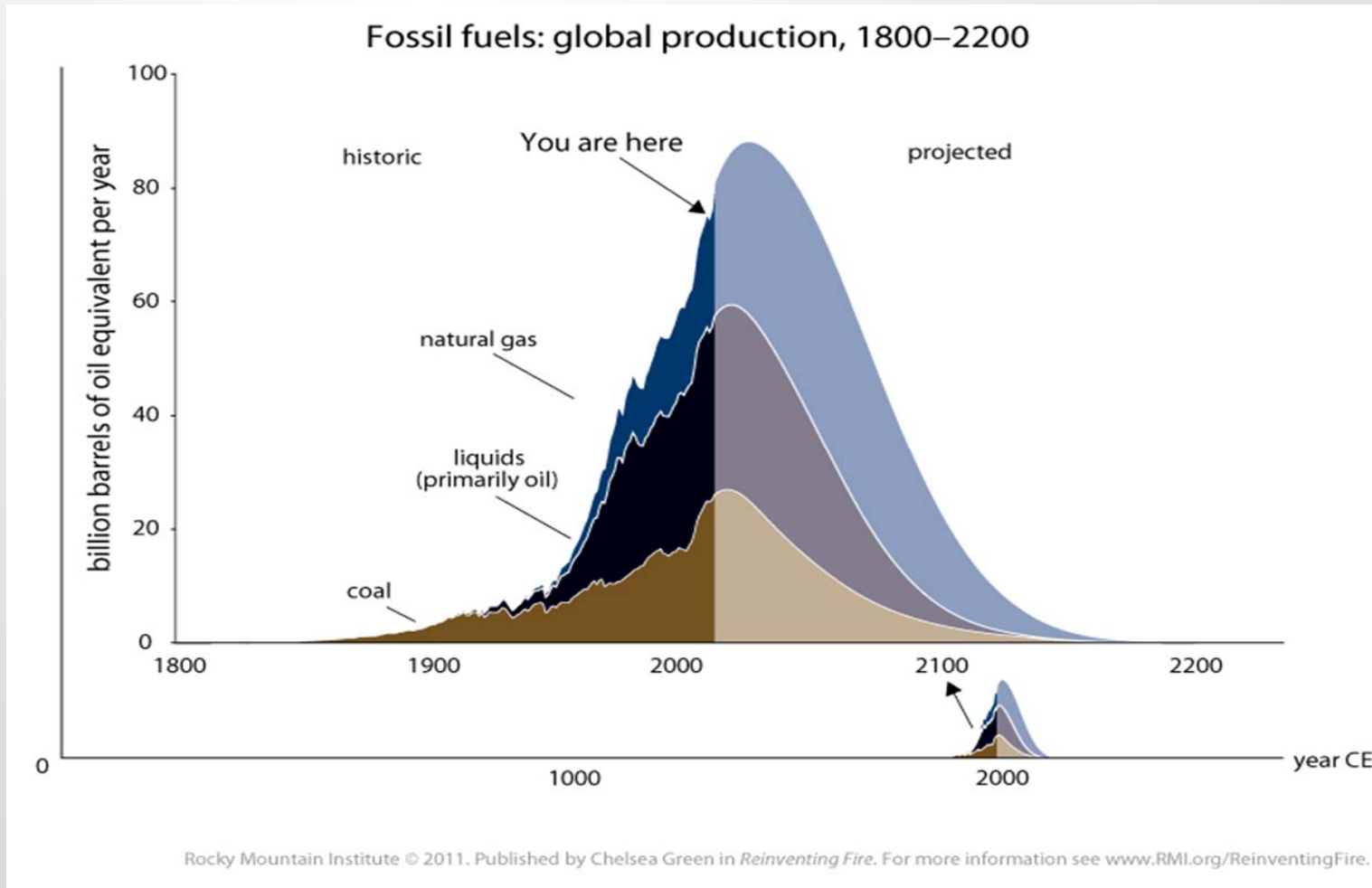
- Greenhouse gas emissions
  - ... 8% of global emissions
- Nutrient loss
  - ... 52% of agricultural land
- Sanitation
  - ... 13-33% openly dumped
- Water footprint
  - ... 3 times volume of Lake Geneva
- Ecological impacts
  - ... Intangible
- Economic impacts
  - ... 2.6 trillion dollars

