

4th SA-GEO Symposium and 3rd Space for National Development (SND)

# Circular economy and human settlements

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# Acknowledgements

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  - Godfrey, L.K., Nahman, A., Oelofse, S.H., Trotter, D., Khan, S., Nontso, Z., Magweregwe, F., Sereme, B.V., Okole, B.N., Gordon, G.E., Brown, B., Pillay, B., Schoeman, C., Fazluddin, S., Ojijo, V.O., Cooper, A.K., Kruger, D.M., Napier, M., Mokoena, R., Steenkamp, A.J., Msimanga, X.P., North, B.C., Seetal, A.R., Mathye, S.M., 2021
  - *The Circular Economy as Development Opportunity: Exploring Circular Economy Opportunities across South Africa's Economic Sectors*. CSIR, Pretoria, South Africa.
  - <http://hdl.handle.net/10204/12233>
  - Chapter 5:
  - Cooper, A.K., Kruger, D.M., Godfrey, L.K., Napier, M., 2021. *Creating resilient, inclusive, thriving human settlements through a more circular economy*.

# Linear economy

- Resources move through the economy in one direction
  - *Including energy and space*
    - Being harvested, collected or mined
    - Being refined and processed to create products and services
    - Being used and consumed
    - Being discarded or thrown away
- Only creates value while
  - Available resources entering at one end and the waste exiting at the other do not foul up anything, or even everything
- Unfortunately
  - Non-renewable (finite) resources
    - Uneconomical to obtain
  - Waste disposal difficult
    - Landfills filling up
    - Pollution
    - Climate being changed
  - Too many incentives for not leaving the linear economy
    - Not paying for one's pollution and environmental damage, etc

# Eutrophication of Hartbeespoort Dam

Google Maps Hartbeespoort Dam

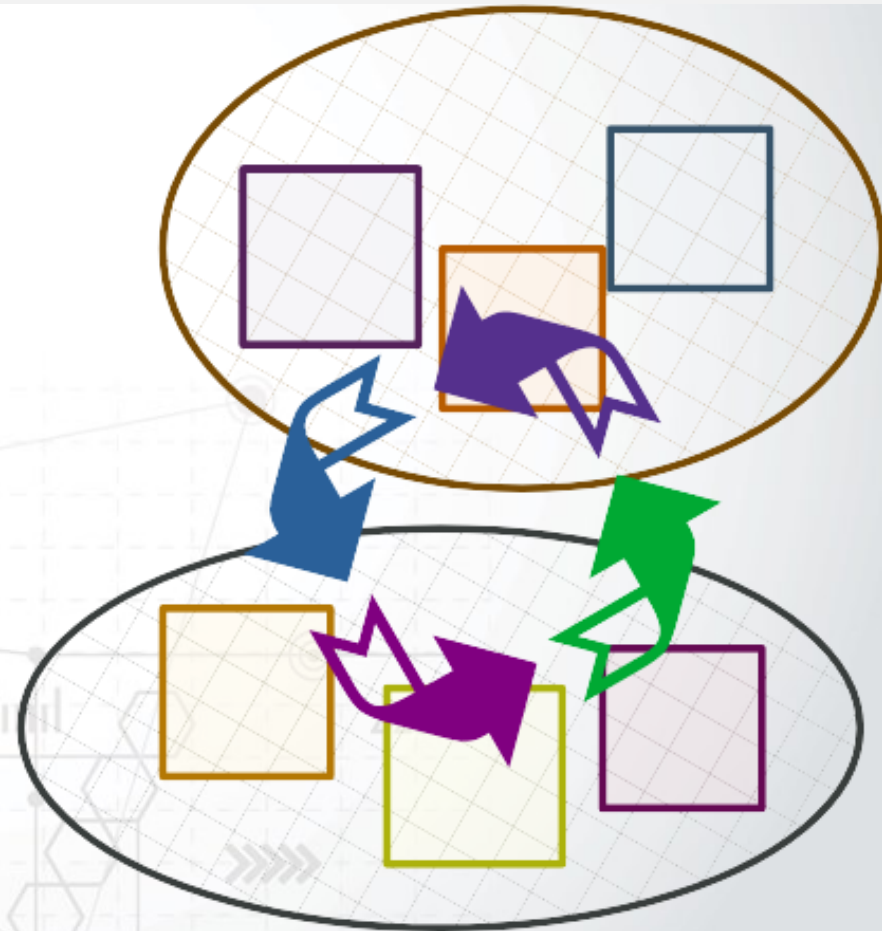
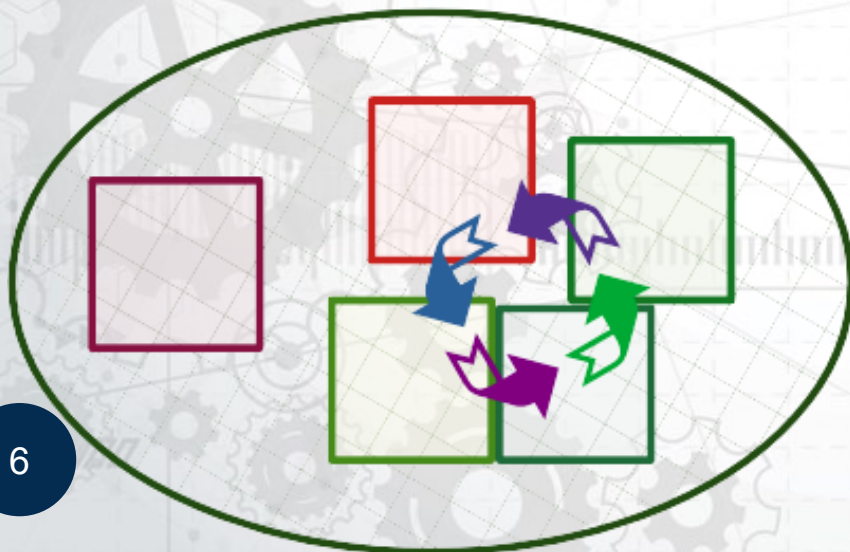


