

# Circular Economy in Africa-EU Cooperation

Country report for Nigeria



**EUROPEAN COMMISSION**

Directorate-General for Environment  
Directorate F – Global Sustainable Development  
Unit F2 - Bilateral & Regional Environmental Cooperation

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### Acknowledgements

We acknowledge the valuable contribution of several co-workers from within the four participating institutions, as well as the feedback received from DG Environment and other DG's of the European Commission as well as the Members of the EU delegation to Nigeria.

### Preferred citation

Rajput, J.; Potgieter, J.; Aigbokhan, G.; Felgenhauer, K.; Smit, T.A.B.; Hemkhaus, M.; Ahlers, J.; Van Hummelen, S.; Chewpreecha, U.; Smith, A. & McGovern, M. (2020) Circular economy in the Africa-EU cooperation - Country report for Nigeria. Country report under EC Contract ENV.F.2./ETU/2018/004 Project: "Circular Economy in Africa-Eu cooperation", Trinomics B.V., Tomorrow Matters Now Ltd., adelphi Consult GmbH and Cambridge Econometrics Ltd.



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Luxembourg: Publications Office of the European Union, 2020

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EN PDF	ISBN 978-92-76-26832-1	doi:10.2779/572359	KH-06-20-059-EN-N
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# Abbreviations

<b>AFD</b>	Agence Française de Développement
<b>AMCEN</b>	The African Conference of Ministers of Environment
<b>COFIDES</b>	Compañía Española de Financiación del Desarrollo
<b>ECOWAS</b>	Economic Community of West African States
<b>EE</b>	environmental education
<b>EEE</b>	Electronics and Electrical Equipment
<b>EHS</b>	Environmental, Health and Safety
<b>ELV</b>	End-of-Life Vehicle
<b>EPA</b>	Economic Partnership Agreement
<b>GEF</b>	Global Environmental Facility
<b>GES</b>	Growth Enhancement Support Program
<b>GICBu</b>	Green Innovation Centres for the Agriculture and Food Sector
<b>GIZ</b>	German Gesellschaft für Internationale Zusammenarbeit
<b>IEI</b>	Innovation Enterprise Institutions
<b>ILO</b>	International Labour Organisation
<b>LASEPA</b>	Lagos State Environmental Protection Agency
<b>LAWMA</b>	Lagos State Waste Management Authority
<b>MRF</b>	Materials Recovery Facility
<b>MSMEs</b>	Micro, Small and Medium Sized Enterprises
<b>NBTE</b>	National Board for Technical Education
<b>NCF</b>	Nigerian Conservation Foundation
<b>NIP</b>	National Indicative Programme
<b>OEM</b>	Original equipment manufacturers
<b>PIGB</b>	Petroleum Industry Governance Bill
<b>TVET</b>	Technical, Vocational Education and Training
<b>VEI</b>	Vocational Enterprise Institutions
<b>WEEE</b>	Waste of Electronics and Electrical Equipment



## **Executive Summary**

### ***Circular economy trends in Nigeria***

Nigeria is Africa's most populous country and it is also the largest economy in the continent accounting for 18% of the GDP generated in the continent. Even though significant structural change has taken place in the Nigeria over the last decades (especially a growth in the service sector), the country is still strongly dependent on oil production and exports for its national income and employment. The impact of Covid-19 on the global oil prices has painfully exposed the risks associated with continuing oil dependence. The crisis could be the tipping point for shifting away from resource extraction as primary contribution to GDP. A circular economy shift has however, not been articulated in any recovery measures to date. This is a missed opportunity as the Circular Economy (CE) can contribute to job creation and transformation and contribute to food security and leverage the key role of the informal sector.

Even though the CE concept has not yet received a lot of attention in the private sector or the public discourse, Nigeria has several sectors that could benefit from the uptake of CE principles.

The most promising areas for development of CE principles are agri-food, plastics/packaging, and waste management. The selection of sectors covered is based on the following rationale:

- Relatively high contribution of these sectors to the national GDP and share of the labour force;
- The existence of policies and strategies that support transition to a CE in these sectors;
- Dire and pressing waste management situation, in Lagos (Nigeria's most populous city) in particular;
- Identification of opportunities in these sectors that contribute to the achievement of CE goals.

The **agricultural and food sector** needs to be put in the centre of Nigeria's circular economy pathway, as the sector is still a major source of income and employment in the country. Adoption of CE principles could act as a driver to promote food security and increase productivity in the agriculture and food production sector. This is most notable especially in times of crisis, such as the current COVID-19 pandemic. For a just transition, the inclusion of small-scale farmers in the transformation process is key, ensuring that the stability and size of their income is increased. This study shows that agriculture can benefit the growing population and the environment with a focus on minimisation of food losses through improved harvesting and better handling and storage of harvested products, cold-chain logistics, and circular approaches related to beneficiation of agricultural and food waste for energy and soil conditioning. Existing cold chain solutions that make use of stand-alone solar technologies have proven to support farmers and market vendors minimise waste.

The need to decouple the economy from oil dependence and support a secondary-resource market highlights the importance of the **waste sector** and the opportunities for using waste as a resource, particularly in e-waste and plastics recycling. The predominantly informal nature of waste management in Nigeria needs to be formalised to a degree, and leveraged to develop a structured, integrated waste management solution for urban and rural areas. A shift to a secondary resource market is also viable in the automotive sector. Given the number of imported and local vehicles, opportunities exist to develop effective secondary resource marketplaces. This requires end-to-end consideration from availability of secondary materials to markets for products developed using secondary resources – a closed loop approach. Application of circular models to waste management such as the recovery and processing of secondary materials has the potential to unlock economic opportunities in Nigeria. The waste industry should be considered an important enabling sector for CE development and a driver of job creation, as improved collection and utilization of waste can simultaneously reduce the increasing pressures on the environment and ensure the recovery of otherwise lost economic value.

The **plastics industry** has grown in Nigeria with an increased focus on end-user plastics. However, its scale is still insufficient to effectively compete with imported materials. Currently Nigeria remains a major importer of plastics with over 70% of the feedstock imported (mainly from the Middle East, Europe and Asia) and 30% locally produced. There are opportunities for application of circular models, through the use of end-of-life plastics as a feedstock. This can benefit both formal and informal actors, empowering stakeholders across the value chain through:

- Involvement of international players, to develop closed-loop systems for the industry. Nigeria stands to leapfrog and become a leader in innovative, sustainable plastics production and management;

- Involvement of local packaging industry to support a transition to circular models. A local production label *Made-In-Nigeria* can accelerate progress towards a new era of high-quality Nigerian manufacturing. CE principles are key to ensure that such an industrial revival does not lead to an increase in environmental pressures;
- Multinational chemical players are driving innovative development in the industry with local CE hubs. The goal is to establish local value chains and an innovative local chemical industry, based on secondary materials.

On a side note, at a time when global focus is on the 4th Industrial Revolution and the potential of the ICT sector, Nigeria is being left behind. The industry has the potential to drive CE approaches across all sectors, facilitating digital access to services that negate the need for ownership. Currently, the Nigerian ICT sector is characterized by a dominant voice/SMS market, without an enabling telecommunication, financial, policy and regulatory environment. Digital poverty needs to be addressed holistically, not limiting to connectivity. Only then large-scale uptake of digital solutions for circular consumption can take place.

In order to be successful, a CE transition in Nigeria will have to be well-adapted to the national economic and societal context, forging a transition pathway that aligns pressing societal needs with CE opportunities. A transition that considers the social and environmental impacts, which ensures that basic human needs are met in a sustainable manner and that promotes social transformation in terms of poverty alleviation, adherence to human rights, equality and access to resources, is crucial. This link is important because there can be unintended social (e.g. employment losses in informal sectors, if these are not taken on board in the transformation process) and political consequences that need to be considered for the transition to a circular economy. Existing social divides (gender, education level) should not be exacerbated by the transition, while sustainable resource use needs to be accompanied by livelihood preservation. The imperative for a just transition is pertinent for policy dialogues in terms of alignment to national priorities and the social dimension of a CE transition.

### ***Policy framework supporting circular economy activities***

CE models and concepts are relatively novel in Nigeria with limited formal uptake. Policies developed around waste management and environmental protection serve as a starting point. Political ambition to reduce oil-dependence could become a driving force behind a CE transition. Nigeria hopes to encourage and promote the development of green growth initiatives that relate to the circular economy. Key policy and regulations include:

- **Economic Recovery and Growth Plan (2017).** Macro-economic stability and economic diversification away from dependence on oil. Mainstreaming CE principles into this plan could provide a clear vision for economic diversification in Nigeria;
- **The draft National Policy on Plastic Waste Management (2020).** Lays the foundations for plastics and a CE. This policy is not yet gazetted;
- **Steps recently taken to tackle large E-waste problem,** including a CE initiative for electronic products in Nigeria, to increase circularity of the E-waste sector.
- The country is implementing an **Extended Producer Responsibility (EPR)** policy based on international guidance. These can encourage industry to shift to closed-cycle manufacturing and efficient take-back schemes for remanufacturing and recycling.

### ***Existing awareness and capacities on circular economy in Nigeria***

National awareness of CE is still low in Nigeria, with primary focus on waste management issues. Recycling and resource recovery initiatives have received attention from government and waste management authorities. Community-led awareness target all citizens, while international organizations mainly focus on engagement in rural areas. Industry awareness is growing, but the majority of Nigerian industries are still unaware and as a result do not actively participate in disposal and processing of their waste. Creating a broader awareness is critical to gain on the ground support, if Nigeria would like to transition to a CE.

Nigeria's waste sector comprises an informal waste-picking and recycling industry, consisting of scavengers/waste pickers, intermediaries, artisans, and small-scale enterprises engaged in the recovering, re-manufacturing and reuse of predominately, e-waste. Research suggests that

awareness of environmental and health impacts of hazardous disposal practices is low amongst informal workers in Nigeria, particularly with regard to e-waste management.

### ***Trade and investments in the circular economy in Nigeria***

Although resource exports, particularly oil, are important for the Nigerian economy, the overall export levels are relatively low compared to other countries. In 2018, the share of total trade in GDP was 33%. Trade directly related to the circular economy is mostly limited to materials and resources. Some of the most important trade related trends for Nigeria are listed below:

- Nigeria has a rather low trade intensity compared to other African countries, indicating the presence of significant trade barriers;
- Materials and natural resources account for on average 95% of the exports from Nigeria to the EU, 93% of which is oil;
- Nigeria's bulk of trade involves oil, which means circular approaches to economic transformation (including the shift from petroleum-based feedstocks to secondary feedstocks) will need to manage trade-offs as the loss of employment in extraction needs to be mitigated by means of capacity building and reskilling to enable people currently employed in the oil industry to find new jobs in the circular economy.

Improving the overall trade and investment climate in Nigeria will be an important prerequisite to also unlock investments in circular business activities and trade in CE-related goods and services. Despite not having signed the ECOWAS EPA, Nigeria is signatory to several international conventions and treaties that aim to support a more sustainable trade of goods and services. Although CE-related trade in Nigeria is currently dominated by e-waste, there has been some diversification in particular in the renewable energy sector, where local solar companies increasingly import technologies from Original Equipment Manufacturers (OEMs). However, especially the import of solar technologies is still hampered by a 10% import duty levy by the Nigerian Customs Service. This is an example of how trade regulations and tariffs can hamper the transition to a greener economy.

To solve Nigeria's pressing problem with imported electronic waste, the control of exports of used and end-of-life products (e.g., WEEE and ELVs) from Europe to Africa must be improved. In this context, the training of enforcement officers from African countries in Europe could be considered.

Although the link with circular economy is limited, the trends in trade in environmental goods and services between the EU and Nigeria show that the trade in these categories is growing, indicating a demand for environment-related technologies and services. Indeed, imports dominate Nigeria's trade in environmental goods and services, where renewable energy technologies as well as 'cleaner and more resource efficient products' account for the largest part of the imports. Currently no African country is part of the ongoing negotiations on the WTO Environmental goods agreement. As the agreement has significant potential to promote green growth and sustainable development, knowledge transfer and even the diversification of exports, an active involvement of Nigeria and other African Countries offers great opportunities to support trade and investments in environmental goods and services.

