AFRICAN CHALLENGES FOR ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) AND THE ROLE OF KNOWLEDGE TRANSFER

Lessons from the implementation of South Africa's Waste RDI Roadmap

Prof Linda Godfrey

Manager: Waste RDI Roadmap IU

Africa-Europe Dialogue Symposium on Innovation for Sustainable Development

29 November 2017

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

CSIR

our future through science

Outline of presentation

- South Africa's Waste RDI Roadmap
- The SDG challenge for Africa
- Waste and the SDGs
- Waste management challenges facing Africa
- Opportunities for innovation
- Conclusions

Introduction to 10 Yr Waste Roadmap

- The Department of Science and Technology (DST)
  - Published South Africa's 10-Year Waste Research Development and Innovation (RDI) Roadmap in 2014
  - Aimed at providing strategic direction to guide South Africa's portfolio investment, for the next 10 years, in six identified clusters of waste and secondary resources research, development and innovation activity
  - That would lead to (1) More effective decision-making, (2) Faster insertion of context-appropriate Technology, (3) Export of Know-How and Technology, (4) Strengthened RDI capability and capacity
  - An ultimately supporting South Africa's implementation of the National Waste Management Strategy and the waste hierarchy

Introduction to 10 Yr Waste Roadmap

- **Municipal Solid Waste**

  e.g. paper and packaging, C&D waste, OFMSW, residual waste

- **Electronic Waste (WEEE)**

  e.g. all fractions, metal, plastic, glass, etc.

- **Waste Plastic**

  e.g. pre- and post-consumer plastics (all)

