



**PREVENT**

Abfall Allianz

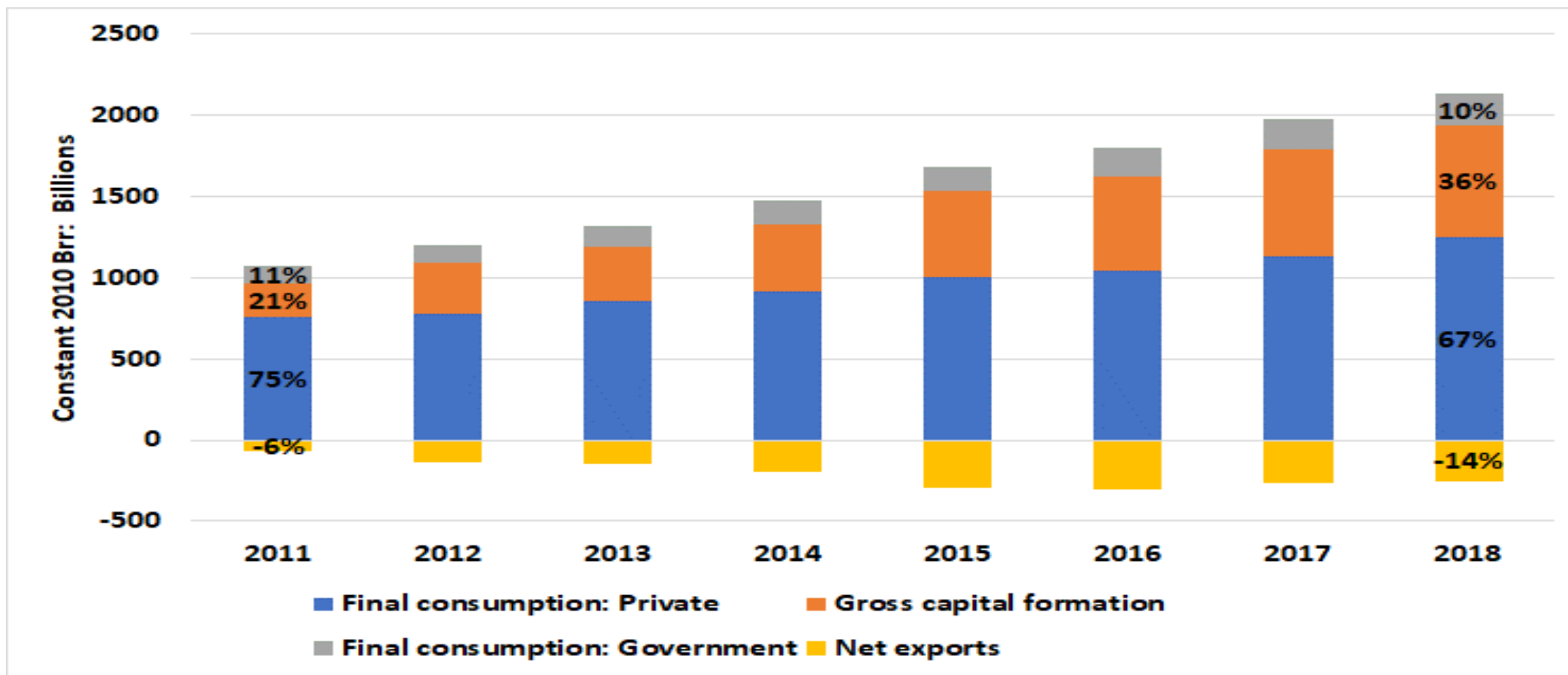
# **Status of biogenic waste management in urban and rural regions of Ethiopia**

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Ayele Hegena Anabo(PhD), National Environmental  
Law Development and Enforcement Advisor,  
EFCCC/GIZ

