Evaluation of Waste Management in Southwestern Nigeria for Clean Environment, Circular Economy & Agri-food Systems Development

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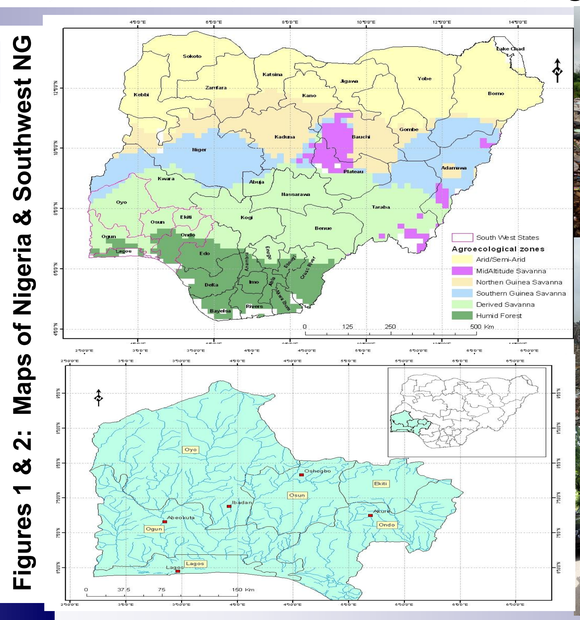
Introduction and Objective

Poor waste management results in environmental, ecological and socioeconomic problems in Southwestern (SW) Nigeria. Attempts at managing waste through burning can lead to climate change while landfill leachate reduces soil and ground water quality. Hence, the need to look for better alternative. This research looks at the current challenges in the waste management system in SW Nigeria, as well as proposes a more contemporary system that will move the region towards developed circular economy/agri-food systems. Environmental Kuznets Curve hypothesis provided theoretical framework.



Figures 1 & 2: Maps of Nigeria & Southwest NG

Figures 3 - 11: Some Landfills & Dumpsites for Waste-to-Resources, Circular Economy+Green Growth>>

Results

Waste Mgt System & Respondents in Nigeria

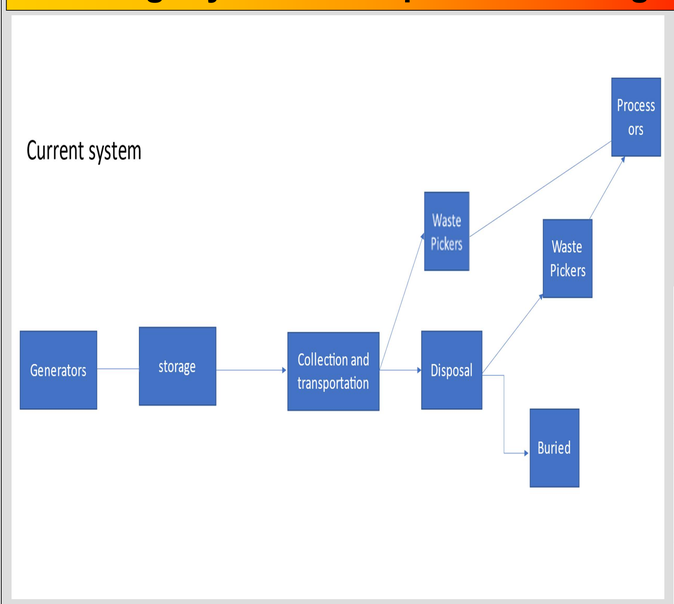


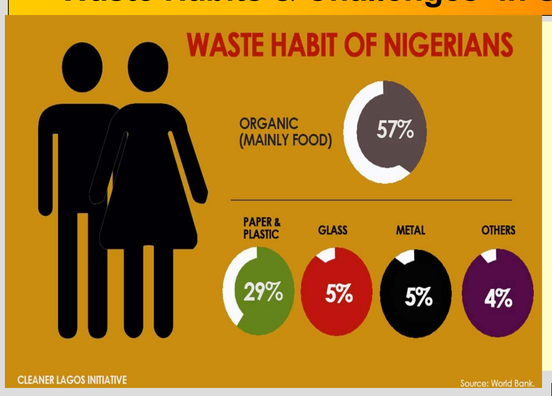
Fig. 12: Linear Economy in Nigeria

SW - Nigeria	Freq.	%
Lagos	64	25.60
Ogun	30	12.00
Oyo	30	12.00
Osun	30	12.00
Ondo	26	10.40
Ekiti	30	12.00
Total	**210**	**100.0**

Waste MGT Challenges	Freq.	%
Pollution and Health Risks	166	69.1
Ltd. Resources	108	44.8
Lack of Tech Skill	57	23.8
Inadequate Managemnt Skill	43	18.1

Table 1&2: Respondents & Waste Mgt Challenges

Waste Habits & Challenges in Southwestern Nigeria



- Only 28.1% separated waste at source, 46.2% used private collection services in SW Nigeria
- Major waste management challenges were pollution & health risks (69.1%), limited resources (44.8%), lack of technical skill (23.8%) and inadequate management skill(18.1%).