### ***Existing and future economic, environmental and social impacts***

The implementation of national policies and initiatives that are related to the circular economy have several positive economic, social and environmental impacts and benefits documented in this report that include:

- Creation of new business and employment opportunities;
- The recovery of otherwise lost economic value from waste; Recycling of wastes;
- Capacity building, knowledge sharing and up-skilling, especially of informal workers in the waste sector;
- Raising awareness among the public on better waste management practices; Diversion from landfill.
- Improved health conditions of the public as a result of safer waste management practices;
- Resource efficiency.

In this study we have also done a forward-looking assessment analysing the impacts of implementing a (limited) set of CE actions between now and 2030. A macro-economic model was used to estimate the impact of implementing a set of circular economy measures in the identified priority sectors Agri-food, plastics, construction, EEE products and E-waste and general waste. Overall, the circular measures assessed could lead to an increase in economic activity and create additional jobs. The key findings are the following (more detail in section 3.2.3):

- **Economic benefits:**
  - A **3.2% increase of GDP** (+ €15.2 bn) compared to business as usual;
  - An improved trade balance, through a reduction in imports worth € 4.4 bn;
  - Food loss reduction across the agricultural value chain and associated investments are the largest driver of the impacts found in our modelling assessment.
- **Social benefits:**
  - **1.6 million additional jobs** would be created compared to business as usual, which is equivalent to an increase of 3.9%;
  - If done in the right way, increased activities in waste collection and recycling could strengthen the economic position of (informal) waste workers, and attention for capacity building and training can ensure that these people will benefit from the CE transition as well.
  - The largest employment increases are found to occur in agriculture, services (largely driven by waste management), distribution, retail and manufacturing. The largest job loss occurs in the chemicals sector, due to product substitutions.

### ***Directions for national policies to contribute to the CE transition in Nigeria***

In order to effectively upscale CE activities in Nigeria, it is important that a holistic policy vision for the CE is developed at the national level, which is integrated into the broader framework of economic policy. In such an effort cooperation and coordination between different government departments such as the departments of environment, agriculture, information and culture, science and technology, trade and investment, and finance, is essential. Furthermore, there should be coordination across the different government levels, from the federal government down to the regional and local authorities. A national CE policy in Nigeria should focus on:

- Facilitation of CE development and investments in sectors with high CE potential and where needed sector specific approaches could be included, but not without involvement of the private sector;
- Strengthening domestic industry to help increasing the circularity of value chains;
- Capacity building and vocational training to increase the number of workers capable of working in the manufacturing sector or other CE-related sectors requiring technical skills.

### ***CE-related cooperation activities between the EU and Nigeria***

#### **Policy dialogues and development cooperation**

Progressive political exchange with EU is taking place, but even though official policy dialogues exist, attention for CE policies is largely lacking. However, Nigeria has participated in several cooperation initiatives, mainly with individual EU Member States such as The Netherlands. Activities within the framework of development cooperation offer a platform for the exchange between actors from the EU and Nigeria.

- Initiatives and platforms envisioned as a catalyst for engagement on the CE had to be postponed due to the impacts of COVID-19. Even though the COVID-19 crisis hit the country hard, **the need for economic recovery programs represents a window of opportunity to implement economic reforms aimed at economic diversification and CE can play a guiding role in this process ;**
- Priorities of development cooperation currently focus on human resources development in the rural sector. The EU actively supports development programs in cooperation with Nigerian stakeholders, but these rarely have an explicit CE-thematic focus. **Mainstreaming CE activities into existing cooperation programs can ensure policy continuity as well as a positive contribution to a transition to a (more) circular economy within the rural context;**

- With increasing environmental awareness and the pressures of climate change, CE-related topics are gaining more attention. **This represents an opportunity to give more attention to circular solutions within existing development cooperation programs, by focusing on promising measures such as the use of organic waste and improvement of the handling, storage and distribution of produced crops to reduce food losses.**

### The role of financial institutions in CE promotion

The External Investment Plan (EIP), aims to encourage investment in partner countries in Africa. The EIP aims to mobilise private capital investment towards development-orientated investment; many of instruments (guarantees) put at disposal of African countries (Nigeria included) have a green economy, digital innovation focus. **The sectoral focus sectors and the promising CE opportunities identified therein (e.g. reduction of post-harvest food losses), can be used as an inspiration for EU financial institutions and DFIs to direct their investments towards circular approaches.**

There is a growing emphasis on climate-proof and socially inclusive economic investments, including CE-related ones. However, there is a need to connect these growing sustainable investment ambitions with bankable circular investment opportunities. Increased cooperation between EU-based financial institutions and Nigerian regional financial institutions could help in this respect. Newly established financial institutions such as the Development Bank of Nigeria or the African Guarantee Fund, offer potential to contribute to the promotion of a sustainable economic development in Africa. Future CE-related activities may benefit from a cooperation between the EIB or European DFIs with these local and regional financial institutions. **Such cooperation activities are recommended as regional finance institutions could play a role in translating the generic CE eligibility criteria and principles from investment guidelines used by European Finance institutions and DFIs to the practical context of financeable projects and assist EU-based financial institutions in judging the environmental and economic potential of such investments. In this way, financial support available in EU financial institutions can be 'unlocked' to contribute to CE development.**

### Research and technical cooperation

Currently, there are no bilateral agreements on joint research initiatives or other framework documents that govern research cooperation between the EU and Nigeria. While there is no explicit CE focus, topics related to water security, crop yield improvement, and waste management are in focus. Since EU knowledge institutions are already developing a strong knowledge base on available CE measures and business models that can be applied in these thematic areas. **As such increased cooperation between these organizations and Nigerian research institutions is recommended, to spur circular economy development in the country. Similarly, bilateral cooperation programs between research institutes from EU Member States and their Nigerian counterparts could help to build CE capacity in Nigeria, e.g. through exchange programs for professors or students or joint research projects.**

Collaboration between local and international research and innovation hubs for the advancement of circular economy principles and its local adoption should be promoted. This does not only hold for academic institutions but also for R&D departments of multinational and EU-based companies that can bring in more applied knowledge on how to develop circular value chains and build a local ecosystem that puts a capacity building pipeline in place. Cooperation between research institutes and departments and businesses can drive upscaling of pilot projects. Involvement of local organisations is key to ensure that the solutions that are being developed to fit the local context and practical reality in the private sector, which will ensure that implemented CE measures make economic sense within the Nigerian context. The EU could facilitate this by providing financial support to research cooperation activities such as joint research projects in the area of CE.

# 1 Introduction

## 1.1 This report

This report is one of the eight ‘country reports’ to be produced as part of the study ‘Circular Economy in the Africa-EU Cooperation’. The general objective of this study is to provide a better understanding of the state of play of current and potential uptake of the circular economy in Africa. The study should also facilitate a better understanding of the potential impact of the transition to Circular Economy in the EU and in Africa in terms of opportunities and trade-offs for Africa and highlight the role of EU-Africa cooperation in circular economy development in both continents.

This report analyses the state of play of circular economy activities in Nigeria as well as the potential to expand these. It explains the potential economic, environmental and social impact of the transition to the circular economy for the country in terms of opportunities as well as trade-offs, and identifies policies and strategies to maximise the former and mitigate the latter. It also provides recommendations for a more effective and integrated EU approach for promoting the Circular Economy transition in Nigeria, connecting the different levels of EU engagement including policy dialogues, development cooperation, trade and investments, innovation and research.

### 1.1.1 *Scope of circular economy activities*

Circular Economy (CE) in this report is understood as an economic system which ultimately produces neither waste nor pollution by keeping products longer in use and by circulating materials at a high quality within the production system and, if possible, feeding them back into the biosphere to restore natural capital at the end of life. As such, the circular economy covers both economic aspects (e.g. value addition, job creation, GDP growth) as well as environmental aspects (focusing on materials and resources). In addition, it takes a full lifecycle perspective, including raw material extraction and processing, design & manufacturing, use & consumption, as well as end-of-use management to look at the potential for circularity throughout the value chain. Although we acknowledge that the transition to a zero-emission energy system is related to the circular economy concept, this study addresses only material resources and not renewable energy deployment.

This report is developed in the context of the implementation of the European Green Deal agenda (EC, 2019), and notably of its international dimension. Elements developed in the Circular Economy Action Plan (EC, 2020<sup>A</sup>), but also in other EU strategies such as the Farm to Fork Strategy (EC, 2020<sup>B</sup>) or in EU Waste prevention and management policies are taken as guiding principles. For instance, priority sectors or policy instruments have been taken as inspiration while not neglecting the local contexts and dynamics of the selected African countries. Connections between the Nigerian and European policy agendas are shown throughout the report and potential future links are discussed in the recommendations chapter.

### 1.1.2 *Methodology*

The report has been prepared by Trinomics, adelphi and Cambridge Econometrics in close cooperation with TOMA-Now and their Nigerian country expert, who has contributed local knowledge to the analysis across all sections of the report. Furthermore, the EU delegation in Nigeria has been consulted. Desk research has been the basis for Chapter 1, and Chapter 4, and has also fed into Chapter 2.

In addition, several datasets have been analysed to be able to understand the status of the circular economy in Nigeria (Chapter 2). The desk research by the country expert was complemented by interviews with relevant experts, see stakeholder lists appended to this report (Annex A).

The modelling of impacts and benefits on Chapter 3 has been carried out using the econometric model [E3ME](#). The modelling has followed three steps: 1) collecting the required data for each country; 2) build the model (i.e. developing a model solution for each country); and 3) design and implement the scenarios.

### 1.1.3 Reading guide

This report has been structured as follows:

- **Chapter 2** provides an overview of the status of the CE in Nigeria analysing CE trends, the policy framework supporting CE activities, the enabling environment for trade and investments in the circular economy as well as existing awareness and capacity in relation to the CE;
- **Chapter 3** sheds light on the economic, social and environmental impacts and benefits of the Circular economy in Nigeria at present and for the future;
- **Chapter 4** studies cooperation between the EU and Nigeria, by mapping CE-related cooperation activities between the two, and exploring opportunities for expanding such;
- **Chapter 5** provides recommendations for a more effective and integrated EU approach to promoting the CE transition in Nigeria, connecting all levels of the engagement including policy dialogues, development cooperation, trade and investments, innovation & research.
- **Chapter 6** summarises the main findings from the earlier chapters.

## 1.2 Nigeria at a glance

Nigeria is the most populous country in Africa, with 201 million inhabitants (World Bank, 2020) and it is also the largest economy in the continent based on GDP. In the 2018 version of the Human Development Index, Nigeria ranked 158<sup>th</sup>, and 24<sup>th</sup> within the African continent. Nigeria ranks 4<sup>th</sup> when it comes to EU-Africa trade, whereas the EU accounts for over a third of Nigeria's exports and over 30% of Nigeria's imports originate from the EU in the period 2010-2018 (UN Comtrade, 2020). Overall, Nigeria has a substantial trade surplus, which amounted on average to US\$ 43 bn between 2010 and 2018.

When looking at Nigeria's economic structure we see that the country is still strongly dependent on its agriculture sector, although the services sector has grown strongly during the last decade. Even though Nigeria has a large agriculture sector, due to relatively low agricultural productivity and its large population the country is still a net food importer. Within the service sector, the finance sector, telecommunications and retail are important sectors.

Even though the standards of living have been continuously improving in Nigeria, as reflected in the growth in the score in the Human Development Index, which grew from 0.467 in 2005 to 0.534 in 2018 (UNDP, 2020), the country is still facing important societal and environmental challenges. Over 40% of the Nigerian population is still living below the poverty line and due to rapid population growth this figure is increasing. Other societal problems include a high unemployment rate and high income inequality. With regard to the environment, the country is suffering from negative environmental impacts of oil and gas extraction, significant air pollution issues in urban centres and biodiversity loss.

The COVID-19 crisis has revealed once more the vulnerability of Nigeria's economy due to its strong dependence on oil exports, which led to strong economic decline in the first half of this year as oil demand collapsed and prices dropped. This reinforces the ambition of the Nigerian government to diversify the economy. Even though the COVID pandemic will have a serious impact on Nigeria's economy in the next few years, the situation also represents an opportunity for Green recovery. Strengthening the role of green investments and a transition to a less resource-dependent circular economy could help diversifying economic activities in Nigeria and create sustainable growth and employment opportunities.



