



Circular Economy: The African Story

[Name of Event/ Presentation]

[Date] 27th May 2021





Lesson Plan



Circular Economy what it is and what it is NOT



Circularity in Africa



Framework for Circularity: Circle Economy's Key Elements



Key Elements in practice Assignment



Circular Economy: what it is

Introduction

This course assumes a basic understanding of Circular Economy, so will not go into depth defining the core concepts. As a reminder, the Ellen Macarthur Foundation outlines 3 principles for a Circular Economy:

1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems.

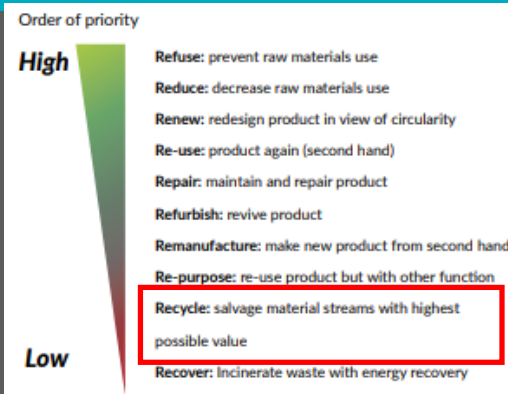
Question: Which of these do you believe is the most important?

For more content on the basics, refer to www.ellenmacarthurfoundation.org.



Circular Economy: what it is NOT

Recycling: recycling slows down real innovation (Lemille, 2019). It does not challenge consumption habits nor value chain design. It ignores embedded pollution and a product's value beyond its material components. It is the lowest value & last resort of the technical cycle cascades.



Source: Cramer, 2017

A “developed world” innovation:



The core principles are not new, nature has been cycling 3 elements (carbon, hydrogen & oxygen) to create most life forms. Higher income countries are often “locked in” to linear systems through 100s of year of investments in linear infrastructure. Lower income countries can pivot far more easily to adopt circular systems.

An expensive tech solution:

It is critical to work with the resources available in a given context. That might be human resources, such as an abundant informal sector who are able to reach the last mile. Localised closed loops have the potential to create more value from what is already there, especially for rural communities.

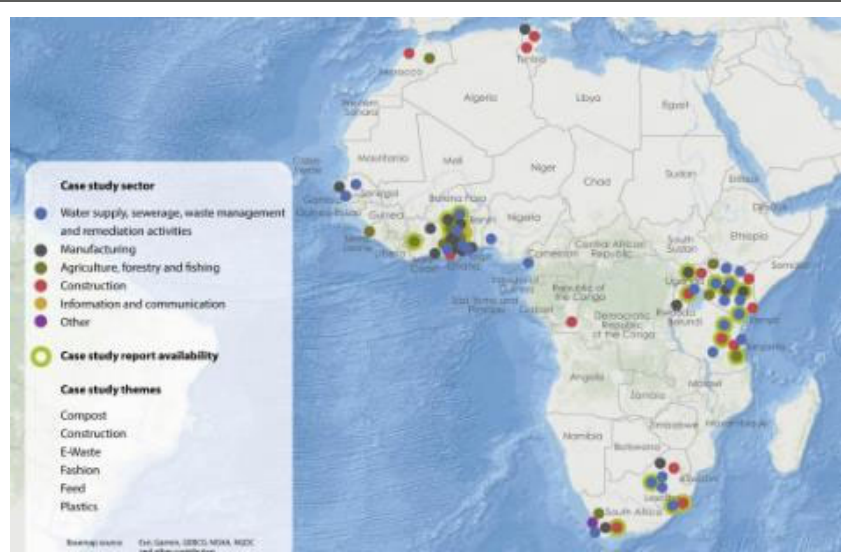


Source: greenABLE, South Africa

Circularity in Africa

Specific contexts to consider:

1. Informal sector
2. Agriculture/ rural focus
3. Decentralised closed loops



Source: Footprints Africa report, 2021



Circularity in Africa



The following trends were observed from initial analysis of initiatives as part of the curation of an African database*:

- Predominance of **material recovery**-focussed initiatives
- **Early stage**, less mature enterprises
- Significant eco-system **barriers to scale**, such as perverse policy incentives (e.g. chemical fertiliser subsidies inhibiting uptake of organic fertiliser)
- Collaboration with the **informal sector** to lower unit costs
- Difficulty of finding initiatives that don't self-identify as circular.