## Introduction

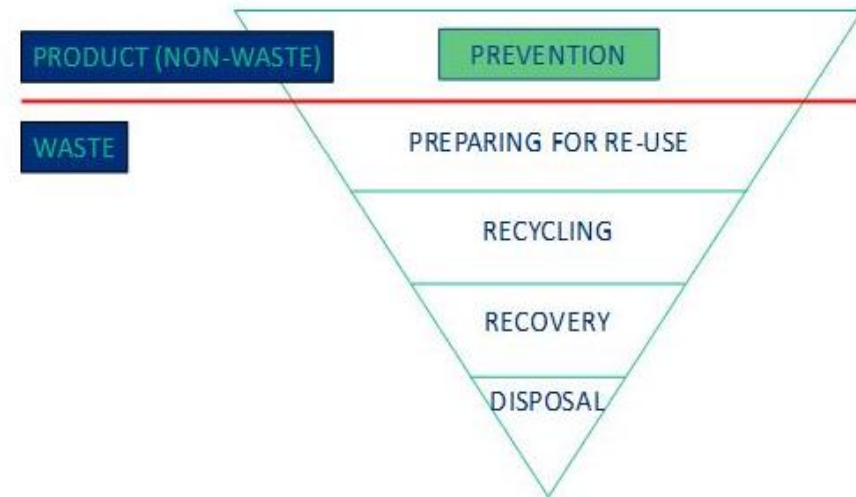
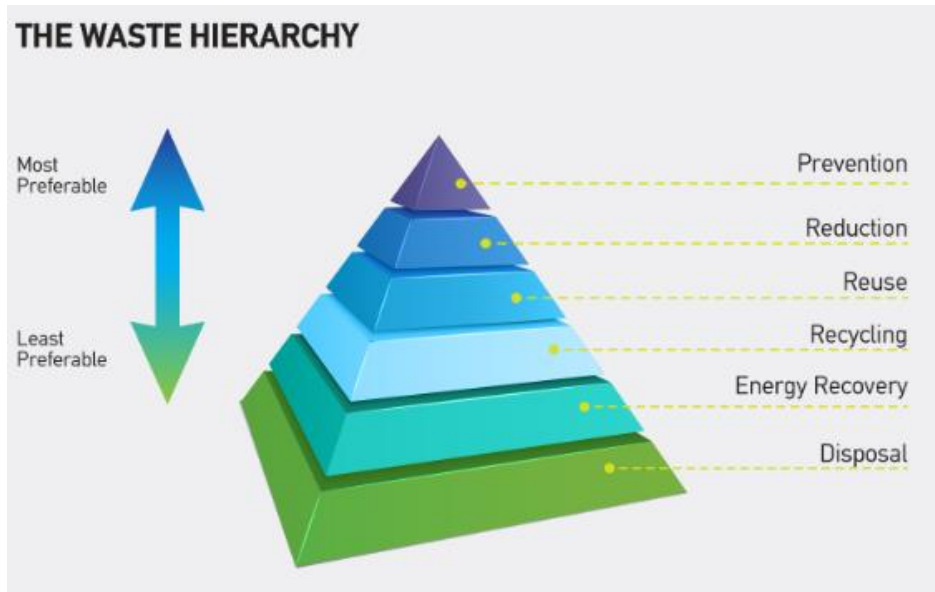
- The population of Ethiopia has grown from 63.5 million in 2000 to over 110 million in 2020, making it Africa's second populous country after Nigeria
- The UN medium variant population projections suggest that by 2050, Ethiopia may have as many as 198m people (UNDESA 2017)
- Under the rapid population growth and economic development, the solid waste volumes are projected to increase an average of 10.1% per year from 2020-2025 and 9.9% from 2026-2030 (World Bank 2021c)
- Rural population (% of total population) in Ethiopia was reported at 78.31 % in 2020 (the World Bank collection of development indicators, compiled from officially recognized sources)