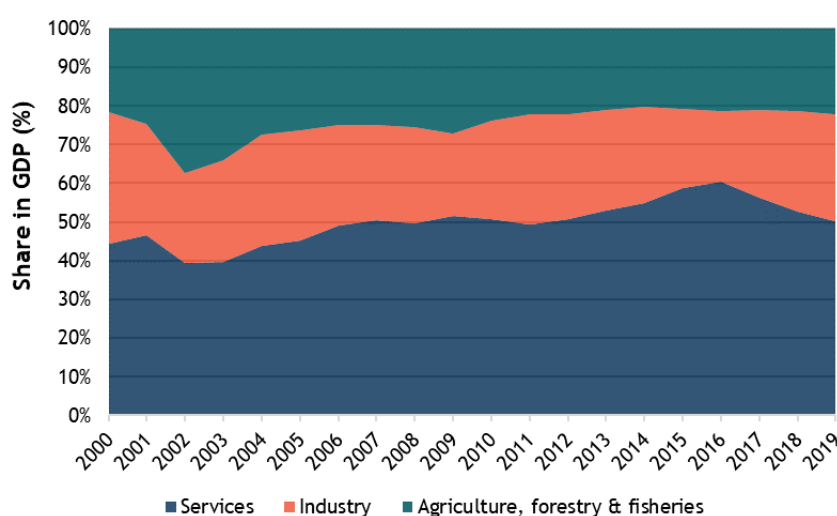
## 2 Status of the circular economy in Nigeria

### 2.1 Economic analysis of circular economy trends in Nigeria

#### 2.1.1 Economic structure

The economic structure of Nigeria is relatively similar to that of other countries in Sub-Saharan Africa, although the share of agriculture and services are somewhat larger. The relatively large share of agriculture to the total amount of value created in the economy is of note, remaining relatively constant, accounting for 21% of Nigerian GDP in 2019 (Figure 2-1), which is higher than the average of 15% in Sub-Saharan countries.

**Figure 2-1 Contribution of the primary sector, industry and services to the Nigerian economy. (World Bank -WDI, 2020)<sup>A</sup>**



The Nigerian economy is dependent on oil through direct and indirect channels, despite the diminishing contribution of oil to the country's growth. The share of oil and gas revenues in gross domestic product (GDP) has been steadily declining and is only about 10 % today (NBS, 2019). Nonetheless, oil and gas still account for about 90 % of Nigeria's exports and about half of consolidated government revenue.

Strong population growth in the past 50 years has placed stress on Nigeria's resources and infrastructure. Nigeria is by far the biggest African country in terms of population (with an estimated 201 million people)(World Bank WDI, 2019)<sup>B</sup>. This coupled with rapid urbanisation in the metropolitan centres, in particular Lagos, means Nigerians are under pressure to enact a transformative shift to a circular economy that will support the growing population and help to keep the urban centres livable.

Government economic rents are anticipated to decline in the long-term and overall economic growth will be affected (The Mail & Guardian, 2009). The Nigerian Government has implemented the 'Change' agenda framework to diversify the economy and drive investment in infrastructure for a more connected system than eases movement of people and products (Daka, 2019).

#### Economic impact of COVID-19

COVID-19 will have far-reaching social and economic impact on Nigeria (PwC, 2020). Nigeria should expect an unprecedented economic shock. As the country is still in crisis at the time of the report, the full impact and knock-on effects of the pandemic on the economy is not yet clear. However, comprehensive

structural and economic policy reforms could reduce the anticipated impact. The crisis could be the tipping point for shifting away from resource extraction as primary contribution to GDP. A circular economy shift has however not been articulated in any recovery measures to date.

Rampant unemployment will contribute to social challenges, which may further hamper recovery. The following impacts are foreseen to be imminent:

- Massive spike in unemployment;
- Massive number of people in informal sector not earning a daily wage between lockdown and recession. Huge food security challenges;
- Fiscal crisis at both Federal Government and State level. Depletion of external reserves.

Emerging Circular Economy trends in Nigeria have the potential to help mitigate (part of) the impacts above. The opportunities related to job creation and transformation are intricately linked to the need for food security and the key role of the informal sector. Holistic approaches that address the intersection of socio-economic and environmental impacts are needed to drive the transition to a circular economy in Nigeria.

### 2.1.2 Circular economy-related trends

Even though the circular economy (CE) is often understood as the new word for resource efficiency or waste policy 2.0, it is a radically different model for structuring the entire economy. As such, the shift to a CE which is 'restorative and regenerative by design', requires a far-reaching transformation of the economy, affecting entire supply chains, from resource extraction, through production and eventually waste treatment after a product's useful life. For this reason, the lifecycle perspective is a very useful angle to study the CE, as it does look at all the lifecycle stages of products and also pays attention to the consumption phase. The latter aspect is key, since changing consumption patterns and models can make a very important contribution to a shift to a (more) circular economy. Because the lifecycle perspective is a central feature of CE thinking, we have also structured this chapter along these lines, looking at the following aspects of the value chain:

- Resource extraction (section 2.1.3);
- Production and Manufacturing (mainly focusing on the production phase);
- Trends in consumption
  - On a natural resource level;
  - On a product level/ from the consumer perspective.
- Trends in the end-of-life stage: waste generation and management.

The focus of sectors covered in this section (2.1) is based on the following rationale:

- Relatively high contribution of these sectors to the national GDP and share of the labour force;
- The existence of policies and strategies that support transition to a CE in these sectors;
- The extent to which large opportunities exist for CE solutions in a sector to solve environmental problems and create new economic activities;

The most promising sectors in Nigeria are as follows:

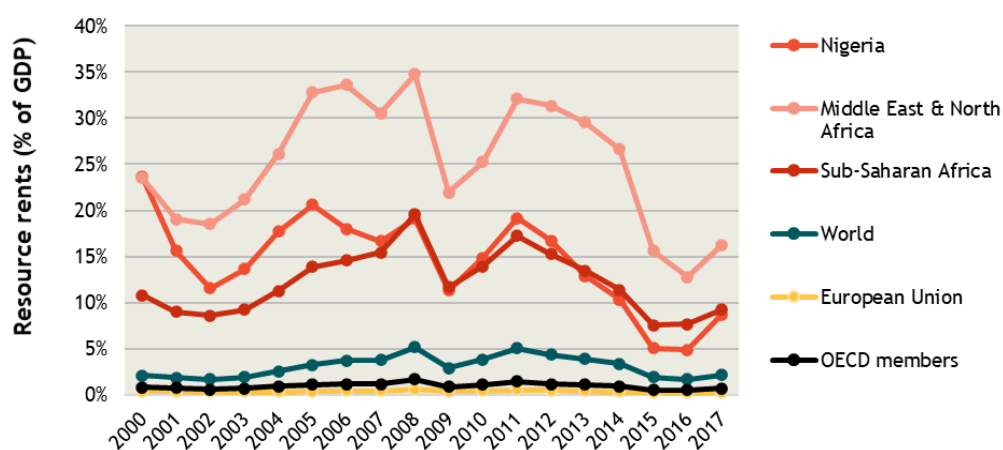
- **Agri-food** (including potential elements from resource extraction, food consumption and elements regarding food waste)
- **Plastics/packaging** (including the plastics recycling)
- **Waste management** (including Waste management, EPR/DRS and E-waste)
- Opportunities in other sectors (Digitalisation as a key enabler, transport)

### 2.1.3 Resource extraction

In Nigeria, natural resource rents contribute 7% (average 2014-2018) to the GDP, although recently, this has been declining gradually. As such, Resource extraction remains one of the most important sectors of the Nigerian economy. The oil & gas extraction sector in combination with oil refining accounted for 8.7% of Nigeria's GDP in 2019 (NBS, 2020). In 2018, Nigeria produced 2,051 thousand barrels of oil a day (98.4 Mtons in the entire year), equivalent to 2.2% of global production (BP, 2019). A large share of the oil is exported, which generated a net annual trade surplus for oil of USD 17 - 99 bn over the period 2010-2018, thereby accounting for 91% of the total export value. Even though the Nigerian government has stated the ambition to diversify the country's economy and reduce the dependence on oil, the dominance of the oil sector could act as a barrier for CE development in certain sectors (e.g., the plastics sector). On the other hand, the circular economy could also be a paradigm for what the diversification of the Nigerian economy could look like. Moreover, the fact that many livelihoods in the country are dependent on the oil & gas sector emphasises the need for a just transition framework. It is necessary to identify opportunities that reduce waste and stimulate product innovation, while at the same securing the livelihoods of the workers currently employed in the resource extraction sector.

Zooming in a bit more on the resource rents in Nigeria, over the period 2000-2017, the majority of income is derived from production of oil (81%), followed by forest rents (timber, 12%) and natural gas (7%). In general, the trends in resource rents for Nigeria follow the average trend for Sub-Saharan Africa (Figure 2-1). In 2000, resource rents accounted for almost a quarter of the total value created in the Nigerian economy and this share declined to 9% in 2017, whereas the average contribution over this period was 14%. Even though the contribution of resource rents to the overall value creation is falling, the importance of resource rents in Nigeria is still far above the global average. This means that the country's economy is relatively susceptible to volatility in resource prices, especially oil prices, as painfully reflected in the recent economic downturn due to the COVID-19.

Figure 2-2 Resource rents as share of GDP (%) compared to regional averages (World Bank -WDI, 2019<sup>c</sup>)



### 2.1.4 CE Trends in production in manufacturing

#### The agri-food sector

Agriculture accounts for 22% of Nigeria's GDP, a stable and significant contribution. Nigeria relies heavily on the agriculture sector as an employer of a large proportion of the population (around 35%), as well as for food security (World Bank, 2020<sup>A,D</sup>). Currently, there is a pressing need for circular economy approaches to focus on resilience, due to the increasing severity of climate-related impacts.

Nigeria is the world's largest producer of cassava, yam, and cowpea. Nigeria is also one of Africa's largest producers of rice, an important food security crop. Rice generates more income for Nigerian farmers than any other cash crop in the country (FAO, 2020<sup>A</sup>). Despite this, the country faces a food-deficit and depends on imports of grains, livestock products, and fish (Tradingeconomics.com, 2020). Nigeria is simultaneously one of the largest rice producers and importers in the world. Pressure from a growing population is impacting already diminished resources, further threatening food production.

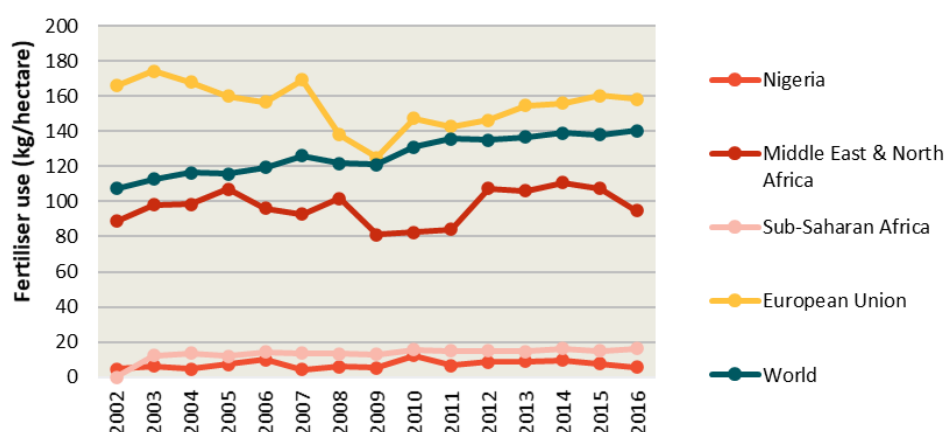
### COVID-19 impact on food production

The COVID-19 pandemic is impacting global food systems, disrupting regional agricultural value chains, and posing risks to household food security (FAO, 2020). The impact of COVID-19 on food security in Nigeria is of pressing concern and the overriding priority of the government should be the health and safety of Nigerians. International interventions should be aligned to the envisioned priority areas:

- Getting money to the Bottom of Pyramid efficiently and keeping food supply chains intact.
- In Nigeria, 50 to 70% of the economy is informal and these people are living on daily subsistence conditions;
- As lockdowns and semi-lockdowns take place, it is becoming increasingly difficult for food supply chains to work and get the food in the places where it is needed;
- Keeping the food supply chain working means being smart about how the rules work on the necessary social distancing and safety rules, while continuing with food (and power) systems.