For more insights, refer to www.footprintsafrica.co.

*Source: Footprints Africa. From review of a sample of 60 case studies.



Circle Economy's Key Elements



1. Prioritise regenerative resources
2. Stretch the lifetime
3. Use waste as a resource
4. Rethink the business model
5. Collaborate to create joint value
6. Design for the future
7. Incorporate digital technology
8. Strengthen & advance knowledge.

For more, refer to www.circle-economy.com/circular-economy/key-elements.



1. Prioritise Regenerative Resources



Ensure **renewable**, **reusable**, **non-toxic** resources are utilised as materials and energy in an efficient way. 3 strategies:

1. **Regenerative materials**: utilise bio-based, reusable, non-toxic and non-critical materials
2. **Regenerative water**: replace freshwater with less impactful alternatives and enact water efficiency measures
3. **Regenerative energy**: replace energy sources with less impactful alternatives and enact energy efficiency measures.

Examples: Hya Bioplastics (Uganda), MycoTile (Kenya), Sabon Sake (Ghana), Maji Jibu (Tanzania), Neat EcoFeeds (Ghana), GAYO (Ghana), OKO Forests (Ghana).

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 1. Regenerate - Hya Bioplastics



Hya Bioplastics Uganda, Manufacturing

"Solutions that upcycle local waste streams show immediate impact."



What they do

Hya Bioplastics produces biodegradable consumer packaging from plant fibres such as maize husks, sugar cane bagasse and water hyacinth. The process uses waste by-products from agriculture. If they can refine their prototype with water hyacinth, could provide a viable solution to an invasive species which has encroached on 20,000 hectares of Lakes Victoria, Albert and Kyoga in Uganda. This has blocked waterways, causing eutrophication and impacting water quality. Hya Bioplastics' packaging is compostable and biodegradable.

Circular Strategies



Prioritise regenerative resources



Rethink the business model



CASE STUDY: 1. Regenerate - MycoTile



MycoTile

Kenya, Manufacturing

"The construction industry is quite conservative. It's hard to convince people that they can make a wall from mushrooms."



What they do

MycoTile offers a high performance and cheaper alternative to traditional building materials. Their carbon negative process bonds agricultural waste (such as maize cobs, coffee husks and coconut coir) with mushroom mycelium. The product is denatured through heat treatment to inhibit mycelium growth. Their products are fire-retardant due to the natural presence of chitin in mycelium.

In Kenya, most construction materials are imported. Meanwhile, the annual housing deficit of 250,000 units is unmet by supply of 50,000 units. Creating low cost, low impact building materials is a social imperative.

Circular Strategies



Prioritise regenerative resources



Rethink the business model



2. Stretch the Lifetime



While resources are in-use, **maintain**, **repair** and **upgrade** them to maximise their lifetime and give them a **second life** through take back strategies when applicable. 3 strategies:

1. Maximise lifetime of products in-use: **upgrade**, **repair** and **maintain**.
2. Maximise lifetime of products after use: give products and parts another life.
3. Maximise lifetime of biological products: ensure that they are properly managed and preserved.

Examples: WEEE Centre (Kenya), Suame Magazine (Ghana), Dignified Wear (Ghana), Kolics Wear (Ghana).

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 2. Stretch - Suame Magazine

Suame Magazine Ghana, Manufacturing



Image: Adam Cohn, 2008

What they do

Rather than a single business, this is an informal cluster of around 200,000 artisans located 10km from the city of Kumasi. In 2013, a prototype vehicle was designed and manufactured by artisans in partnership with a Dutch NGO. It was intended for use in rough terrains and completed entirely with local equipment (Domfeh, 2013).