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# Circular and regenerative cities



# The circular economy can be within a neighbourhood, between neighbourhoods in a town, or across towns

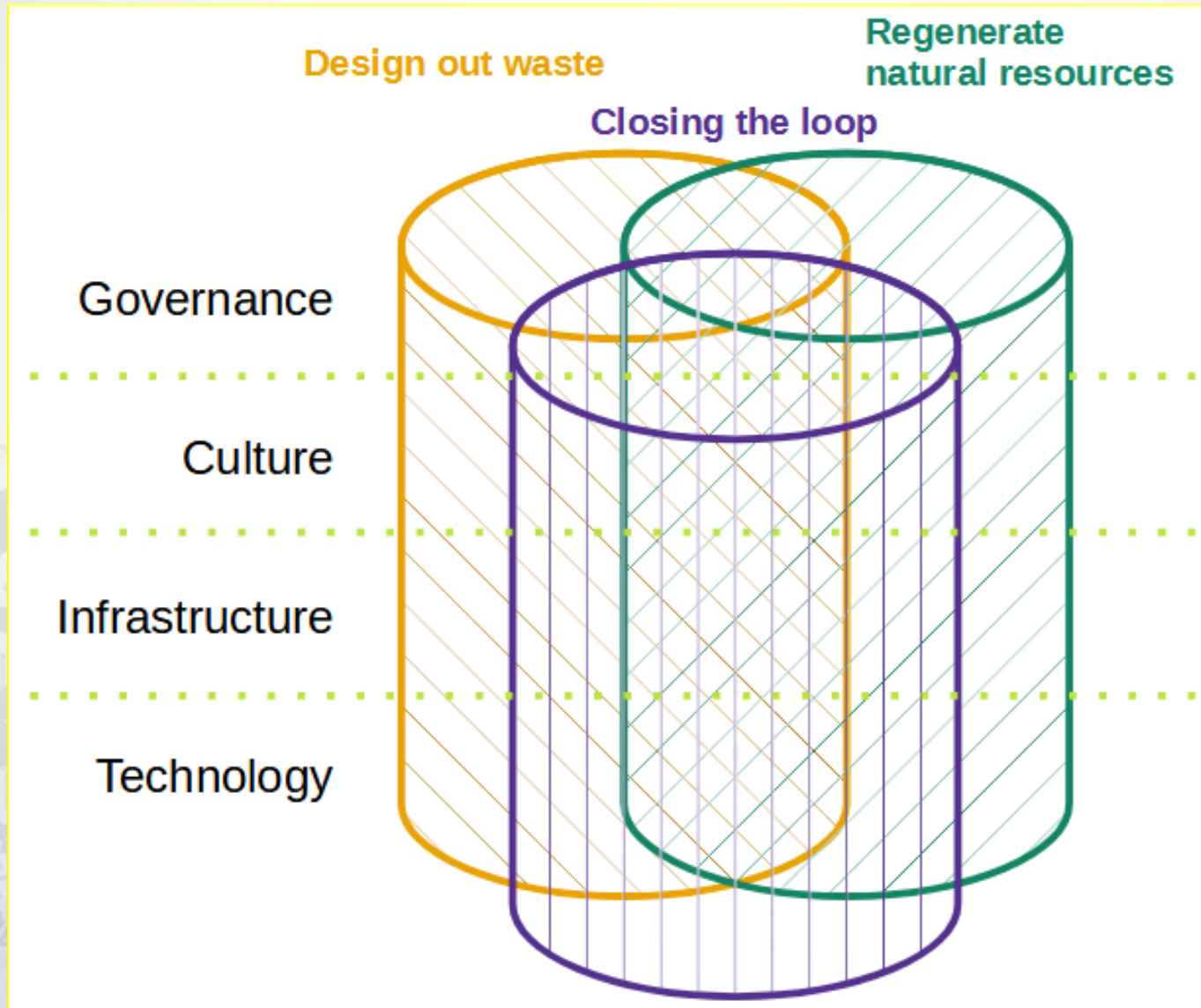


# Opportunities for greater circularity in urban systems

- Design out waste
  - Green, energy-efficient buildings, more compact cities, pedestrian-friendly neighbourhoods
- Keep materials in use
  - Circular construction value chains, circular organics, waste management
- Regenerate natural systems
  - Urban agriculture, renewable energy, green roofs, green open spaces



# Circular economy





# Human settlements in South Africa

- Two-thirds of South Africans live in urban areas
  - Often inappropriate spatial planning
    - Apartheid and modernism
    - Sprawl and low densities
    - Monofunctional neighbourhoods
- Much informality
- Problems
  - Energy- and carbon-intensive
  - Inefficiencies and waste
  - Inadequate amenities, services and public spaces and maintenance
- Need sustainable, inclusive and circular growth
  - Compact, connected and coordinated cities
  - Higher densities, mixed land use, integration with transport



# Benefits and costs over short and long terms

<i>Long-term</i>	<b>Difficult to sell</b>	<b>Is this good or is this bad?</b>
<i>Benefits</i>		
<i>Short-term</i>	<b>Low-hanging fruit</b>	<b>Kicking the can down the road</b>
	<i>Short-term</i>	<i>Long-term</i>

**Costs**

# Design out waste and pollution

- Consider entire complex urban system
  - Providing services and infrastructure across multiple sectors
  - Not just buildings, building components, economic or production systems