### Agricultural productivity is still relatively low

Favourable rainfall across the country and the adequate supply of inputs by the Government and several NGOs benefited the 2019 national cereal production, estimated at 30.9 million tons, about 16 % above the five-year average (FAO, 2020<sup>B</sup>). Cassava production stands at about 50 million metric tons annually. It is mostly grown by smallholders on small plots for local consumption and sale. National average yield is estimated at 13,63 metric tons/ha, but the potential yield could be up to 40 tons/ha (FAO, 2020<sup>B</sup>). However, overall agricultural productivity has remained low (average of 1.2 metric tons of cereals/ha) with high post-harvest losses and waste. The low crop yield can be attributed to limited access to technologies in agricultural production (such as the very low level of irrigation development: less than 1 percent of cropped land under irrigation) and limited adoption of research findings and technologies (FAO, 2020<sup>A</sup>). Additionally, low soil quality and low fertiliser use (Figure 2-6) contribute to low yields. Fertiliser use in Nigeria is 67% lower than the average in Sub-Saharan countries and equivalent to only 4% of the world average. These challenges are indicative of where priorities and opportunity lie for the Circular Economy in Nigeria. The prevalence of organic waste further strengthens this assumption. Optimising the treatment of organic waste through composting or other treatment techniques can increase the availability of affordable locally produced organic fertiliser that can be applied to increase yields.

Figure 2-3 Fertiliser use per hectare in Nigeria compared to regional averages (World Bank WDI, 2020)<sup>c</sup>

In Nigeria there are still significant levels of small-scale farming practices and many of these smallholder farmers do not have access to expensive agricultural machines and equipment. The digital platform hello Tractor enables farmers to lease tractors from other farmers via a mobile app. A private public partnership between John Deere and the Federal Ministry of Agriculture and Rural Development aims to make 10,000 tractors available to small-scale farmers, and Hello Tractor is a partner in this initiative. It has been estimated that full deployment of tractors in Nigeria could bring an additional 9 million hectares of land into production, creating 37 million tons additional food and more than 2 million direct and indirect jobs (Roy, 2020).

The food production industry in Nigeria experiences multiple barriers to growth as discussed above. Taking a multi-pronged approach to the industry, focused not only on soil quality and inputs for improved yield but also implementation of digital solutions, will unlock economic opportunity while taking socio-economic needs into account, paving the way for a just transition. The key lies in adopting a systemic, transparent approach. The biggest value waiting to be unlocked in this sector lies with the adoption of circular agricultural practices. Some innovative companies like PS Nutraceuticals are already experimenting with innovative resource efficient production techniques such as aeroponics (Table 2-1). Upscaling of circular agriculture practices such as Hello Tractor and PS Nutraceuticals can support increase of yields, reduce post-harvest losses and consequently, address food security issues.

Table 2-1 Innovative solutions to production constraints - example: PS Nutraceuticals

Description	Benefits
<p>Aeroponics - Growing produce without the use of soil or aggregate medium, by the use of a misted environment. This is a complementary approach to supplement current production. PS Nutraceuticals is in partnership with Lagos State in a scheme to grow rice and tomatoes to feed the growing population. The company is using aeroponics and vine-cutting technology in collaboration with the International Institute of Tropical Agriculture on YIIFSWA-II, a project that seeks to provide affordable, high-quality seed yam tubers for smallholder farmers in Nigeria and Ghana. It has recruited 40 local farmers in Oyo and Ogun states to work on the project.</p> <p>The company is embracing CE principles by the shift to a production method that uses climate smart approaches that eliminates waste and optimises resource use.</p>	<ul style="list-style-type: none"> <li>Minimal water, electricity, &amp; labour inputs needed.</li> <li>Crops are also quick to harvest and there are limited pests.</li> <li>Higher productivity due to spacing and year-round production</li> </ul>

### Food loss and waste

As in many African countries, food losses across the value chain represent a significant loss of agricultural production, economic value and thus farmer income. For our modelling exercise (presented in section 3.2) we estimated that food losses in Nigeria amount to a total value of around € 8.3 bn on an annual basis. Over-extended supply chains are brittle - the establishment of local and regional cooperation for short supply chains is key to a resilient food production system that is resilient to shocks. Nigeria's food supply is further challenged by inadequate storage facilities, poor access to markets, and limited access to funding. About one-third of the food produced for human consumption each year is lost or wasted, most of it in developed countries. In developing countries, food loss happens early in the supply chain, due to challenges related to harvesting practices and storage. In Nigeria, the main hotspots for post-harvest losses are harvesting and parboiling followed by losses occurring during milling (GIZ, 2015).

Nigeria consumes an average of 2.3 million tons of tomatoes a year and produce just about the same amount, according to a 2017 report by PWC. Without adequate storage facilities and an efficient means of transporting them to the markets, about 45% of harvested tomatoes go to waste. Nigeria imports about 1.3 million tons of tomatoes to fill the gap, mostly from China and other parts of Asia. Nigeria is the third largest importer of the commodity in Africa (Bloomberg, 2019). Currently, Dangote Farms (Nigeria's biggest tomato processing plant) is idle due to lack of feedstock that resulted from disputes with farmers and insufficient supply of feedstock.

Circular approaches to agriculture are key to address the challenges that the sector faces. Across the value chain there are opportunities for optimisation towards an industry that uses a minimum of external inputs (chemical fertilisers that are reliant on the extraction of mineral resources), closes nutrient loops by recycling all organic material back into the soil (including wastewater) and utilisation of unavoidable agri-food waste. Robust supply chain management practices can benefit the growing population by embracing circular economy principles that focus on the minimisation of waste through the development of improved harvesting and better cold-chain logistics (e.g., Coldhubs, Table 2-2).

**Table 2-2 Innovative solutions for food waste and loss**

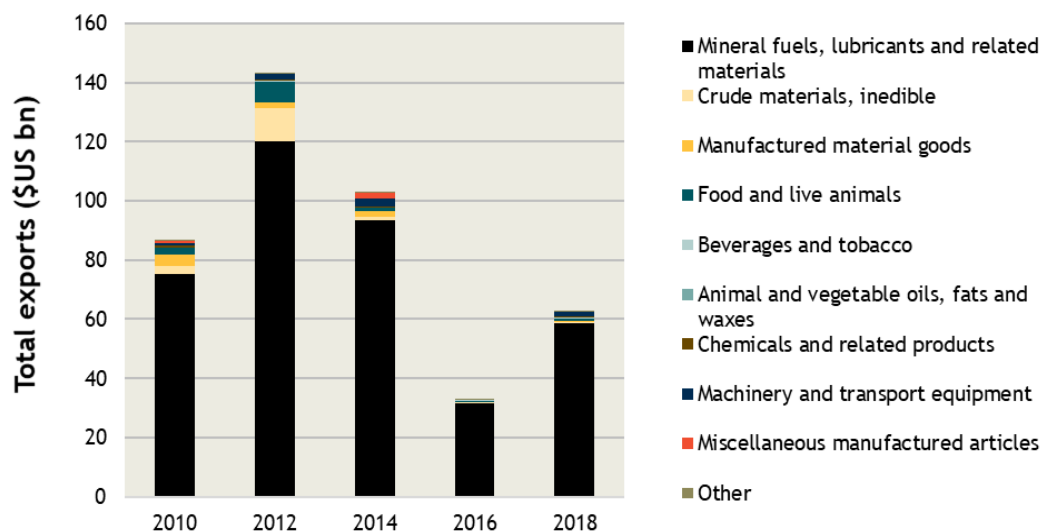
Company	Description	Benefits
<b>Coldhub</b>	A "plug and play" modular, solar-powered walk-in cold room, for 24/7 off-grid storage and preservation of perishable foods that extends the shelf life of perishable food from 2 days to 21 days. It is. This addresses the problem of post-harvest food waste while giving more access to nutritious food for rural populations. Farmers pay a daily flat fee for each crate of food they store.	<ul style="list-style-type: none"> <li>Reduced post-harvest food waste by extending shelf life of produce. With more of their harvest to sell, smallholder farmers will be able to increase their annual income by 25%.</li> <li>Improved access to food for rural populations due to better cold storage facilities.</li> </ul>
<b>Farmforte</b>	Purchases smallholder farmers' produce and exports, alongside running its own sweet potato farm in Edo state. Processes and transports perishable goods for farmers.	<ul style="list-style-type: none"> <li>This solves the challenges of storage, logistics and market access for smallholder farmers.</li> </ul>

### Trends in the plastics industry

Crude Petroleum and Natural Gas are the main contributors to the Mining and Quarrying sector, accounting for 99% of the value created in the sector (NBS, 2019). Natural resources and materials accounted for 95% of total export value over the period 2010-2018. Fossil fuels (predominantly oil) are the most important export product (Figure 2-1), followed by other crude raw materials (e.g. metal ores and minerals) and processed materials, accounting for 91%, 3.1% and 1.6% of the total export value,

respectively. The heavy reliance of Nigeria on ‘linear’ sectors such as resource extraction, makes Nigeria vulnerable to shocks in international trade and oil prices. The COVID-19 pandemic has shown painfully how vulnerable Nigeria is to shocks in international oil trade. Furthermore, on the long term Nigeria is likely to be negatively affected by the shift to circularity in the economies of trade partners such as the EU. This is where international trade partners like the EU can play a role in supporting the Nigerian government in the diversification of the country’s economy.

Figure 2-4 The share of different products in total Nigerian exports in the period 2010-2018 (UN Comtrade)



Over the years the demand for plastics in Nigeria has grown. A survey by the National Bureau of Statistics revealed that the industry has witnessed a significant increase in production in the past decade with an annual growth of 13.9%, from 120 kt in 2007 to 442 kt in 2017 and was estimated to grow to 513 kt in 2020. Over 3,000 plastic companies exist in the country today, versus the 50 companies that launched the industry in the 1960s. Much of that growth is attributed to the technological disruptions taking place in the industry due to the surge in plastic consumption. As Nigeria is a major importer of plastics, with over 70% raw materials imported (mainly from the Middle East, Europe and Asia) and 30% locally produced (Nigerian Government, 2020), there is a pressing need for companies to deploy sophisticated technologies to meet the growing demand (Obioha, 2019). However, the sector faces daunting challenges such as the high costs of production due to poor logistics infrastructure and the absence of quality standards for production. In order to be a viable industry, there needs to be engagement on lowering barriers to markets, both local and foreign.

A field survey in 2017 on plastic waste generation in Nigeria revealed that the packaging waste accounts for the lion’s share (63%) of plastic waste generated. The Nigerian packaging industry has seen a rise in the number of Afrocentric brands that can potentially compete with the import market. Strengthening research and development in the local packaging industry can support a transition to circular models in the emergent industry. The industry foresees that the local production label *Made-In-Nigeria* will accelerate progress towards a new era of high-quality Nigerian manufacturing and transform the country into a global manufacturing hub (Nigeria Packaging, 2017). Governmental focus on minimisation of food waste emphasises the need for specialised food packaging. This creates the opportunity to develop innovative sustainable packaging solutions that balance the need for food preservation with environmental impact.

One of the key players in Nigeria's local plastics industry is Sarsoli Industrial company, a Lagos-based company which started operations in 2011. Sarsoli is the first plastic master-batch manufacturing company in Nigeria (AllAfrica.com 2019). A major driver for Sarsoli has been "local production as a means of increasing employment and technical empowerment and assisting the Nigerian government's diversification policy to be boosted with a departure from an oil-dependent economy with the country also saving foreign exchange in local production", according to Managing Director, Jaiprakash Changrani (AllAfrica.com, 2019). Sarsoli, and other local processors, can benefit from knowledge sharing on best practice solutions that focus on designing plastics materials for end-of-life. A push for local production puts Nigeria at the fore of innovating for the local landscape.