**Figure: Composition of the Ethiopia's GDP: 2011-2018**

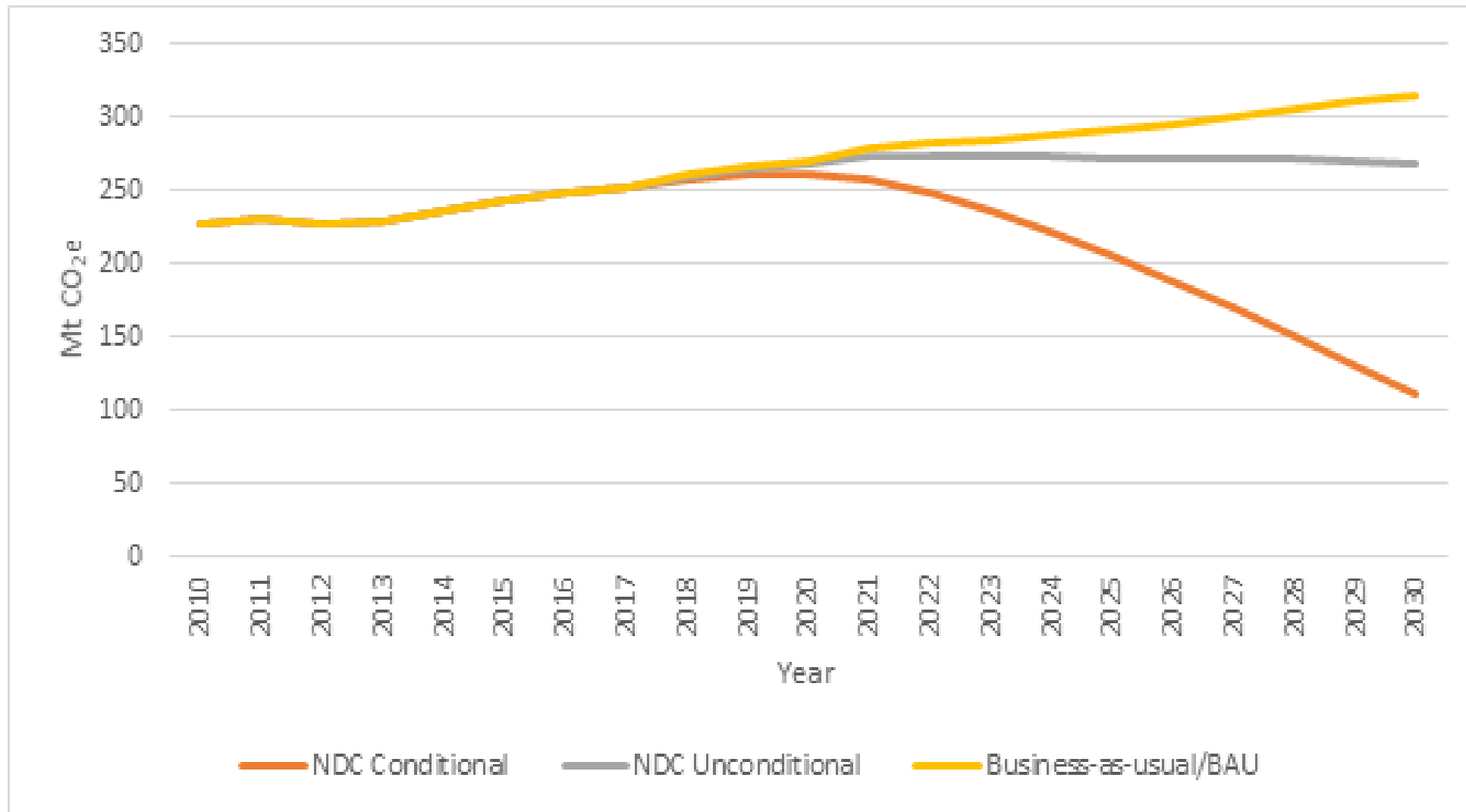
Source: World development indicators

## The 3 R -4R Principle in organic waste management policy, law and practices in Ethiopia



*Waste Management Hierarchy (WFD). (Source: European Commission)*

- ❖ This economic growth and the population pressure have its negative side-effects in organic solid waste generation