The cluster experienced a boom in the 70s and 80s due to restrictions on imports of cars and spare parts but more recently has gone into decline. The skills and equipment of the mechanics have not been able to keep up with vehicle innovation, which features increasing levels of electronic technology (Verbuyst, 2016).

Circular Strategies



Stretch the lifetime



CASE STUDY: 2. Stretch - WEEE Centre



WEEE Centre

Kenya, Manufacturing

"Through creating an inclusive value chain that rewards all stakeholders, we can change the perception of waste and achieve significant impact."



What they do

In Kenya, only 1% of the 51,000 tonnes of electronic waste produced in 2019 was recycled (Clasp, 2019). E-waste contains harmful materials which are detrimental to the environment and human health when these devices are not properly disposed of.

WEEE Centre processes e-waste from 4,000 clients to repair, upcycle, recycle or extract its valuable components for reuse. Repaired products are sold to second-hand dealers, extending their useful lives.

Circular Strategies



Stretch the lifetime



Use waste as a resource



Collaborate to create joint value



Incorporate digital technology



3. Use waste as a resource



Utilise waste streams as a source of secondary resources and recover waste for reuse and recycling. 3 strategies:

1. Valorise waste streams- **closed loop**: reuse, repurpose and recycle waste streams within the same industry
2. Valorise waste streams- **open loop**: reuse, repurpose and recycle waste streams within other industries
3. Energy recovery from waste: recover waste energy or generate fuels and energy from waste streams.

Examples: Kyuma Goods (Kenya), RamBrick (South Africa), LONO (Cote d'Ivoire), Compost Kitchen (South Africa), Mr Green Africa (Kenya), Arena Recycling (Tanzania), EcoBrixs (Uganda), Pyramid Recycling (Ghana), Reaval UNO (Ghana), Libe Green Innovation (Tanzania), Clothes to Good (South Africa), Gunjur (Gambia), NAMé Recycling (Cameroon), Rewoven (South Africa), Ecodudu (Kenya), etc.

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 3. Waste - Kyuma Goods



Kyuma Goods Kenya, Manufacturing

"When you are working with leather, you have to measure everything. This makes it easier to understand your business' impact."



What they do

Cattle farmers risk losing their herds and thus their livelihoods in droughts. Kyuma offers an alternative income source for them, purchasing hides alongside lower quality reject hides from slaughterhouses. Using their proprietary, non-toxic tanning method, they are able to prevent significant waste and create beautiful shoes, belts and accessories. They provide training for young people in the poorer north of Kenya, who collect and preserve hides using natural techniques.

Circular Strategies



Use waste as a resource



CASE STUDY: 3. Waste - RamBrick

RamBrick

South Africa, Manufacturing



What they do

Construction waste constitutes 30% of waste going to landfill. At the same time, South Africa is experiencing a huge housing deficit. RamBrick is a compressed earth block application using waste soils from construction and development sites and crushed rubble to manufacture blocks for housing construction. The blocks comprise 70% waste soils, 25% crushed builder's rubble and 5% cement stabiliser using a hydraulic compression system to compress the waste materials into blocks that are air cured, creating a very low-embodied building material (251kg CO₂/m²) compared to concrete blocks at 760kg CO₂/m²). The blocks are thermally efficient, bullet-proof, sound-proof, cheaper (16% cheaper than concrete blocks and 45% cheaper than clay bricks), zero water in manufacturing and low embodied energy.

Circular Strategies



Prioritise regenerative resources



Collaborate to create joint value



Design for the future



Use waste as a resource



4. Rethink the business model



Consider opportunities to create greater value and align incentives through business models that build on the interaction between products and services. 2 strategies:

1. **Product** business models: deliver products to customers through business models that ensure maximum value
2. **Service** business models: deliver services to customers through business models that ensure maximum value.

Examples: LONO (Côte d'Ivoire), Closing the Loop (pan-African), The Clothing Bank (South Africa)

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 4. Business Model - Closing the Loop



Closing the Loop

Africa, ICT

"We practice circular economy not because it is easy to do, but because it is our only option."