Nigeria is also home to large multinational chemical players such as BASF and Dow Chemicals. BASF West Africa Limited is actively pursuing CE initiatives, having initiated a Waste-to-Chemicals (W2C) pilot in Nigeria, which focuses on chemical recycling of plastic waste (see Table 2-3). They are looking at next stages such as the export of recovered materials from W2C. Their overall aim is to seed the construction of local value chains and establish an innovative chemical industry based on secondary materials. According to their experience, technologies for waste treatment and beneficiation are reasonably available, but challenges exist with regard to access to waste, creating sustainable employment opportunities. BASF targets specific polycarbonates and looks at tapping into other initiatives and partnerships to develop this further. However, over-estimation of the value of plastic, especially given the cost of crude oil is a significant consideration, especially to access plastic at an affordable cost. This is where African Mega-Cities like Lagos have an advantage and could trigger new value chains if activities are localised. Given the overall need to develop parts of local value chains and the further need for skills development, they therefore advocate that partnerships are key to growth and development in this area (Interview BASF West Africa, 2020).

West Africa is also key to Dow Chemical's African growth ambition, anchored on strong economic potential, increasing regional economic integration, government-led drive for diversification, high access to mobile technology and a young, entrepreneurial demographic. The chemical industry can deliver much potential value-adds to Africa's development from the obvious economic diversification, manufacturing growth, technology, employment to science talent development, environmental sustainability, as well as food and energy security (Guardian, 2019; Interview Dow Chemicals, 2020). The development of a robust market for recycling will support both the recycling and packaging industries. DOW Chemicals recognizes that the after-usage, post-consumer phase often results in plastics landing up in environment (Interview Dow Chemicals, 2020). Hence, they are working with collectors and other parts of the recycling value chain to support mechanical recycling in Nigeria to close the loop and drive solutions for end applications to become new raw materials, even though this is not normally their area of business focus.

**Table 2-3 Innovative solutions in the plastics industry**

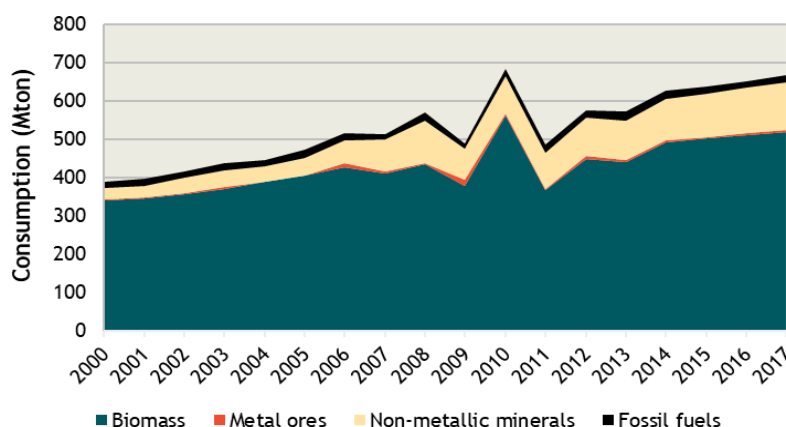
Company initiative	Description	Benefits
<b>Food and Beverages Recycling Association (FBRA) - (FBRA, 2020)</b>	<ul style="list-style-type: none"> <li>Self-regulatory initiative founded in 2013 for recycling of food and beverage packaging waste into synthetic fibre and other uses.</li> <li>Members include Nigerian Bottling Company/Coca-Cola Nigeria, Nigerian Breweries, Seven-Up Bottling Company, Nestlé Nigeria, Guinness Nigeria,</li> </ul>	<ul style="list-style-type: none"> <li>Highlight waste-to-wealth initiatives</li> <li>Review progress in the implementation of the EPR program</li> <li>Strengthen policies and regulations to enable the recycling of food grade</li> </ul>

Company / initiative	Description	Benefits
	<p>Intercontinental Distillers, International Breweries, Tulip Cocoa, and Prima Caps and Preforms.</p> <ul style="list-style-type: none"> <li>Conducted awareness campaigns in curbing environmental pollution caused by food and beverage packaging waste, with collection partners including RecyclePoints, WestAfricaENRG and Chanja Datti.</li> <li>Promoting proper disposal and separation of plastics. FBRA could be a steppingstone towards a formal system of EPR in packaging in Nigeria.</li> </ul>	<p>packaging waste materials by establishing national standards for recycled PET</p> <ul style="list-style-type: none"> <li>Determine how Producer Responsibility Organisations (PRO) can support waste management</li> </ul>
<b>Recycle Pay: Created by African Clean Up Initiative &amp; WeCyclers</b>	<ul style="list-style-type: none"> <li>The project helps parents to cover a portion of their children's school fees by collecting and bringing plastic waste to recyclers. The project is straightforward – a parent brings a bag of plastic waste to a facility; it gets weighed and the weight is deducted from the school fees.</li> </ul>	<ul style="list-style-type: none"> <li>Eases the financial burden of families in the community</li> <li>Access to education - allows kids to go to school</li> <li>Reduces the problem of plastic waste collection</li> </ul>
<b>Alkem Nigeria</b>	<ul style="list-style-type: none"> <li>Synthetic fibre manufacturer.</li> <li>Recycled PSF manufacturer from hot washed pet flakes; export recycling of polyester.</li> <li>Does not process plastic into new bottles, rather, it converts into fibre for making cloth.</li> <li>Bottle recycling in partnership with Coca Cola</li> </ul>	<ul style="list-style-type: none"> <li>Only company in Nigeria that has the capacity to fully process recycled plastic in an industrial process that makes it into raw materials for packaging manufacturing</li> </ul>
<b>BASF West Africa - Waste2Chemicals Project</b>	<ul style="list-style-type: none"> <li>CE Lab in Lagos - Innovations and new technologies for problematic materials are being explored.</li> <li>Waste-2-Chemicals is a BASF West Africa initiative in Nigeria that leverages a cost-effective pyrolysis technology to convert plastic waste into useable and safe oil feedstock.<sup>106</sup> The initiative is currently in the pilot stage and aims to: <ul style="list-style-type: none"> <li>Design &amp; deploy a scalable model to aggregate and sort at micro-level plastic waste from the streets.</li> <li>Leverage off-the-shelf cost-effective, pyrolysis technology to regenerate original crude oil content from sorted plastic waste into chemical feedstocks.</li> <li>Enable a CE by re-engaging those chemical building blocks in BASF value chains (after potential co-processing or direct swap against cracker feeds)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Aims to deal with multi-layer or plastics with residues, through chemical recycling methods.</li> <li>Address materials difficult to recycle mechanically.</li> <li>Contributes to achieving recycling targets efficiently.</li> <li>Chemical recycling can help reduce proportion plastic waste ending up in landfill or incineration.</li> </ul>
<b>Dow Chemicals</b>	<ul style="list-style-type: none"> <li>Project Butterfly (2017) works with communities in South Africa, Nigeria, Kenya, Ethiopia &amp; Algeria to tackle poor waste management through education, clean-up and innovation-focused initiatives.</li> <li>Along with non-profits and local communities, project aims to bridge the gap between recycling buy-back centres, sorting facilitators, collectors and recyclers.</li> </ul>	<ul style="list-style-type: none"> <li>Advancing a CE in Africa - one that redesigns, recycles, reuses and remanufactures to keep materials at their highest value for as long as possible.</li> <li>Reshaping and transforming mindsets, communities and plastic waste using circular economy principles.</li> </ul>

### 2.1.5 Trends in resource consumption

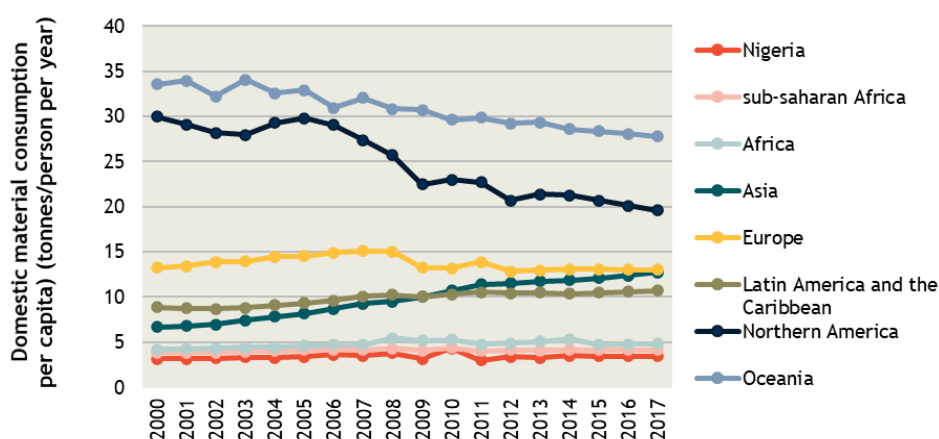
The growing population in Nigeria, especially the exponential population growth in Lagos, places unprecedented pressures on resources such as arable land, infrastructure, water, and energy as well as extracted resources required for production, leading to an overall increase in consumption levels. Biomass is dominant in Nigeria's material consumption (Figure 2-5), accounting for 78% of the total in 2017. In order to ensure sustainability in the long run, it is important that economic growth and material consumption decouple at a certain point.

Figure 2-5 Domestic material consumption<sup>1</sup> by type in Nigeria for the period 2000-2017. (UNDP, 2020)<sup>A</sup>



Resource consumption per capita in Nigeria remained very stable over the last two decades and is quite similar to the Sub-Saharan African average, but almost 30% lower than the African average and only a quarter of the average resource consumption in Europe (Figure 2-6).

Figure 2-6 Material consumption per capita in Nigeria compared to regional averages (UNDP, 2020)

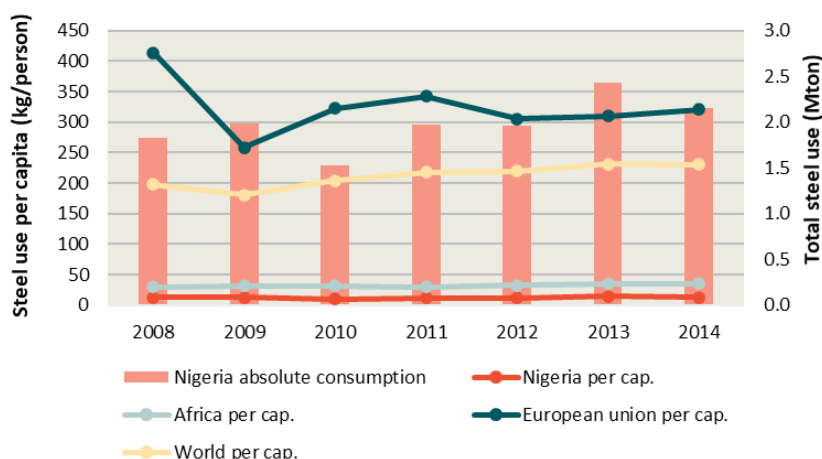


Globally, cement, steel, aluminium and plastics account for almost 70% of the direct global GHG emissions from industry (Material Economics, 2018). Therefore, it is relevant to look at trends in the consumption footprint for these materials. Nigeria has an annual cement consumption of around 21 Mtons, which is equivalent to approximately 150 kg/capita which is 73% lower than the global average (World Steel, 2019). When looking at steel, we see that the country consumed around 6.8 Mtons of steel in 2019, of which three quarters are imported. This corresponds to an annual consumption of 34 kg steel/capita,

<sup>1</sup> Domestic material consumption = Domestic Material Extraction - Exports + imports

which is 85% below the world average of 225 kg steel/capita (ibid.). Over the past two decades, steel consumption in Nigeria has remained low (Figure 2-7).

Figure 2-7 Steel consumption in Nigeria in comparison to other regions (World Steel Association, 2019).



### 2.1.6 The end-of-life stage: Waste as resource

The current solid waste management system in Nigeria is very rudimentary, inefficient and unsustainable. It is characterised by inadequate waste management facilities, poor access to waste collection and management services, and a very low share of generated waste being collected (Nigerian Government, 2018). Nigeria currently lacks adequate budgetary provisions for the implementation of integrated waste management programmes across States (*ibid.*). The lack of comprehensive data signals the need for coherent policy coordination at national and sub-national levels with appropriate technical assistance. Focus for waste treatment should address the limited amount of landfill capacity available and establish mechanisms to divert organic waste and recyclables from ending up in landfill.

*“Waste generation has consistently expanded both in volume and complexity. This is due to the rapid increase in population over the years, the increase in socio-economic development, industrialization, technology advancements, changing lifestyles and consumption patterns. Sadly, these developments have not been matched by adequate provision including funding and infrastructural facilities to sustainably manage this ever-growing quantum of waste.”* <sup>89</sup>

Olori Olufunke Babade,

The Director: Pollution Control and Environmental Health Federal Ministry of Environment, Abuja.