**Figure: Ethiopia's business-as-usual, unconditional and conditional emission pathways**

Source: GoE and World Bank (2021)

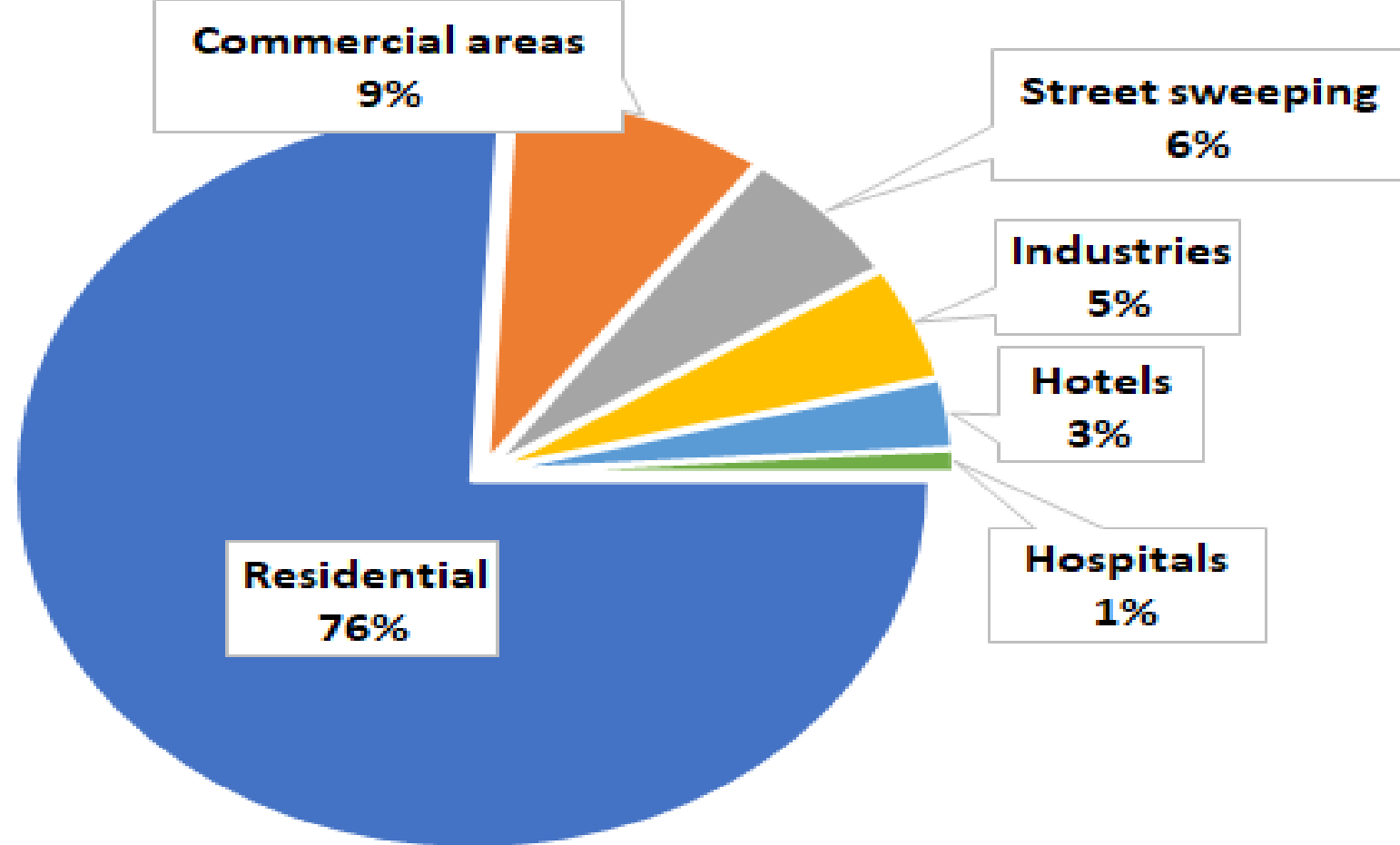
# Policy priorities and actions

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- Polluter Pays/Pay-As-You-Throw (PAYT)
- Extended Producer Responsibility Schemes (EPRS)
- Green Procurement Schemes
- Education/Awareness raising
- Certification schemes (e.g. Ecodesign, Ecolabel)
- Communication/Awards
- Industry 4.0
- Eco-industrial parks

- 
- RECP (Resource Efficient and Cleaner Production)
  - Industrial symbiosis
  - Take-back/collection schemes
  - Innovative (Green) Product design
  - Service based business models





**Figure: Share of municipal solid waste in Addis Ababa by source: 2019**

Source: Addis Ababa Solid Waste Management Agency (2019)

# PILOT PROJECT



## GUIDELINE FOR ORGANIC WASTE TREATMENT IN EAST AFRICA

**12/2020 – 06/2022**

*This project, implemented by DBFZ & RETech, is funded by the PREVENT Waste Alliance, an initiative of the German Federal Ministry for Economic Cooperation and Development (BMZ). More information:  