What they do

The global use of electric and electronic equipment grows by 2.5 million tonnes annually. Only about 17% percent of these items are formally collected and recycled at end of life. Closing the Loop (CTL) has seized the opportunity of more ethically-minded companies seeking to minimise the impact of purchasing new electronic equipment. CTL offers them a 1-for-1 promise: for every device procured, CTL will recover and recycle an equivalent piece of electronic waste from the African continent, which lacks the proper facilities to process e-waste. E-waste containing harmful toxins is often processed in unsafe conditions. CTL incentivises their collectors not to dismantle devices and ensures safe collection and recycling.

Circular Strategies



Rethink the business model



Use waste as a resource



Collaborate to create joint value



CASE STUDY: 4. Business Model - LONO



LONO

Côte d'Ivoire, Agriculture

"The technologies are now mature enough to transform biowaste into income. Now we just need willing investors and business models that match the context."



What they do

LONO's founders are passionate about developing technology appropriate to the rural context, accessible and easy to maintain. LONO has developed community-scale, clean technologies to transform agricultural waste and by-products into compost, animal feed and biofuels. The company has two different models. First, domestic-scale, pre-fabricated composters and digesters for farmers to process their own biowaste. Outreach teams advise farmers on how to enhance the compost to suit their soil and crops. Second, LONO partners with medium-sized factories to build industrial scale biowaste composting and biodigestion units and avoid waste incineration, sharing revenue generated with their clients.

Circular Strategies



Rethink the business model



Use waste as a resource



Design for the future



5. Collaborate to create joint value



Work together **throughout the supply chain**, internally within organisations and with the public sector to **increase transparency** and create **joint value**. 5 strategies:

1. Industry collaboration: to create joint value and identify synergies
2. Customer/ consumer collaboration: engage and guide customers and consumers to ensure circular use of products
3. Government collaboration: on circular policies and programmes
4. Internal collaboration: to guide employees and facilitate greater **knowledge sharing** between internal divisions
5. Community collaboration: where facilities or offices are located

Examples: *Safi Sana (Ghana), Closing the Loop, GAYO (Ghana), The Clothing Bank (South Africa), GreenABLE (South Africa).*

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 5. Collaborate - greenABLE



greenABLE

South Africa, Waste management

"We have taken the initiative to be responsible for our industry's waste, whilst adding value to the lives of persons living with disabilities."



What they do

GreenABLE employs disabled women to process used printer cartridges. Each year they process ~306,000 printer cartridges, diverting 220 tonnes of waste from landfills. Workers separate cartridge components to extract plastic, metals such as mild steel and aluminium. Plastics are granulated, extruded and pelletised and, along with the other materials, are sold to manufacturers for recycling.

Women are officially employed by sponsoring organisations (not GreenABLE). In South Africa, Black Economic Empowerment regulations require employers to have Broad-Based employment, in order to be eligible for certain contracts. GreenABLE allows them to attain these employment figures whilst cleaning up the environment and providing training for a group, which typically faces 70% unemployment rates.

Circular Strategies



Collaborate to create joint value



Use waste as a resource



CASE STUDY: 5. Collaborate - Sabon Sake

SABON SAKE

Sabon Sake

Ghana, Agriculture

"Growing food as medicine can be achieved and made accessible with healthy, regenerated soils."



What they do

Sabon Sake uses agricultural waste to create microbe-enriched biochar that regenerates infertile and degraded soils. The economic loss of degrading soils in Africa is estimated at \$68 billion per year (Montpellier Panel, 2014). Sabon Sake's amendment is produced with agricultural waste from sugarcane. They use thermochemical conversion technology to produce biochar, which is inoculated with microorganisms and used as a customised soil blend. This sequesters carbon released into the atmosphere. Sabon Sake partners with local farming communities and runs workshops for farmers. They provide a market for farmers' produce, which incentivises them to ensure their produce is of the highest quality.

Circular Strategies



Collaborate to create joint value



Prioritise regenerative resources



Rethink the business model



6. Design for the future



Account for the **systems perspective** during the design process, to use the right materials, to design for appropriate lifetime and to design for extended future use. 3 strategies:

1. Design out waste: during production and use
2. Design for cyclability: to **enable multiple uses** and lifecycles of a product and its materials
3. Design for **durability**: for products made to last and to ensure longer use.