The role of the informal sector in waste management cannot be understated. In many states and Local Government Areas, informal waste pickers and collectors fulfil an important role in municipal waste collection, sorting and recycling. Many of these workers are exposed to hazardous conditions and subsist on very low incomes. Consequently, as Nigeria seeks to modernize its waste management and recycling processes, this group is at risk of being marginalised and seeing its livelihood threatened. Employment impacts in the circular economy transition are varied, and includes diversification, substitution, transformation, redefinition and elimination - impact is not limited to job creation. If certain jobs are lost due to the transition, the people who are employed in such capacities need to be included in the transition process. It is key that the transition will be systemic and inclusive. Such a transformative transition will require support from government at all levels to prepare for the consequences/results as the economy shifts from linear to circular.

One of the initiatives aimed at achieving circular transformation in a circular manner is the Blue Box program implemented by the Lagos State Waste Management Authority. The program covers the entire waste management chain including collection, transport, sorting and sale of materials to off-takers. It supports a shift to a circular economy by inclusion of Community Recycling Centres, which would be a platform to harness the expertise of waste-pickers and to capacitate and re-integrate them as resource managers, to maintain their means of livelihood. As such, it contributes to Nigeria's path to poverty reduction and shared prosperity by supporting markets for secondary materials, promoting private sector-led growth, and rebuilding social contracts (LAWMA, 2020). The initiative is projected to generate over 46,000 direct and indirect jobs for Lagosians (The Nation, 2019). Next steps planned include the roll-out of a Green Box Program to generate a stream of feedstock for waste to energy initiatives and to tackle the growing organic waste challenges that Nigeria faces (Holland Circular Hotspot, 2019).

Economic empowerment in the waste industry is achieved by the enabling environment for private sector participants (predominantly informal SMEs) that collect household waste. In Lagos, the public Lagos State Waste Management Authority (LAWMA) dominates the waste sector and cooperates with hundreds of small-scale Private Sector Participants (PSP). The PSP waste collection program contributes to poverty alleviation through job creation for smallholders, but there are challenges regarding the reliability of waste collection services, and adherence to and improvement of (environmental) performance standards. Although the program has the potential to increase local income generation and the availability of recycled materials, the success of the program is hampered by the difficulty for waste collection companies to charge for waste collection services, the general attitude towards waste handling and a poor road infrastructure, amongst others.

The roles and responsibilities related to waste management are complex, which hampers enforcement of policies. Solid waste management in Lagos State comprises federal and local government in partnership with the private and informal sectors. The key institutions and their primary roles are indicated in Annex D - Table D1.

The recycling industry in Nigeria is not yet sufficiently formalised to generate holistic data and therefore it is difficult to get a realistic overview of the sector. The financial potential of recycling in the region is evident when we look at the numbers: Lagos, with 16 million residents, about 10% of Nigeria's population, produces about 10,000 tons of solid waste daily. This translates to a value chain potential of about USD 2 Billion per year in Lagos alone. Expanding this analysis to the whole of Nigeria, the resulting potential of the recycling industry is approximately USD 8 Billion, about 35% of the country's 2018 budget ([Cycled, 2017](#)). Recycling activities are steadily increasing across the country, but still largely restricted to the informal sector. A high-level overview of the waste value chain in Lagos is given in Table 2-4. In some areas of the country, recycle points have been set up in residential neighbourhoods (Table2-5).

**Table 2-4 Waste value chain: Lagos State**

Collection	Transport	Recycling
<ul style="list-style-type: none"> <li>Private Sector Participants (PSP) (predominantly informal SMEs)</li> </ul>	<ul style="list-style-type: none"> <li>Waste pickers transfer waste, usually in carts.</li> <li>LAWMA endeavours to formalise by June 2021 in Lagos</li> </ul>	<p><b>Informal</b></p> <ul style="list-style-type: none"> <li>Composting plant Ikorodu</li> <li>Waste to energy initiative at Ikosi Market</li> <li>Plastics recycling at Olushosun landfill</li> </ul> <p><b>Formal</b></p> <ul style="list-style-type: none"> <li>Blue Box Initiative</li> </ul>

Table 2-5 Recycle points ([Recyclepoints, n.d.](#))

Description	Benefits
<ul style="list-style-type: none"> <li>RecyclePoints is based on a point-based incentive model with which recyclables are collected from registered post-consumers who are in turn rewarded with points, which when accrued can be used to redeem household items and cash.</li> <li>RecyclePoints partners with Coca Cola, Pernod Ricard, Google Nigeria, WestAfricaENRG and others to create an ecosystem for recycling in Nigeria.</li> </ul>	<ul style="list-style-type: none"> <li>Collects waste directly from households, ensuring a clean recycling stream for plastics. The collected recyclables are further processed at Collection and Sorting HUBs (CoSoHUB) and thereafter sold to manufacturing/recycling plants who use the items as raw materials.</li> <li>When fully implemented and scaled into various geographical locations in Nigeria, RecyclePoints would be diverting from landfills an average of 10,000 metric tons of recyclable waste annually. They intend to setup Recycling Kiosks at strategic positions in various cities, to act as drop-off centres for recyclable materials. (<a href="#">Changemakers, 2015</a>)</li> </ul>

### Generation and management of E-waste

Due to unscrupulous importers and a porous customs system, Nigeria now ranks alongside Ghana as one of the world's leading destinations for electronic waste (UNEP, 2019). In 2017, Nigeria generated 290,000 tons of electronic waste, a 170% increase from 2009. In addition, it receives over 60,000 tons used electronics and electrical equipment from other countries through Lagos' ports. An unknown amount enters Nigeria via land routes from neighbouring countries (IISD, 2019). E-waste recyclers in Nigeria (mainly in Lagos) have reported good recovery rates for base metals such as ferrous metals, aluminum and copper. However, they are simultaneously producing vast amounts of waste due to unsophisticated refurbishment and material recovery methods (Manhart et al, 2011). The e-waste recycling sector is still mainly informal, hence the need for enforced Environmental, Health and Safety (EHS) guidelines across the informal industry.

Generally, refurbishing, collection, and recycling of used and end-of-life e-products takes place in and around certain business clusters. The most prominent of these clusters are Alaba Market and Ikeja Computer Village, which comprise 2,500 and 3,000 small businesses in the field of refurbishing and marketing of used electrical and electronic products (Manhart *et al*, 2011).

There is a heavy reliance on diesel and petrol-powered generators to supplement the unstable national grid. However, the growing demand for standalone solar solutions, as they become more affordable, has the unintended consequence that more toxic lead acid batteries - a major component to stand alone solar solutions - will end up in dumpsites across the nation at their end-of-life (Heinrich-Böll-Stiftung, 2020) This approximates to over 110,000 tons of used lead-acid batteries generated in Nigeria annually from automotive batteries and alternative energy battery systems (*ibid.*). There is an increasing number of off-grid solar system producers marketing their products under leasing arrangements; a dedicated Producer Responsibility Organization may be established.

**Table 2-5 E-waste management companies in Nigeria**

<b>E-Terra Technologies Limited</b>	E-Terra Technologies Limited is a company working on the eco-friendly management of e-waste, recycling, refurbishing, and data destruction of storage devices.
<b>Hinckley Group</b>	Hinckley became the first registered electronic waste recycler in Nigeria, providing end of life solutions for electronics equipment while preventing environmental pollution and human harm caused by hazardous electrical waste.
<b>Anambra State: Closed Loop System</b>	A battery recycling facility with a closed loop system to ensure minimum environmental pollution, and health protection for workers has been put in place in Anambra state and aims to act as an example for other facilities in Nigeria. The Heinrich Böll Stiftung suggests that the Nigerian government could encourage formalised and standard recycling processes as this would create new cleaner jobs for unemployed youth, but also accelerate the production of locally made batteries.

The 'Circular Economy Approaches for the Electronic Sector in Nigeria' project will support E-waste Producers Responsibility Organization (EPRON) to promote sustainable production and consumption by encouraging producers to assume responsibility for the lifecycle of their products. As these activities are planned, it needs to be acknowledged that "producers" are generally importers and distributors, and not the original equipment manufacturers (OEM) themselves. In most cases, OEMs maintain a marketing presence without local production in Nigeria.

#### Existing extended producer responsibility (EPR) and deposit return schemes (DRS)

Lagos State Environmental Protection Agency (LASEPA) is working with the National Environmental Standards and Regulations Enforcement Agency (NESREA) to implement EPR. NESREA has commenced the registration of Operators in the EPR Programme, including Producers, Producer Responsibility Organizations (PRO), Recyclers and Collectors ([NESREA](#)). The EPR programme is a statutory provision within the National Environmental Regulations (Annex C) for the manufacturing sector, including the Food, and Beverage (packaging waste) the Electrical Electronic and Motor Vehicle sectors (waste batteries and tyres). These Regulations have since been gazetted by the Federal Government and are being enforced.

Due to COVID-19 impacts, the likelihood of mandatory EPR implementation being prioritized is unlikely. However, if this materialises, existing voluntary EPR systems in Nigeria, Food and Beverage Recycling Association (FBRA) for food and beverage packaging, Alliance for Responsible Battery Recycling (ARBR), and EPRON for e-waste are expected to get a major boost (RVO, 2020). More details on voluntary EPR programmes in Nigeria can be found in Annex D, Table D-5.

#### 2.1.7 Opportunities in other sectors

##### Key enabler: Digitalisation

Nigeria has one of the largest populations of young people in the world. This positions it favourably for the development of a strong digital economy, with a transformational impact ([World Bank, 2019](#)). According to Siegfried Zottel, World Bank Senior Financial Sector Specialist, "There is a vibrant ecosystem of digital entrepreneurs in Lagos and Abuja that is supported by dynamic incubators, venture capital, digital start-ups and the diaspora" ([World Bank, 2019](#)). An inclusive digital transformation will require a systemic approach for access to both infrastructure and finance, capacity building, and innovation that goes beyond the urban hubs of Lagos and Abuja.

Digital platforms help make the circular economy transition more accessible. These platforms help enable shared services and e-commerce targeted at reuse and second-hand marketplaces. On a manufacturing operational level, it can further help identify areas for resource optimisation using data management and analytics. Digitalisation can create sound, accessible platforms that make the circular economy a lot more tangible.

Before this can happen, digital poverty needs to be addressed. This needs to extend beyond improving access to connectivity. Combining circular economy policies with social protection measures will be important to help identify and mitigate potential unintended consequences from a transition to the circular economy. The industry has the potential to drive circular economy approaches across all sectors, minimising strain on resources and facilitating access to services that negate the need for ownership. Digitalisation can close material loops by providing accurate information on the availability, location and condition of products - these are all key enablers for a secondary resource marketplace.

### Transport

The access to mobility in Nigeria is rather poor, as reflected by the very low motorisation rate in the country as well as limited availability of public transport options (Hamukoma *et al*, 2019). The use of passenger cars has been growing steadily in Nigeria over the past decade, growing from 1.2 M units in 2013 to 1.6M units in 2019 ([Deloitte, 2018](#)). The Nigerian vehicles market is dominated by the sales of imported secondhand vehicles, accounting for 80-90% of the total sales (*ibid*). Consequently, the contribution of the automotive sector to the country's economy and employment is very limited. Moreover, the abundance of old vehicles on the Nigerian roads also leads to serious air quality problems, especially in urban centres. One of the reasons why the sales of new vehicles are so limited relates to their high prices and the poor availability of affordable financing instruments for private car users. As a consequence, only 2% of the Nigerian population can afford to buy a new car (*ibid*). The current situation reflects an opportunity for carsharing models, to increase access to mobility for a larger part of the Nigerian population, while preventing the need for private cars. Also, the use of new or newer second-hand cars by such sharing companies, could reduce the environmental problems caused by old cars.

The majority of Lagosians (45%) make use of informal taxis called *Danfos*, 40% walk and only 11% of the population use a private car ((Hamukoma *et al*, 2019). The high pedestrian number can be attributed to heavy congestion that makes motorised transport inefficient. The country is organically aligned with service models rather than ownership of products. However, circular economy approaches to transport have not yet been implemented in Lagos to any large extent, as the city remains faced with daunting challenges related to transport and mobility (Hamukoma *et al*, 2019):

- Road infrastructure and traffic congestion;
- Poor public transport services (less than 3% of daily mobility).