<https://preventwaste.net/en/>*



German RETech Partnership  
Recycling & Waste Management  
Made in Germany



# IDEA FOR SOLUTION



**GUIDELINE  
FOR ORGANIC WASTE  
TREATMENT IN  
EAST AFRICA**

Status-quo  
organic waste  
management

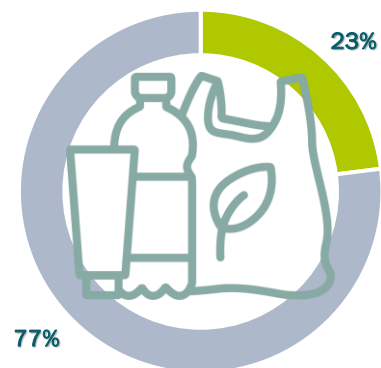
Best practices  
& application

Knowledge  
transfer

*The aim of the project is to develop a legal, technical and economic guideline for dealing with organic waste as a basic strategy for politics, administration, research and the private sector for East African countries, using the example of Ethiopia.*

# FACTS EAST AFRICA

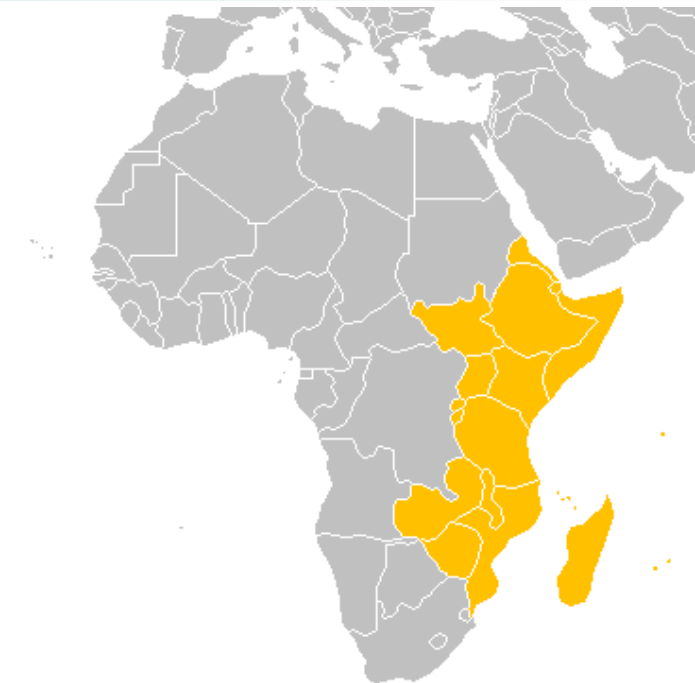
GERMANY  
~1.5 kg per inhabitant & day



■ Organic ■ Others



- Less than 0,5 kg per capita & day
- tripling of generation by 2050
- Capture rate 40-50% in Sub-Saharan countries
- Recycling rate below 4%
- Mainly biological residues of over 50%