Examples: Maji Jibu (Tanzania), Safi Sana (Ghana), LONO (Côte d'Ivoire), RamBrick (South Africa).

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 6. Design - Safisana



Safisana

Ghana, Waste management

"Our circular model treats waste as a resource while creating broad impact in the community."



What they do

Safisana's business is designed to close the loop and return nutrients to the biosphere i.e. in the biological nutrient cycle. They design and operate systems that take market, abattoir waste and sewage from urban slums to produce electricity, compost, irrigation water and seedlings, using Anaerobic Digestion (AD). In Accra, 72% sewage ends up untreated in the environment and organic matter comprises 65% municipal waste. Their process of diverting this waste from over-burdened landfills and the environment has an additional benefit of replenishing soils. This is critical given Africa has the most degraded soils in the world (Montpellier panel, 2014).

Circular Strategies



Design for the future



Rethink the business model



Collaborate to create joint value



Use waste as a resource



Prioritise regenerative resources

FACTORY CAPACITY

WASTE:	25 tons of waste per day
ELECTRICITY:	2,200 kWh per day
FERTILISER:	2 tons per day
IRRIGATION WATER:	20,000 liters per day
SEEDLINGS:	800,000 per year



CASE STUDY: 6. Design - Maji Jibu



Maji Jibu

Tanzania, Water

"We have produced less than three or four truckloads of plastic waste to date. Plastic companies want to partner with us for recycling, but we just don't have enough waste."



What they do

Through a franchise model, Maji Jibu has a decentralised network of entrepreneurs offering affordable access to safe drinking water, in the process keeping plastic in circulation for as long as possible. Jibu's 20 litre bottles last for 200-400 refills. As the founder says "We have produced less than three or four truckloads of plastic waste to date. Plastic companies want to partner with us for recycling, but we just don't have enough waste."

Circular Strategies



Design for the future



Stretch the lifetime



Rethink the business model



Prioritise regenerative resources



7. Incorporate digital technology



Track and **optimise resource use** and **strengthen connections** between supply chain actors through digital, online platforms and technologies that provide **insights**. 2 strategies:

1. Data and insights: employ technologies to **gather and analyse data** to provide insights on resource use
2. Digital platforms: employ online platforms to connect and **improve information sharing** between stakeholders.

***Examples:** DigiYard (South Africa), WEEE Centre (Kenya), GreenABLE (South Africa), NovFeed (Tanzania), Build for You (Ghana), Kudoti (South Africa).*

Sources: Circle Economy, Footprints Africa.



CASE STUDY: 7. Digital - DigiYard

DigiYard

South Africa, Construction

"Ultimately our goal is to create a self-sustaining service which could be rolled out in cities across South Africa, and the wider world."



What they do

An internal innovation competition at Arup led to the creation of an app-based service connecting unused construction site materials and waste with small-scale builders and traders in the informal sector. The construction industry is estimated to be accountable for using around two-fifths of the world's energy and materials flow, one-sixth of freshwater reserves and one-quarter of global wood harvest (Horvath, 2004) while contributing to 13–30% to total waste generated worldwide (Thongkamsuk, 2017). In South Africa, some 30% materials delivered to a construction site are wasted, ending up in landfill. Meanwhile, millions of South Africans live in townships with limited infrastructure and low quality housing, reinforcing stark inequalities.

Circular Strategies



Incorporate digital technology



Collaborate for shared value



Rethink the business model



8. Strengthen & Advance Knowledge



Develop research, structure knowledge, encourage innovation **networks** and disseminate findings with **integrity**. 4 strategies:

1. Education & curriculum: integrate principles of circularity into primary, secondary and tertiary curriculum and conduct workplace trainings
2. Knowledge management: solidify definitions and create frameworks to support the understanding of the circular economy across contexts and maintain cohesive systems of data...
3. Research & development: research and facilitate new technological developments to aid the transition to a circular economy
4. Communication & awareness: raise awareness and run information campaigns about strategies for and impacts of the circular economy in different contexts.