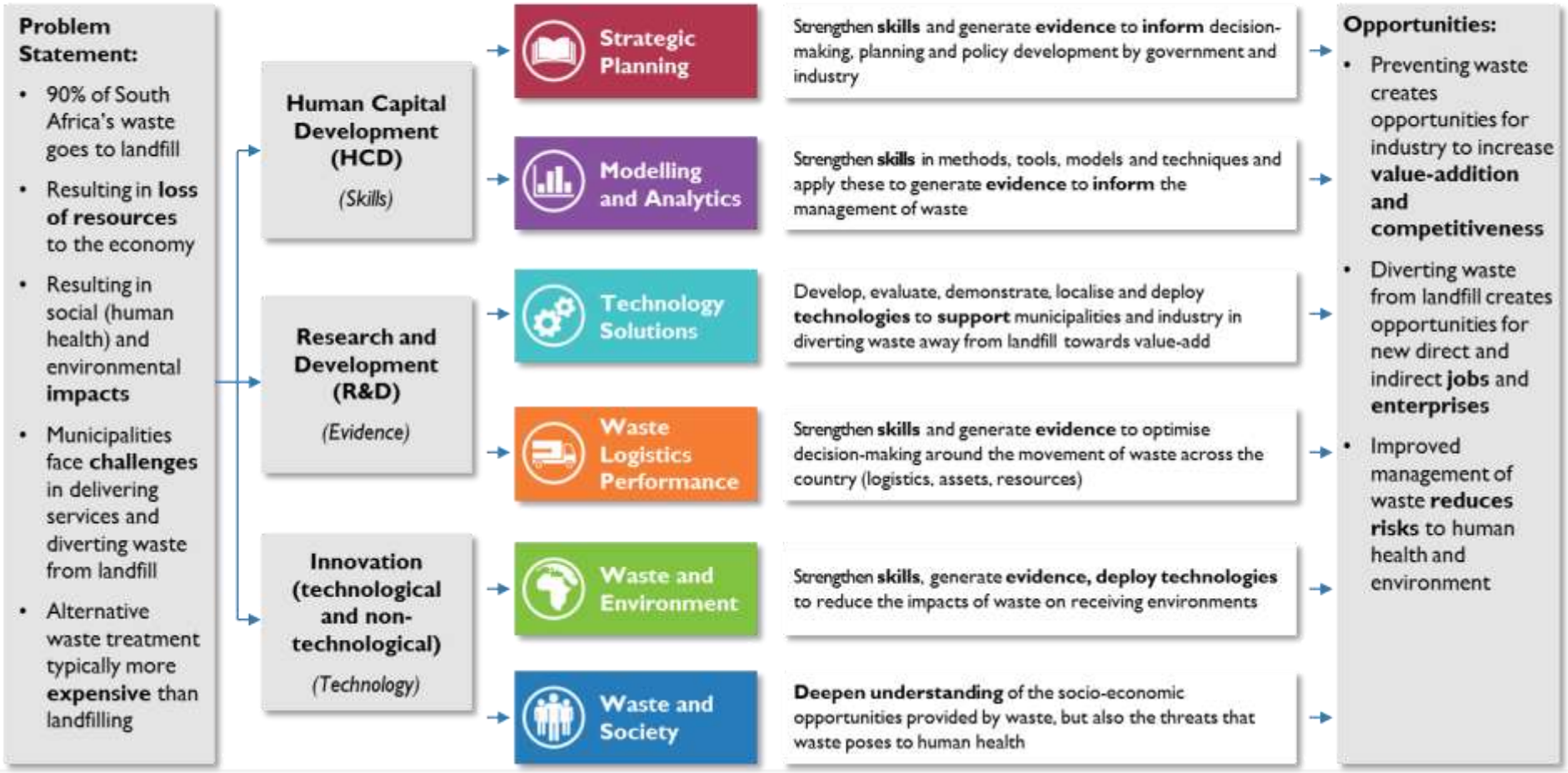
- **Organic Waste**

  e.g. industrial biomass, OFMSW, food waste

- **Waste tyres**

Maximising the diversion of waste away from landfill **towards value-adding opportunities**, including **prevention** of waste and the optimised **extraction of value** from reuse, recycling and recovery, in order to create significant social, economic, and environmental **benefit** for South Africa.