# STATUS-QUO EAST AFRICA



© Gert Morscheck



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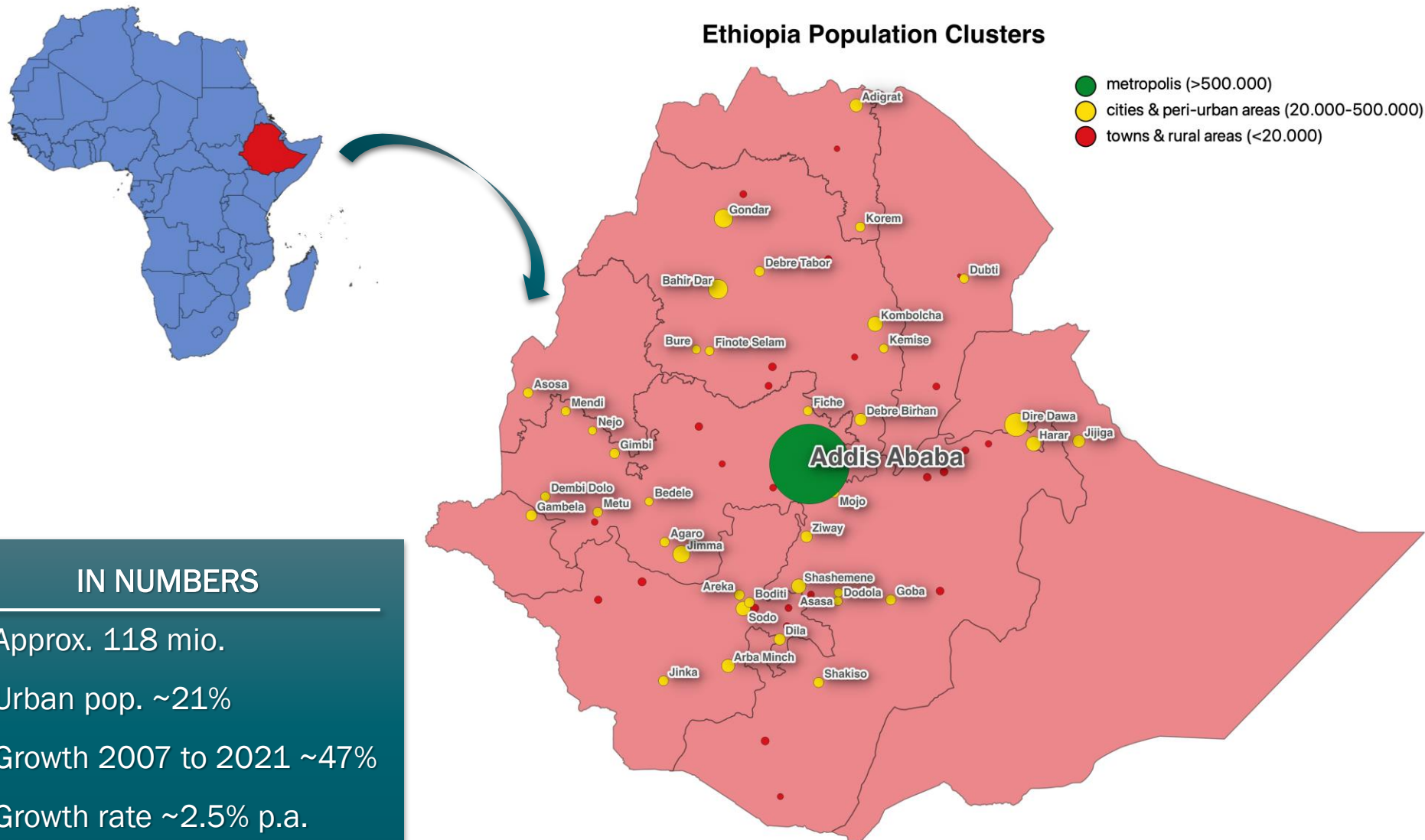
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- Inadequate collection and treatment of waste
- Unknown material and energy potential
- Lack of technologies & know-how
- Implementation and application of laws and regulations
- Stable financing
- Informal sector
- Diverse market actors with divergent interests