# A pause to reflect on climate change

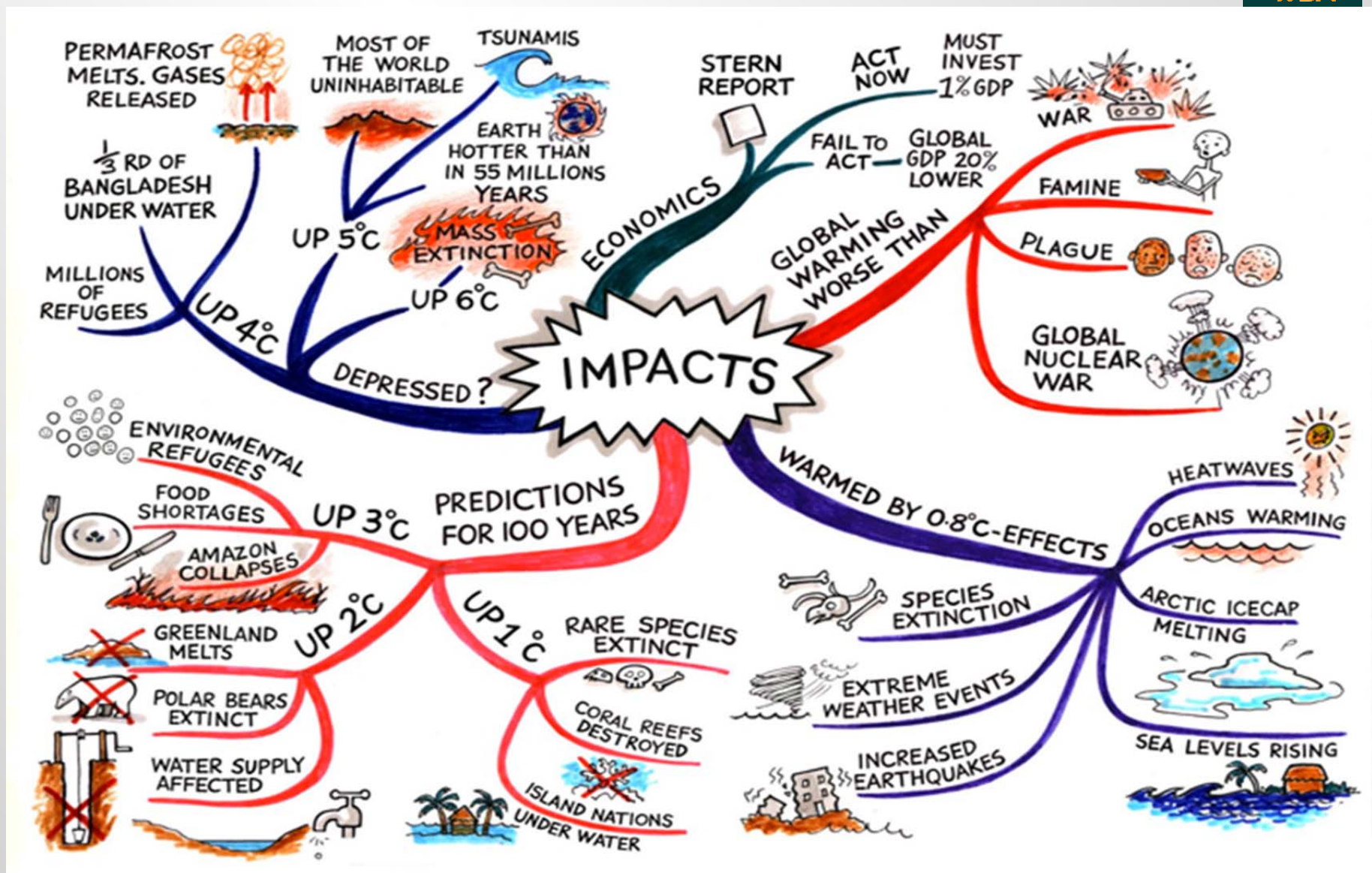




# Burning fossil fuels will still be predominant way to produce energy



So if we cannot reduce fossil fuels quickly we have to implement other strategies to reduce GHG emissions.