  - Maintain infrastructure to prevent waste and inefficiencies
- Not just waste of resources, but waste of space
  - Sharing economy
- Construction consumes vast amounts of resources
  - Planning, designing and monitoring manufacturing and building
    - Standard sizes when specifying material
  - Calculate resource requirements accurately
  - Share expensive equipment
  - Recovering unused materials from building sites
  - Digital systems: Building Information Modelling (BIM)
  - Reuse materials (e.g. concrete)
  - Extend lifetimes of existing stock

*Vodafone – 6 star GBCSA rated*




# Keep products and materials in use

- The loops are dynamic and are the flows of resources, materials, parts, goods, by-products and so on
  - Bring together organisations with different cultures
  - Costs and benefits could be weighted differently against participants
  - Significant time gaps between the costs and the related benefits
- Reuse, repair, repurpose, recycle, upcycle, renovate, reduce, dismantle, separate, remanufacture, share, lease
- Distribute expired but safe food to food banks and charities
- Just-in-time procurement
- Appropriate sizes of packages and portions of food
- Reduce waste and use of virgin resources
- Reverse logistics
- Food and garden waste
  - Compost, mulch and fertiliser; growing algae, mushrooms and insects for food and feed; fibres; bioenergy; retrieving nutrients; bioplastics and bio-aromatics





# Urban Surfer: Informal Recycling Solutions



home   who we are   what we do   issues reclaimers face   reclaimers by the numbers   relevant websites   video & photo library

Tracking data from 50 informal waste reclaimers, distance covered in Km's.