# DIFFERENT PLACE, DIFFERENT SOLUTION

## Ethiopia Population Clusters



## IN NUMBERS

- Approx. 118 mio.
- Urban pop. ~21%
- Growth 2007 to 2021 ~47%
- Growth rate ~2.5% p.a.
- Median age 19.5 years

## FORECAST 2050

- Approx. 205 mio.
- Urban pop. ~36%

- At least 50% of generated waste is uncollected
- Disposal in unauthorized areas or open combustion
- Huge gap between demand and supply of utility services

## Rural areas

- Waste generation 0.11 – 0.35kg/capita/day
- Annual increase 5-10%
- Organic waste 50-70%

## Urban areas

- Waste generation 0.17 – 0.48kg/capita/day
- Annual increase 5-10%
- Increase of plastics and packaging materials
- Solid waste collection 30-70%
- Recycling rate 5%

## Agricultural & other relevant biomasses

### Coffee processing waste



© Bihate Chala

- Largest coffee producer in Africa (5<sup>th</sup> in the world)
- Coffee husk, pulp & mucilage are promising biogas feedstocks
- Methane potential ~68mio. m<sup>3</sup>/year

### Animal manure



- Livestock population largest in Africa
- Mainly cattle, chicken, goat and sheep
- 5.9 mio. households keep more than 4 cattle

### Water hyacinth



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- Invasive aquatic weed plant
- Destroys fish & agricultural industries
- Water hyacinths cover 40.000 ha of Lake Tana
- 1 ha has a methane potential of ~ 35.000m<sup>3</sup>

### Abattoir waste



- Livestock population mainly for meat production
- ~98% of abattoir waste is dumped
- Export orientated slaughterhouses are state of the art facilities



# FACTS ETHIOPIA



- Governmental goal – 80% waste collection until 2030
- Several pilot projects on waste collection & segregation
- Reppie waste-to-energy-plant in Addis Ababa
- National Biogas Programme