Hence, the priority actions for the city in terms of transportation lie with infrastructure development and public transport. Circular economy is however, beginning to emerge in sharing models such as for bike-sharing in communities. The company Maanar provides smart bicycles for easy communal use in communities in Nigeria. It has created a bike sharing service through a mobile app (Maanar, 2020). The app allows users to locate available bicycles nearby. In order to unlock a bicycle, a barcode can be scanned with the Maanar app. The trip is paid for through the app, at the destination. If we consider transportation as a service, Maanar helps make cars redundant by substituting them with bikes. In areas where vehicle transport is more efficient, the model can be extended to include motorised transport.

From a lifecycle perspective, Nigeria does not yet have either mandatory or voluntary agreements in place for the end-of-life management of transport-related wastes. End of life tyres (ELT) are dumped indiscriminately in landfills and dumpsites due to the absence of a scrap tyre waste collecting system as well as designated landfill sites in the country for tyre wastes (Osaro, 2020). While the potential for remanufacturing of parts from end of life vehicles were explored, Agbo quantified the raw materials potential of used vehicles imported in Nigeria, which is an important destination for European used vehicles (Agbo, 2011). No end-of-life arrangements have been formalised.

A clear circular economy related opportunity exists in the transport sector - from both transportation services and infrastructure, to vehicle lifecycle management. Not addressing these from a holistic, circular perspective, places an unnecessary burden on the Nigerian economy. Given both the number of imported and local vehicles, opportunities exist to explore secondary resource market development. The recycling of tyres alone, would alleviate a growing environmental burden.

## 2.2 Policy framework supporting circular economy activities

### 2.2.1 Overview of the policy framework in the context of circular economy

CE models and concepts are relatively new in Nigeria and up to now formal uptake has been limited. Policies developed around waste management and environmental protection serve as context for a transition to a green / circular economy. The policies and other legislation below focus on waste reduction and management as well as environmental protection and support. Nigeria does not yet have national policy or strategy focused on a circular economy. The focus is on economic transformation and recovery which can leverage greening principles to drive a transition to a circular economy. This speaks to a recovery plan from COVID-19 that may take green, if not circular, economy principles into account. In response to COVID-19 (March 2020), the House of Representatives introduced and passed the Emergency Economic Stimulus Bill, 2020 to provide aid to businesses and individuals in Nigeria (Brooks & Knights, 2020). The Bill forms part of the Federal Government's concerted effort to stimulate the economy and cushion the effects of travel restrictions and business disruptions from COVID-19.

Nigeria has a robust framework of national and federal waste management (see annex D for more details) and environmental laws and policies that are related to the circular economy. However, no explicit circular economy legislation, policy or strategy has been drafted. A barrier that has been identified is the need for enforcement of the standards and regulations pertaining to environmental and waste management. NESREA has an important role to play as the enforcement agency in this regard.

The draft National Policy on Plastic Waste Management (2020) document lays the foundations for a circular economy when it comes to plastics, where the design and production fully comply with the 5R's (Reduce, Reuse, Repair, Recycle and Recovery). This will deliver greater added value in Nigeria and boost innovation. It will curb plastic pollution and its adverse impact on lives and the Nigerian environment. This policy is not yet gazetted.

These efforts made by the government are commendable, but it usually takes years for the principles of the policies in draft and the standards to be agreed upon, and the policies too may not also be applicable at local levels. However, even though the aforementioned policy changes are an important step in the right direction, the link with the transition to a less fossil dependent circular economy are largely missing. Greater cooperation is needed at all levels of government and also between the private and public sectors

to agree on common rules and standards that will enable the mainstreaming of circular economy principles across sectors in Nigeria.

Going forward, the Nigerian government should be willing to develop and support policies programs that will increase investment in circular economy solutions as we recover from COVID-19. This translates to job opportunities, economic diversification, and skills development; other benefits such as greenhouse gas reduction and climate change mitigation will enhance the appeal (Obasuyi, 2020).

### 2.2.2 Environmental standards

A robust regulatory framework and effective enforcement of legislation are critical means of driving green investments. The use of regulations is necessary to address all forms of unsustainable consumption and production patterns, either by creating standards or prohibiting entirely certain operations and activities. Standards can be effective in promoting markets for green goods and services and can induce efficiency and stimulate innovation (interview Juaro, A., 2020).

Regulatory and control mechanisms can also promote principles such as the Precautionary Principle, Polluter Pays Principle, and programs such as the Extended Producer Responsibility (EPR) program (see section 2.2.3). These can encourage industry to shift to closed-cycle manufacturing and efficient take-back schemes for remanufacturing and recycling.

The Federal Government through NESREA has developed thirty-three Environmental Regulations which have been published in the Federal Republic of Nigeria Official Gazette and are now in force (interview Juaro, A., 2020). The full list of these regulations can be found in Annex C.

### 2.2.3 Nationally driven financial programmes and initiatives supporting CE-related sectors

Currently, few nationally driven financial initiatives directly related to circularity have been set up in Nigeria. Some financial programs, are however related to themes that have strong links with the CE.

#### E-Waste

The Nigerian Government, Global Environmental Facility (GEF) & UN Environment have launched a CE initiative for electronic products in Nigeria. This is a USD 15 Million (EUR 14 Million) initiative to increase the circularity of the e-waste sector (Resource Magazine, 2020). The initiative aims to:

- Put a halt to the improper management of electronic waste in Nigeria;
- Bring together players from government, the private sector and civil society;
- Promote recycling of usable electronic components;
- Develop systems for disposal of non-usable and toxic waste.

The programme also includes a range of awareness raising activities on e-waste proper collection, treatment and disposal. Furthermore, the project seeks to support the Producer Responsibility Organisation (PRO) formed in March 2018 under the name of "EPRON". It was founded by industry players including HP, DELL, Philips, Microsoft and Delloite but is not yet fully operational (Interview EPRON, 2020). Awareness raising is a key activity of EPRON, which has engaged in the organisation of the first International E-waste Day in Nigeria in 2019 ( Otufowora, 2020).

#### Agriculture

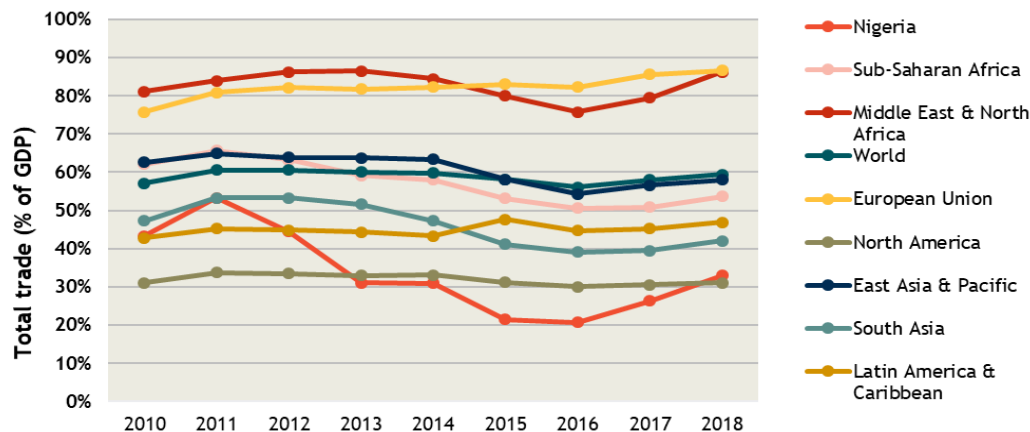
The Growth Enhancement Support Program (GES) is the agriculture sector component of the transformation agenda of the Government of Nigeria. The GES implementation is an agri-tech solution:

an e-wallet that is an “electronic distribution channel which provides an efficient and transparent system for the purchase and distribution of agricultural inputs”(Cellulant, 2020). The farmers can access the e-wallet to buy vouchers that can be redeemed for agricultural input such as seeds, fertiliser and agrochemicals. The farmers buy these inputs at half the cost, while the government covers the other 50%. The programme aims to introduce and place 20 million farmers in a mobile-driven agricultural value-chain. Although the GES contributes to the modernization and increased productivity of Nigerian farms, the program does not directly address circular economy aspects such as the use of organic fertilizers or preservation of soil quality. Also, more specific programs such as the private-public initiative Hello Tractor are supported by the Federal Ministry of Agriculture to promote circular economy development in agriculture.

## 2.3 Enabling environment on trade and investments

The Nigerian economy is characterised by relatively low levels of international trade, despite the country’s position as an important oil producer and exporter. In 2018, the value of trade was equivalent to 34% of Nigeria’s economy. This share is more than twice as low as for the EU (87%) and substantially lower than the Sub-Saharan average of 54% (Figure 2-1). In the period 2010-2018, Nigeria had an average trade surplus of \$ 43 bn (UN Comtrade, 2020). The trade surplus is largely due to the country’s oil and gas exports, which account for over 89% of the total export value. The trade in environmental goods and services in Nigeria is dominated by imports, although the total trade in environmental goods and services declined from \$5.8 bn in 2010 to \$3.4 bn in 2016 (Figure F-2).

Figure 2-8 Share of total trade in GDP (%) (World Bank, 2020<sup>F</sup>)



Foreign Direct Investments in Nigeria are low compared to other countries in Sub-Saharan Africa and FDI inflows have been declining during the last decade to an equivalent of only 0.5% of GDP in 2018. FDI inflows increased again to an equivalent of 1.8% of the GDP (World Bank WDI, 2020<sup>C</sup>), which is close to the average in Sub-Sahara Africa. Important barriers for investment in Nigeria include corruption, limited access to finance and high levels of inflation. However, Nigeria is implementing policy reforms to improve the country’s investment climate through establishment of Special Economic Zones (SEZs) that would provide state-of-the-art economic infrastructure for improved productivity; and structural reforms that will, inter alia, unify Nigeria’s trade and investment policies and associated negotiations.

Overall, Nigeria’s economic growth outlook is positive, although its expected economic growth levels are much more modest than for many other Sub-Saharan countries. In the meantime, the COVID-19 pandemic

has made the economic outlook more uncertain. Nigeria's economy has taken a massive hit from the COVID-19 situation, especially due to the collapse of the international oil price. Consequently, the country's economy is expected to contract by 3.2% this year, in contrast to the pre-pandemic outlook of 2.1% growth ([World Bank, 2020<sup>E</sup>](#)). This has also had significant impacts on the people of Nigeria - an additional 2 million citizens are may be pushed back into poverty due to the pandemic.

Even though the Nigerian government has formulated the ambition to reduce the country's dependence on oil production and diversify the economy, there is still a lack of concrete policies that stimulate a shift to a green and more circular economy and promote investments in such areas. However, there are significant investment opportunities in relation to circular economy activities in Nigeria. There are ample opportunities for the implementation of CE strategies to reduce the cost of construction and contribute to affordable housing. Furthermore, there are opportunities for investments in collaborative economy business models in the transport sector and agriculture, to improve access to mobility and modern farming equipment, respectively.

## 2.4 Existing awareness and capacities on circular economy in Nigeria

### 2.4.1 National awareness of Circular Economy

National awareness of the Circular Economy is still low in Nigeria, with most CE-related concepts referring to waste management issues as the country still faces considerable challenges in this area. Hence, initiatives and awareness of challenges such as recycling and resource recovery have received ample attention from the government and waste management authorities (Ezedu & Ezedu, 2019). The limited awareness of Circular Economy can be attributed to nomenclature - there are no specialised circular economy legal frameworks as of yet, but this does not imply lack of awareness of the concept.

The first substantial country-wide efforts to raise awareness in Nigeria started in 2010 with the creation of the [Green Corps Initiative](#) operating under the National Environmental Standards and Regulations Enforcement Agency (NESREA). The primary objective of this initiative was to raise awareness about environmental protection in Nigeria and "actively involve the citizenry in environmental governance through volunteers under the guidance of NESREA" (Wastesmart.org, 2020). More recently, Director General of NESREA, Prof. Aliyu Jauro, reaffirmed the role of the Green Corps in creating awareness about proper "waste control" and, more specifically, help Nigerians "key into" the circular economy model (THISDAYLIVE, 2020). However, the effectiveness of the Green Corps Initiative has not yet been comprehensively assessed.