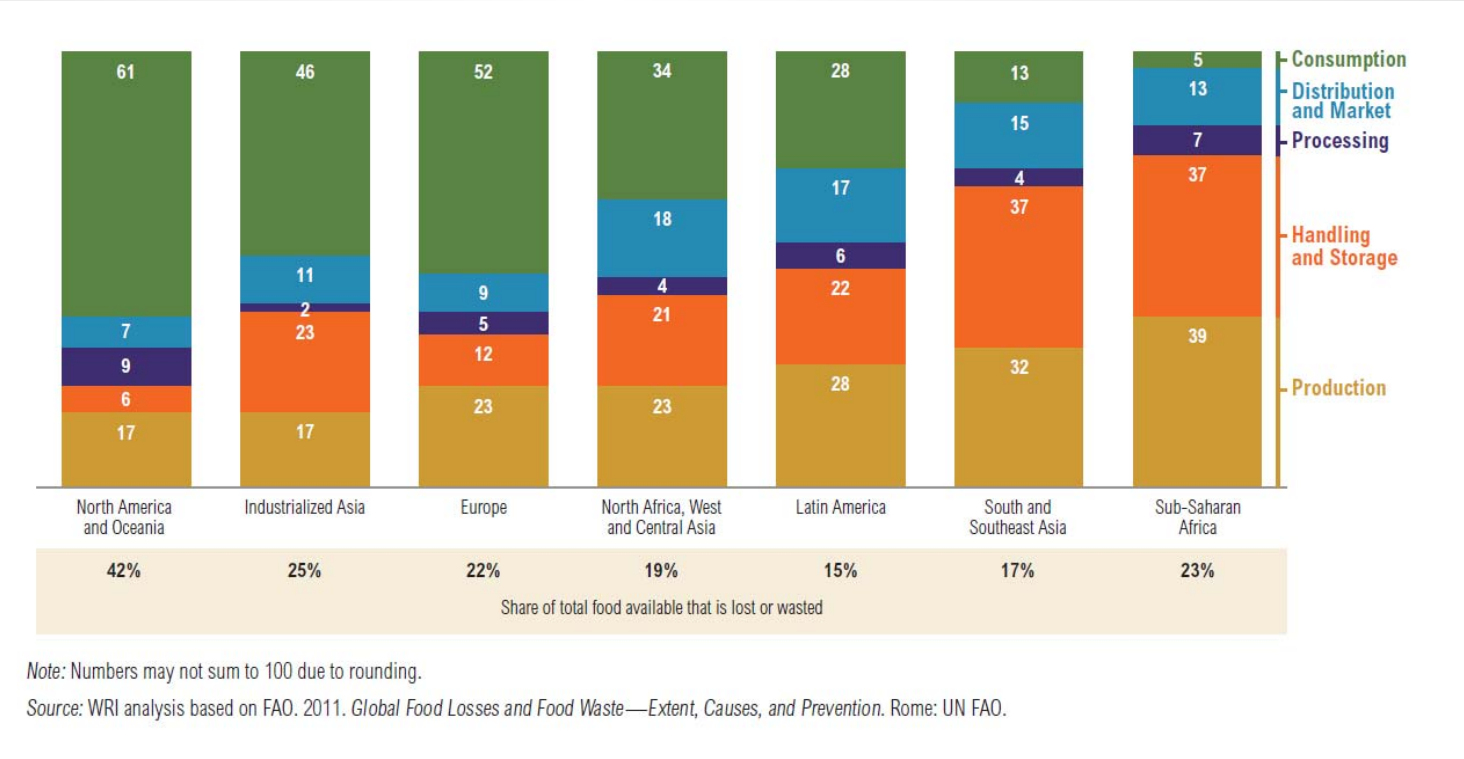


I wonder if we are sometimes in denial ?