Today  
127km

This week  
1044km

This month  
3198km

All time  
23789km

All tracking data



**LATEST NEWS**  
image for link

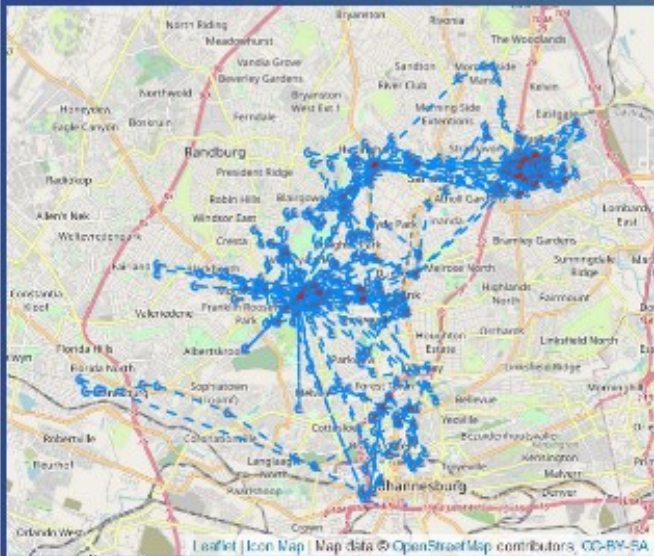
### Reclaimers by km this week

39 Iwan	85km
15 Ma Or...	80km
20 -Mape...	70km
01 Mape...	60km
03 Denzo	63km
48 Mike	67km
31 - Sand...	59km
50 G-Unit	56km
21 Peace	42km
29 - Mph...	29km
49 Joseph	37km
43 Sand...	34km
05 Eric (fa...	34km
41 -Sand...	32km
16 Sandt...	32km
09 - Lucie...	24km
04 Frans	24km
36 - Vasu...	24km

### Select for individual tracking route

- Select all
- 01 Masixole
- 03 Denzo
- 04 - Frans
- 05 - Blanks Alaco
- 05 Eric (falcon gps)
- 06 Monqezi (new tro...
- 08 Shaun
- 09 - Luciano
- 11 John (new)
- 14 Sphe
- 15 Ma Orange
- 16 Sandton Mokopu
- 17 Kgee (new)
- 19 Mdukuzi
- 20 -Mapelela
- 21 Peace
- 22 Fox
- 21 Themba M
- 29 - Mpho (new)


### Coverage map this week




Leaflet | Open Map | Map data © OpenStreetMap contributors, CC-BY-SA

## July Report

### reclaimer activities



RECLAIMERS PRESENTING NEWS



All Project News

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# Regenerate natural systems

- Ecological restoration and regeneration
  - Actively improve natural environment
  - Feed natural resources back
  - Create closed loop systems
- Ecosystem services
  - Household organic waste for livestock and poultry feed
  - Reduce urban heat islands
  - Fix atmospheric nitrogen and carbon
  - Improve food security
  - Provide jobs
- Urban agriculture, renewable energy, green open spaces in settlements, green roofs



Moja Gabedi, Hatfield  
From unofficial landfill to meaningful food garden

# Conclusions

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- Many opportunities to make positive differences
  - Planning, design and management at various scales
  - Entire city-regions, municipal areas, cities, towns, neighbourhoods, buildings
- Many circular city concepts emerged from developed countries
  - Are they relevant and appropriate in developing countries?
  - Facing their own unique challenges and local contexts
    - Poverty, unemployment, inequality, crime and violence
  - Service delivery at municipal level and lack of infrastructure maintenance
- Need reliable data and evidence to guide local initiatives
- Municipalities - Procurement policies; walkable and mixed-use neighbourhoods
- Companies - Reduce packaging
- Neighbourhoods - Share
- Households - Sustainable lifestyles





***Thank you!***