Fig. 16: Waste Challenges & Habit in Nigeria

WTR Model for Circular Economy+Agri-food System Dev. (Figure 17)

Linear to Circular Economy Transition for Agri-food System/Clean Environment

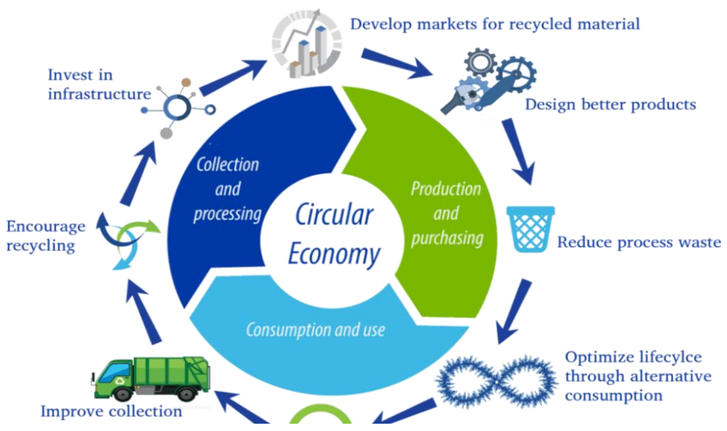


Fig. 13: Circular Economy Model

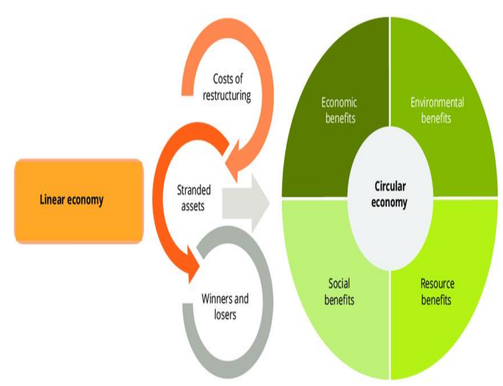


Fig. 14: Circular Economy Transition Benefits

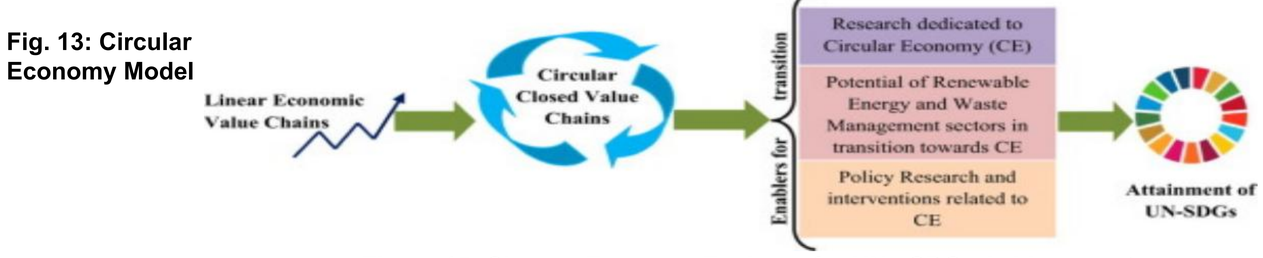


Figure 15: Circular Economy Enablers for UN - SDGs Achievement

Source: Figures 1 - 24 : DIWA-Safisana Partners / Own Computation; IITA Nigeria; Internet

Waste Mgt Practices & Willingness for Circular Economy WTR in Nigeria

- ❑ Anaerobic Digestion => Biogas for Renewable Energy
- ❑ Composting => Fertilizer
- ❑ Wastewater Treatment (Wetland) => Agri-Business

Figure 18 - 22 CE WTR Technology Process

- As part of waste management (mgt) practices;
- **95.2%** were willing to participate in circular economy (CE) process,
- **94.3%** supported polluter pays principle (PPP),
- **96.2%** supported dissemination of public information on waste-to-resources (WTR) for circular economy in Nigeria respectively,
- Waste management challenges significantly influenced health issues and pollution in SW Nigeria (p=0.05).

Materials and Methods

EKC, Energy STAT, Socioeconomic Survey, Sampling & Analyses

- Environmental Kuznets Curve (EKC) hypothesis provided theoretical framework.
- Purposive sampling of major landfills in SW Nigeria with their waste generation patterns using structured questionnaires (210) on spatial-variation, challenges and prospect of waste management practices were done.
- The results were validated at expert workshop for key officials within the waste management industry.
- Data were analysed using descriptive and inferential statistics.

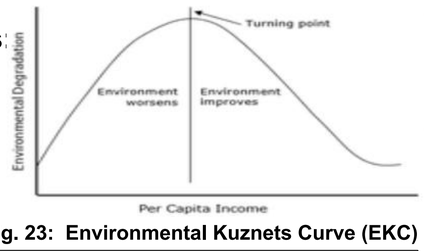


Fig. 23: Environmental Kuznets Curve (EKC)

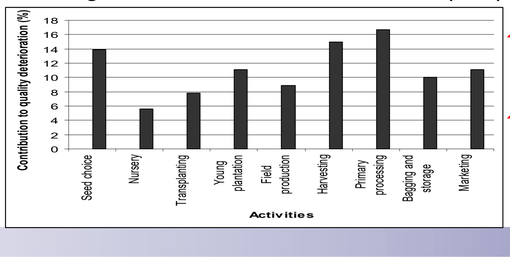


Figure 24: Agri-food Production Value Chain

Conclusions

- **Transiting from linear to circular economy requires a paradigm shift in product economy that curtails environmental impact & waste of resources with increased efficiency at all stages.**
- **With circular economy, waste is now seen as a resource & not a challenge. Waste now becomes input materials for the creation of valuable products as new outputs. This require synergy in the products development, infrastructure, equipment & services sector with support for Waste Managers to take the driver's seat.**
- **Waste separation at source is enhanced by 3 - Waste Bin System: 1st for organic waste, 2nd for other recyclable waste & 3rd for non-recyclable waste.**
- **Government has a role in creating an enabling environment & stimulating demands to sustainably transits from current linear to circular economy for green growth. Pass Extended Producers Responsibility into law & support the Private Sector with Grants.**