Examples: the African Circular Economy Network (ACEN), the African Circular Economy Alliance (ACEA)

Sources: Circle Economy, Footprints Africa.

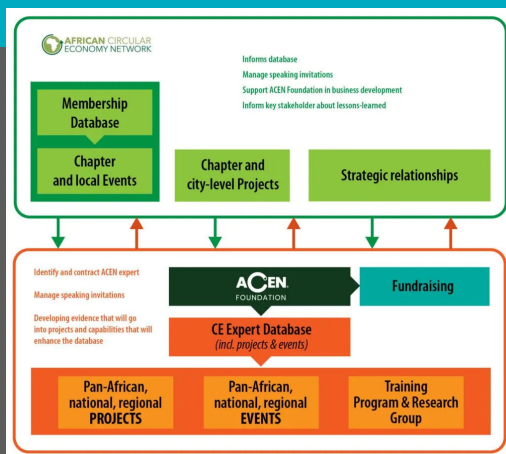


CASE STUDY: 8. Knowledge - ACEN



ACEN, Pan-African network

"Our vision is to build restorative African economies that generate well-being and prosperity inclusive of all its people through new forms of economic production and consumption which maintain and regenerate its environmental resources."



What they do

The African Circular Economy Network (ACEN) is a non-profit network of 100 Country Representatives across 30 Chapters, each representing one country. Chapters are composed of teams of experts (product designers, waste management, urban developers, electronic waste, biomimicry, etc.) who work with key stakeholders to promote Circular Economy in their country and share best practice through Circular business cases and projects.

In collaboration with Trinomics, ACEN has established a Foundation to support capacity building, knowledge transfer, business support, awareness raising and projects across the continent.

ACEN is working with Footprints Africa and Circle Economy to build a knowledge community across the continent.

Circular Strategies



Strengthen & Advance Knowledge



CASE STUDY: 8. Knowledge - ACEA



The Alliance, governmental network

"We believe that the circular economy presents Africa with the opportunity to grow and use its natural resources efficiently while remaining low in emissions. Centralised platforms like the African Circular Economy Alliance will build the momentum for circular economy engagement and foster continental and regional partnerships.."



AFRICAN
CIRCULAR
ECONOMY
ALLIANCE

What they do

The African Circular Economy Alliance is a government-led coalition of African nations with a mission to spur Africa's transformation to a circular economy that delivers economic growth, jobs, and positive environmental outcomes. The secretariat is hosted by Dalberg, the African Development Bank, World Economic Forum and Danida.

The Alliance supports the transition to a circular economy through:

- policy development
- leadership and advocacy
- support in scaling CE businesses and projects.

It was founded by Rwanda, South Africa and Nigeria and has since added members from across the continent.

Circular Strategies



Strengthen & Advance Knowledge



Assignment!

Questions:

1. Choose a Key Element [slide 7] that you want to explore in more detail. Pick one of the examples not elaborated into a Case Study slide and create your own slide, describing the initiative and to what extent it reflects the circular strategy.
2. Select the case study that most inspired you. Identify whether it satisfies any of the other 6 Key Elements. If so, how many? Which ones? How can you be sure?
3. None of the cases outlined came from North Africa. Find a case study that fits one of the Key Elements and create a slide, as outlined in Assignment 1. Bonus points if you submit your slide to the curators of this training material via our [online form](#) or to changemakers@footprintsafrika.co

Conclusion

"The first and foremost rule of the game that needs to be changed is the shift from 'ever lower costs' to 'ever higher generation of value' with what is locally available"

Gunter Pauli, 2014

Contact us

- For collaborations or partnerships
- Share case studies through the questionnaire

- Link to the paper - <https://bit.ly/3rPldhX>
- Our website - www.footprintsafrica.co
- Our email - Changemakers@footprintsafrica.co
- Interactive map - <https://bit.ly/3jpkxwq>





Sources

Circle Economy

www.footprintsafrica.co

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Montpellier panel

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