# Sources of Food Waste

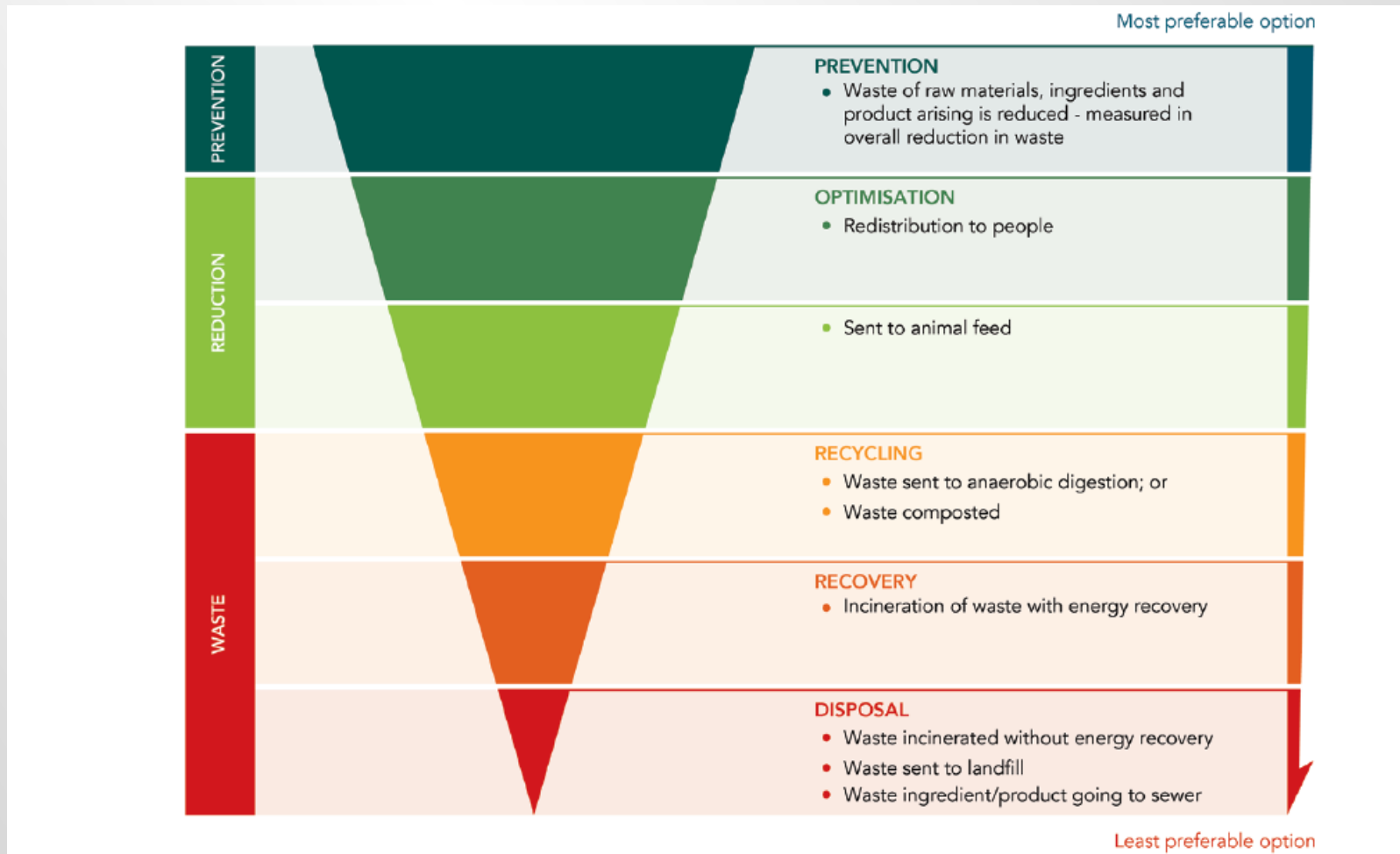
- Manufacturing
- Food services
- Wholesale and retail
- Households