Introduction to 10 Yr Waste Roadmap



Introduction to 10 Yr Waste Roadmap

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

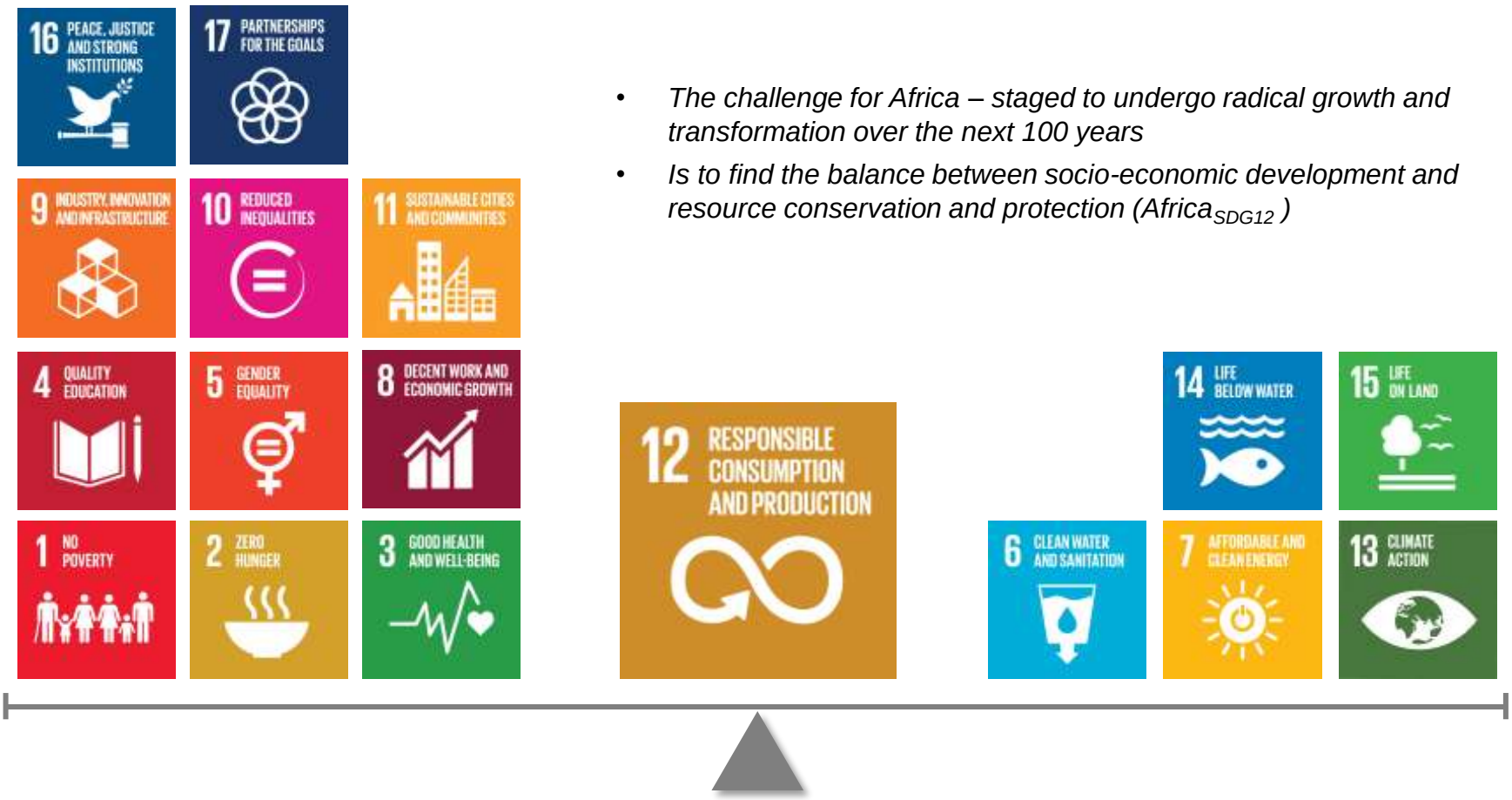
www.wasteroadmap.co.za

The challenge for Africa

SOCIETY + ECONOMY

PLANET + RESOURCES

- *The challenge for Africa – staged to undergo radical growth and transformation over the next 100 years*
- *Is to find the balance between socio-economic development and resource conservation and protection (Africa$_{SDG12}$)*



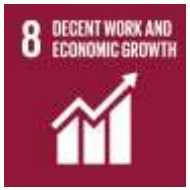
Waste and the SDGs

- Sound management of waste is a specific target under SDG 12 on Sustainable Consumption and Production
- However, given that waste affects almost all aspects of development
- Addressing the waste challenges facing us globally, and in Africa, has the potential to positively impact all of the SDGs
- Knowledge generation and transfer (incl. RD&I) is key to realising these impacts

https://wasteaid.org.uk/waste-sustainable-development-goals/

The challenges facing Africa wrt waste

- Globally, an estimated 12.5 - 56 million people earn a livelihood in the **informal waste sector** (0.5-2% of urban population)
- Examples from Africa –
  - Cairo, Egypt, 33,000 - 70,000 informal workers
  - Addis Ababa, Ethiopia, 5,500 – 7,000 informal workers
  - South Africa, 60,000 - 90,000 (but could be as high 215,000)
- Opportunity to improve these livelihoods and **create decent "work"** through integration, professionalization, formalisation, formal sector employment



Linzner & Lange (2013)
CSIR (2016)

DST Waste RDI Roadmap **Grant Project** awarded to University of Witwatersrand on "Waste Picker Integration" (2016-2019) *(part of global dialogue)*


© Linda Godfrey


© Linda Godfrey

The challenges facing Africa wrt waste

- Globally –
  - Approximately 1.3 billion tonnes per annum (one third of edible part of food produced for human consumption), is lost or wasted
  - Approximately 56% of total food losses and waste occur in developed countries

- In South Africa –
  - Over 9 million tonnes (around 30% of our local agricultural production) goes to waste every year
  - The cost to society is R61.5 billion per annum, equivalent to 2.1% of South Africa's GDP

Lipinski et al. (2013)
CSIR (2012, 2013, 2015)

DST Waste RDI Roadmap Industry-meets-Science workshop on food waste to share information and identify research priorities to inform domestication of SDG 12.3


© Linda Godfrey

The challenges facing Africa wrt waste

- In Africa –
  - The average waste collection coverage is only 55%
  - More than 50% of the collected waste is disposed of to uncontrolled dump sites (19 of world's biggest dumpsites in Africa)
  - With only a 4% municipal solid waste (MSW) recycling rate

- In South Africa –
  - Illegal dumping of waste is prevalent across SA cities and towns, costing municipalities to clean up
  - 90% of all waste generated goes to landfill (often dumpsites)

Draft AWMO (UNEP) (nd)
DEA (2012)

DST Waste RDI Roadmap Scholarship on "Assessing the integration of sustainable waste management principles in dealing with illegal dumping in informal settlements"


© Linda Godfrey

The challenges facing Africa wrt waste

- Globally –
  - Disposal of organic waste to land(fill), and the open burning of waste, contributes significantly to GHG generation
  - Methane from landfills represents 12% of total global CH_4 emissions (2012)