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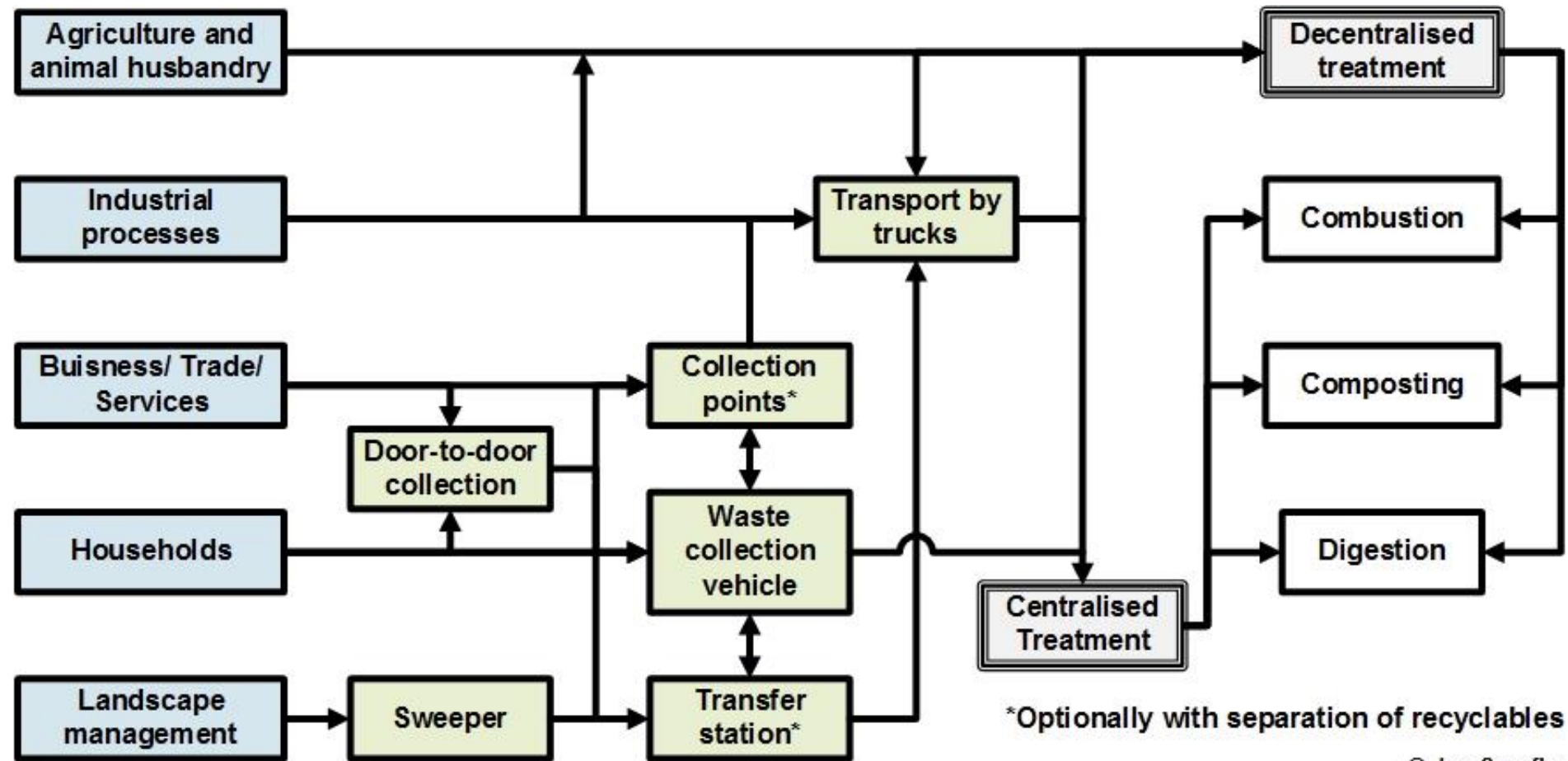


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# IDEA FOR SOLUTION



# CONCLUSION



- Ethiopia has a big unused potential of biomasses
- Government & private sector are aware of the importance of municipal waste handling
- There is still a great lack of appropriate technologies and broad knowledge
- In addition to technical, legal, social and financial restrictions, environmental impacts must also be considered
- Focusing on already pure material flows, such as agricultural or industrial residues, can initially prove the function of treatment and logistics concepts
- In parallel, the establishment of separate collection concepts for domestic waste and the transfer of knowledge to experts and waste producers must be advanced



## MARKUS LENHART

Department Biochemical  
Conversion

[Markus.lenhart@dbfz.de](mailto:Markus.lenhart@dbfz.de)

DBFZ Deutsches  
Biomasseforschungszentrum  
gemeinnützige GmbH

Torgauer Straße 116

D-04347 Leipzig

Phone: +49 (0)341 2434-112

E-Mail: [info@dbfz.de](mailto:info@dbfz.de)

[www.dbfz.de](http://www.dbfz.de)