The background image shows a field of corn plants in the foreground, with a sky filled with large, white and grey clouds. The lighting is warm, suggesting a sunset or sunrise, with a golden glow. A dark teal rectangular box is overlaid on the left side of the image, containing the chapter title.

# Chapter 2: Food Waste Prevention

# Food and Materials Hierarchy



# What can cities do?

- Quantification and characterisation of food waste
- Engagement and reporting
- Organisation - level initiatives
- Regulatory initiatives
- Raising awareness and communication policies





# Chapter 3: Food Waste Collection



# Unique collection case studies

- Auckland, New Zealand
- Cajica, Colombia
- Copenhagen, Denmark
- Hartberg, Austria
- Milan, Italy
- Minneapolis, USA
- New York, USA
- Oslo, Norway
- Seoul, South Korea





# Chapter 4: Food Waste Treatment

# Comparison Table



**TABLE 8: COMPARISON OF TECHNOLOGIES TABLE**

TECHNOLOGY	SUPPORTS FOOD WASTE REDUCTION	COST SCALE 1-5 (LOW-TO-HIGH)	ENERGY PRODUCTION	NUTRIENT RECOVERY	CAN BUILD SOIL ORGANIC MATTER
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**FOOD WASTE SEPARATELY COLLECTED**

Anaerobic digestion	✓	4	✓	✓	✓
In-vessel composting	✓	3	x	✓	✓
Windrow composting	✓	2	x	✓	✓
Liquefaction	✓		Dependent on context		✓
Rendering	✓		Dependent on context		✓

**FOOD WASTE COLLECTED IN RESIDUAL WASTE**

Gasification	x	5	✓	x	x
Incineration and energy recovery	x	4	✓	x	x
Landfill without gas extraction	x	1	x	x	x
LFG extraction	x	2	✓	x	x
MBT	x	2	✓ [with AD]	x	x
Pyrolysis	x	5	✓	x	x



# Chapter 5: Anaerobic Digestion

# What AD can do for your City



- Renewable energy
- Climate change
- Circular economy
- Air quality
- Food security
- Health and sanitation
- Economic development

One tonne of food waste from a supermarket/restaurant can drive your car 852 km!



# Overview of AD

- What happens inside a digester and an AD plant
- Examples from all around the globe
- Financial considerations
  - Capital cost
  - Operating cost
  - Income streams
- Health and safety
- Establishing good practice