- In South Africa –
  - The waste sector was the second largest contributor to total CH_4 emissions (in 2010), contributing 37.2% of total CH_4
  - While other sectors show declining contributions, the CH_4 from the waste sector has increased by 11.3%, reflecting increasing generation and disposal of waste

DEA (2014)

DST Waste RDI Roadmap is establishing two Research Chairs – (i) Waste & Climate, (ii) Waste & Society


© Linda Godfrey

The challenges facing Africa wrt waste

- Globally –
  - Over 80% of marine plastic from mismanagement of waste inland
  - Of that, 75% comes from uncollected waste (poor city cleansing)
- In Africa –
  - Five (5) of the top 20 countries ranked by mass of mismanaged plastic waste (in 2010) were in Africa (Egypt, Nigeria, South Africa, Algeria, Morocco)
  - Limited city cleansing and waste collection services, uncontrolled dumping, growing population, and growing consumption creates significant risk of marine pollution

Allsopp, et al. (2006)
Ocean Conservancy (2015)
Jambeck et al. (2015)

DST Waste RDI Roadmap partnerships with business, governments and academia to raise awareness and generate evidence


© Christoffer Back Vestli - Accra Ghana, Nov 2017

Opportunities for innovation

- Addressing these waste management challenges facing Africa, (and contributing towards achieving SDGs) creates significant opportunities for **social** and **technological innovation**
- Africa is about 15-25 years behind e.g. Europe in the management of waste, creating (i) opportunity to **learn** (knowledge transfer), and (ii) opportunity to **leapfrog** (appropriate technology)
- Waste R&D funding and capacity is limited in Africa, creating opportunities (and a need) for adaptation and localisation of **inbound** waste technologies
- It's not only one-way – social innovation in Africa provides an opportunity for Europe as it transitions to a **Circular Economy**

Opportunities for innovation

- So, if opportunities to address these waste challenges (and to make strides towards domesticating the SDGs) exist, why aren't we already doing it?
  - Lack of **budget** (to invest in infrastructure and services) (waste management can take between 15-50% of municipal budgets)
  - Lack of **skilled capacity** to inform decision-making, monitoring and enforcement, and implementation
  - "Cheap" disposal of waste to uncontrolled dumpsites and landfills makes implementation of alternative waste treatment technologies more expensive (relative) (**correct the economics**)

Draft AWMO (UNEP) (nd)
Ghana EPA (2014)
DEA (2012)

Opportunities for innovation

- Ultimately it's about the **lack of "political will"** to change
- Which **negatively influences** adoption of legislation; monitoring and enforcement; allocation of funding and staff to functions; technology uptake; and the drive to implement alternatives, etc.
- It's about a **weak "enabling environment"** for the public and private sector and "*political and administrative instability*"
- The result, **attractiveness** of the African MSW market is **very low**, based on weak government support; addressable market; solution attractiveness; 5-year market growth potential; market accessibility; and profit opportunity

Draft AWMO (UNEP) (nd)
Ghana EPA (2014), DEA (2012)
Bank of America/Merrill Lynch (2013)

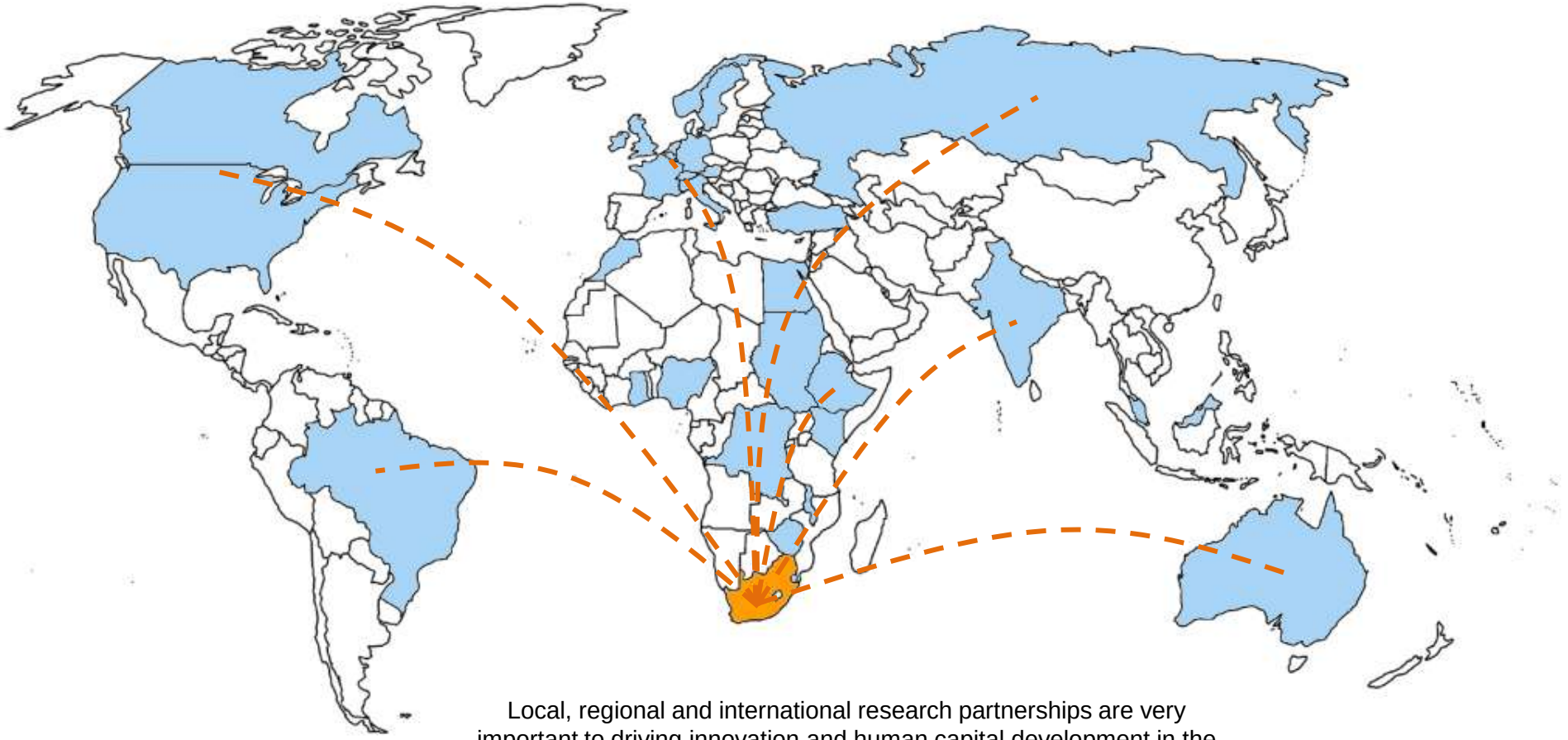
Opportunities for innovation

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Opportunities for innovation

- Changing the paradigm from "**waste**" to "**secondary resource**" in Africa, may create the much needed incentive to unlock these opportunities
- This can be further expanded beyond just waste, to also unlock broader economic opportunities within a **Circular Economy**
- While the drivers of the Circular Economy in Europe, i.e. lack of access to primary resources; lack of space; access to end-use markets, are not the same as for South Africa
- We are all at a similar point in the CE journey and this creates opportunity to **collaborate** and to **learn** to ensure appropriate **domestication** of the CE for Africa

Partnerships for Waste RDI



Local, regional and international research partnerships are very important to driving innovation and human capital development in the South African waste sector

Conclusions

- The waste sector has the potential to contribute significantly to achieving the SDGs
- But, we need to drive a strong “waste prevention” and “waste-as-secondary-resource” agenda to **unlock** the environmental, social and economic **opportunities**
- This requires strengthening –
  - **Skilled capacity** on the African continent, including RDI, to make informed decisions
  - Local, regional and international **partnerships** for knowledge and technology transfer
  - Opportunities and incentives for **innovation**
- **Eliminate** uncontrolled **dumping** and open burning of waste, and the **trafficking** of waste from developed to developing countries
- Create an **enabling environment** for social and technological innovation and private sector growth

Contact details

- **Prof Linda Godfrey**
  Manager: Waste RDI Roadmap IU
  E-mail: LGodfrey@csir.co.za

- **Dr Henry Roman**
  Director: Environmental Services and Technologies
  E-mail: henry.roman@dst.gov.za

- **Ms Magamase Mange**
  Deputy Director: Environmental Technologies
  E-mail: magamase.mange@dst.gov.za

www.wasteroadmap.co.za