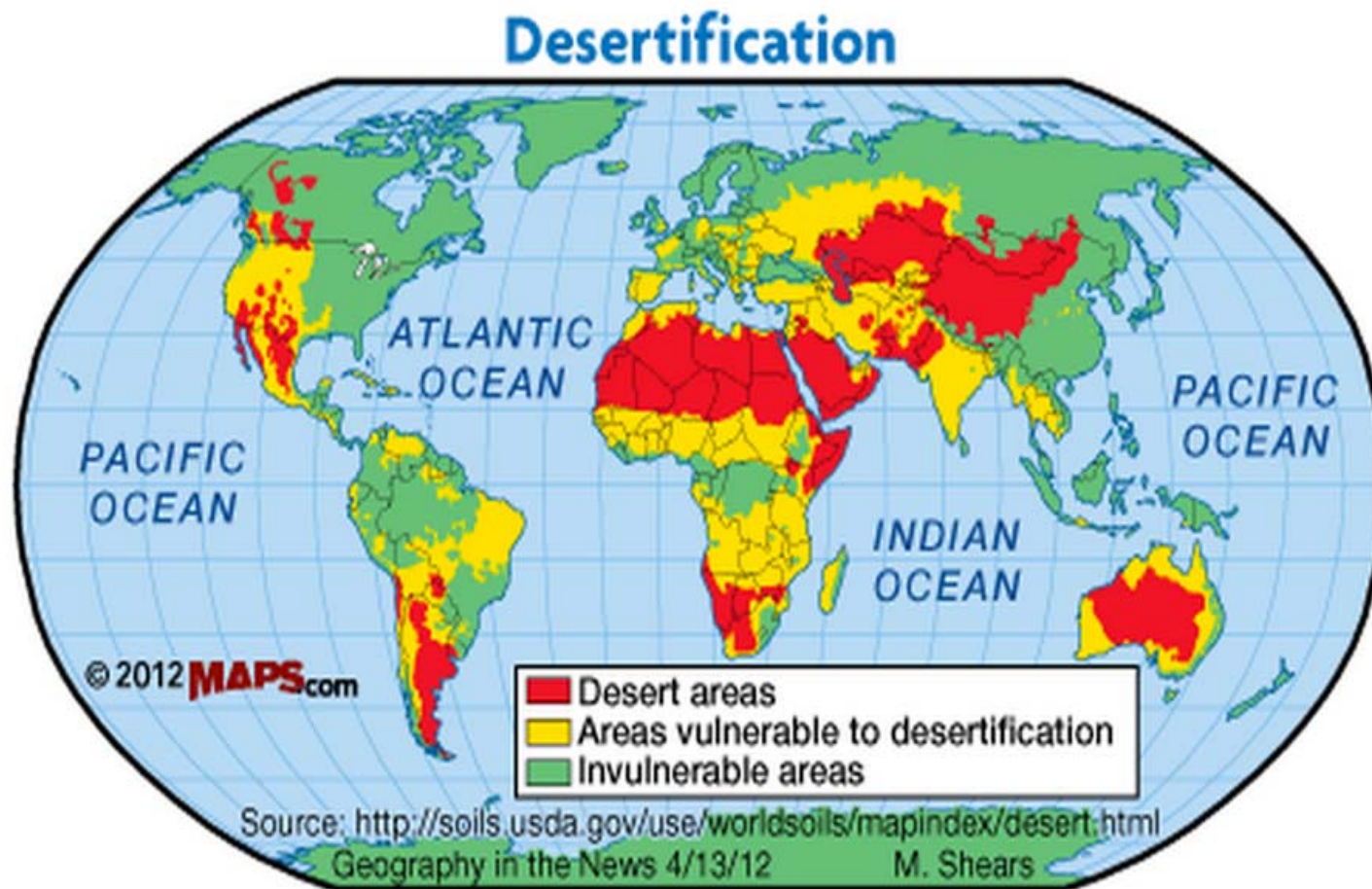
# Chapter 6: Products of AD



# Products


- Biogas cooking and lighting
- Biogas boilers
- Electricity
- Heat
- Biomethane
  - To grid
  - For use as vehicle fuel
- Digestate/compost
- Carbon dioxide
- Cooling

# A pause to reflect upon desertification and topsoil loss



So we must get all the organic carbon and humus back to soil that is possible





# Chapter 7: Policy recommendations, barriers and implementation



# Policies to support

- Targets
- Policies to meet targets
  - Pricing GHG emissions
  - Renewable Energy Incentives
- Waste Management Policies
  - Pay As You Throw
  - Organics to landfill ban
  - Recycling requirements
- Capital Grants



## 5 Actions cities can take today

- Undertake large scale food waste awareness and prevention campaigns
- Require businesses to separately collect food waste
- Monitor and measure
- Provide separate collection of food waste to households
- Require use of food in line with the food and drink material hierarchy

There is no need to reinvent the wheel, there are great experiences available shown in the report.

# Thank You!



The report is now available for download at:  
<http://www.worldbiogasassociation.org/food-waste-management-report/>

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