In recent years a number of awareness creation initiatives for circular economy-related measures have been launched in Nigeria. In addition to state-organised donor- and state-funded initiatives, social entrepreneurs in Nigeria are also increasingly involved in awareness-raising efforts for circular economy. Some of the most relevant awareness initiatives are listed in Table E-1, in Annex E.

### 2.4.2 Businesses/industries awareness

The majority of Nigerian industries are still unaware of circular economy related concepts. However, a large informal waste-picking and recycling industry consisting of scavengers/waste pickers, intermediaries, artisans, and small-scale enterprises is engaged in the recovering, remanufacturing and reuse of waste (Nzeadibe, 2009). According to data from the International Labour Organisation (ILO), the informal E-waste processing industry in Nigeria employs around 100,000 people, which handle over half a million tons of household appliances every year. This also highlights the potential for the development

of circular economy as an opportunity for job creation (Stears Business, 2020). Research suggests that awareness on the impacts on environment and human health of hazardous disposal practices is low amongst the informal workforce in Nigeria, particularly regarding E-waste management (Ohajinwa *et al.*, 2017; Manhart *et al.*, 2011).

Rising awareness about the economic potential of circular economy related business models is further illustrated by the fact that some Nigerian companies are starting to invest in recycling and reuse concepts. As an example, WestAfricaENRG built and commissioned Nigeria's first Materials Recovery Facility (MRF) in Igando, Lagos in 2015. The facility can divert over 30% of valuable fractions from landfill back into commerce and industry within Nigeria in Kano, Abia, Ogun and Lagos (Westafricaenrg.com, 2020). Another indication that industry awareness is growing, is the Circular economy initiative for electronic products in Nigeria project. Apart from these initiatives, industry-driven awareness-raising activities are piecemeal and not well coordinated.

#### 2.4.3 Consumer awareness of circular economy

Regarding awareness of circular economy among citizens and consumers in Nigeria, there is an acute lack of reliable and robust studies leaning on statistically representative sample sizes. Various small-scale assessments indicate that the general level of environmental awareness is still low (Okorie & Amadi, 2017). One assessment explored environmental knowledge and behaviour of 350 Nigerian youth and found that 68% of the respondents "had general environmental knowledge", but "showed low participation in environmental programs" In 2016, a survey amongst 100 students at elementary level found that "environmental concepts [...] are taken for granted or ignored" and "environmental education is viewed as a course to be taken in higher education; therefore, it is being ignored at elementary level" (Alimi & Olatumile, 2016).

A more recent study from May 2019 examines the awareness of 80 students at the University of Lagos. Although the sample consisted exclusively of students at the faculty of Environmental Sciences, it was found that some students still believed that plastics would decay in the environment. The researchers therefore conclude that it is required to close "gap between knowledge and practice in terms of usage, sorting and disposal" (Opeolu & Olukunle, 2019). In the E-waste sector, the analysis of survey results with 228 responses revealed that in spite of a lack of education on E-waste handling protocol, awareness on E-waste management amongst the respondents was high. More specifically, most respondents were aware of toxicity or harmfulness (68%;  $n = 155$ ) of this waste stream and inherent health risks (60.5%;  $n = 138$ ) associated with unsafe disposal practices and hence, the special treatment it requires for safe disposal (50.9%;  $n = 166$ ) (Miner *et al.*, 2020). While these studies reflect the degree of environmental awareness amongst Nigerians, few studies have been carried out on awareness of circular economy-related aspects.

Comprehensive assessments of consumer awareness on circular economy-related aspects in Nigeria do not yet exist, making it difficult to assess general awareness versus depth of awareness. The lack of awareness among consumers is also one of the main challenges associated with barriers to the successful rollout of a circular economy. The situation is compounded by the fact that because of the large informal recycling sector, Nigerian consumers are in most cases used to being paid for their waste by informal workers and are therefore reluctant to hand over end-of-life products without compensation (Chatham House, 2019).

#### 2.4.4 National capacities on Circular Economy

##### Education and skills gaps

In response to the increasingly pressing environmental problems facing the country, Nigeria initiated an environmental education programme in the 1970s. The programme aimed to raise the awareness of citizens for environmental problems by the inclusion of more environmental education topics in the biology syllabus such as pollution and water conservation (Norris, 2016). Following the Port of Koko incident in 1988, where toxic waste was dumped in Koko port in the Delta state, the Nigerian Conservation Foundation (NCF) complemented these efforts by making the Federal government NERDC (now NERC) include environmental education elements into the citizenship education review conference. This was followed by a UNESCO-sponsored national workshop on the integration of environmental education elements into the national school curriculum and the teacher programme (Bosah, 2020). Following the efforts by NCF, the federal Government of Nigeria also adopted the first National Conservation Education Strategy (Norris, 2016).

Despite these efforts, most school and university curricula still do not include a specially designed program on environmental education (EE). Instead, EE is usually implemented through cross-curricular approaches in existing subjects (e.g. social studies, biology, chemistry, etc.). Furthermore, many teachers still prove to have relatively low understanding of the basic concept of EE and many schools lack the necessary teaching/learning aids (mostly due to insufficient funding or management). As a direct consequence, the majority of the Nigerian population still lack adequate knowledge, skills, attitude and awareness on environmental issues.

##### Vocational training capacities

In order to address youth unemployment, the Federal Ministry of Education (MoE) is currently conducting and/or supporting a number of reform projects to increase national penetration of vocational training, which seek to “vocationalise” secondary education. In addition, a National Vocational Qualifications Framework is being developed by the National Board for Technical Education (NBTE) (Craddock, 2017). NBTE is the leading regulatory body for vocational training programs in Nigeria and has a mission to “promote the production of skilled technical and professional manpower for the development and sustenance” of the Nigerian economy (NBTE, 2020). More recently, new types of vocational training institutions have been formed in Nigeria, going by the names of “Vocational Enterprise Institutions” (VEIs) and “Innovation Enterprise Institutions” (IEIs). VEIs and IEIs were established to provide tailor-made education to specific employment requirements in the private sector.

According to the NBTE, Technical, Vocational Education and Training (TVET) face a number of challenges, including gender inequality, inadequate infrastructure (e.g. for laboratories, workshops, ICT equipment), a lack of funding allocated to TVET institutions as well as inadequate capacities for training of trainers (UNEVOC, 2019). So far, environmental and CE-related considerations have largely been absent in the Nigerian TVET landscape. Amongst the 158 approved IEIs listed on the NBTE's website, only two of them explicitly cater to the environmental sector: i) Enville Institute of Environmental and Safety Management Ikeja, Lagos; and ii) Environmental Sustainability Thinking and Action Centre (ESTAC), Institute of Construction & Engineering, Enugu (IEI, 2020). Notably, Enville Institute does offer CE-related programs, e.g., by building entrepreneurial skills in “Waste-to-Wealth through waste recovery, recycling, repair and reuse” (Enville Institute, 2020).



## 3 Impacts and benefits of the circular economy in Nigeria

### 3.1 Existing impacts and benefits

This section summarises key impacts of some of the most impactful existing CE initiatives in Nigeria.

#### 1.1.1. Economic impacts and benefits

The implementation of national policies and initiatives that are related to the circular economy have several positive impacts and benefits that include:

- Creation of new business and employment opportunities;
- Increased local production, due to linking of secondary materials to new manufacturing activities.
- Reduced imports of products due to substitution with local production (see example on GES).
- The recovery of otherwise lost economic value from waste.

#### 1.1.2. Social impacts and benefits

The implementation of national policies and initiatives that are related to circular economy had several positive social impacts that include:

- Capacity building, knowledge sharing and up-skilling;
- Job creation;
- Raising awareness among the public on better waste management practices;
- Improved health conditions of the public as a result of safer waste management practices.

#### 1.1.3. Environmental impacts and benefits

The implementation of national policies and initiatives that are related to circular economy had several positive environmental impacts that include:

- Resource efficiency;
- Recycling of wastes;
- Diversion from landfill.

Table 3-1 below highlights some positive impacts resulting from the adoption/implementation of national policies and initiatives indicated in chapter 2. Where available, economic, social and environmental impacts are summarized.

Table 3-1 Impacts and benefits

Economic	Social	Environmental
<i>The Food and Beverage Recycling Alliance (FBRA) promotes environmental sustainability by driving a self-regulatory post-consumer packaging waste recovery within the food and beverage sector.</i>		
<ul style="list-style-type: none"> <li>• Introduced a large-scale recovery &amp; buy-back scheme for post-consumer packaging wastes which are recycled into other useful products, leading to an increase in local economic activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Public advocacy &amp; outreach campaigns to create awareness through direct engagement activities</li> </ul>	<ul style="list-style-type: none"> <li>• However, individual companies have global commitments for recycling and a commitment by their local subsidiaries toward using rPET once locally available.</li> </ul>

Economic	Social	Environmental
		<ul style="list-style-type: none"> <li>This will increase the recycling rate for PET, and reduce the need to produce new plastics</li> </ul>
<b>ENDP “Cash for Work” - Borno State Waste Management</b> <i>Developed as part of UNDP's sustainable waste management and environmental protection programme, the “Cash for Work” project is funded by the European Union and targets a total of 12,000 people.</i>		
<ul style="list-style-type: none"> <li>During the 4<sup>th</sup> quarter 2019, 659 beneficiaries (385 men &amp; 274 women) were registered and received offers of employment in exchange for money, as part of a clean-up activity in Maiduguri</li> <li>Waste management and hygiene conditions were improved in the Ngomari, Linein Hadiza and Hausari communities in Maiduguri</li> </ul>	No detailed information available on impact	No detailed information available on impact
<b>Africa Cleanup Initiative is a Nigerian NGO that focuses on environmental sanitation, environmental health, environmental education and community development. They implement various programmes, such as RecyclesPay.</b>		
Improvement of the economic situation of poor households.	<ul style="list-style-type: none"> <li>Through Recyclespay assists less privileged parents pay their children's school fees through the collection of recyclables.</li> </ul>	<ul style="list-style-type: none"> <li>Recyclespay helps to reduce plastic pollution while promoting education, good environmental practice of recycling.</li> </ul>
<b>The NESREA Act contains the functions of the Agency. The Agency is authorised to enforce compliance with laws, guidelines, policies and standards of environmental matters. Such standards would include the federal water quality standards and air quality standards. NESREA is the enforcement agency of the Act.</b>		
No detailed information available on impact	<ul style="list-style-type: none"> <li>Environmental education</li> <li>Green Corps: environmental volunteerism among citizens</li> <li>Create environmental awareness</li> <li>Partnerships for the protection of the environment</li> </ul>	<ul style="list-style-type: none"> <li>Enforce laws and regulations on the environment</li> <li>Partnerships for the protection of the environment</li> <li>Enforce laws and regulations on the environment</li> </ul>
<b>Natl Env (WEEE) Regulations Draft Guidelines for Implementation of EPR for the EEE Sector has recently been developed with the key items derived from the extant laws on hazardous waste</b>		
No detailed information available on impact	Improved health and safety for e-waste recyclers	<ul style="list-style-type: none"> <li>Bans the import of waste e-products, thus mitigating e-waste generation and hazardous materials</li> </ul>
<b>The Growth Enhancement Support Program (GES) is the agriculture sector component of Nigeria's transformation agenda. The GES implementation is an agri-tech solution: an e-wallet that is an “electronic distribution channel which provides an efficient and transparent system for the purchase and distribution of agricultural inputs”</b>		
<ul style="list-style-type: none"> <li>By 2014, the farmers involved in the first phase of the project were eligible for financing and approximately USD 600 M was created in lending and micro-financing opportunities, extending impact beyond initial support for the farmers.</li> <li>Upon implementation of the 2<sup>nd</sup> phase of the project, the food import bill dropped by 75% as farming had</li> </ul>	<ul style="list-style-type: none"> <li>Distribute improved seeds, agrochemicals and good farming practices directly to farmers</li> <li>Empower farmers to increase yield</li> </ul>	<ul style="list-style-type: none"> <li>It acts as a pivot to the development of a natural fertiliser and composting value chain for the agricultural sector that can close nutrient loops and minimise external inputs.</li> </ul>

Economic	Social	Environmental
contributed over \$US 30 bn to the country's economy.		
<i>The Blue Box Program is a single stream recyclable collection program that aims to encourage the separation of recyclable materials from the general waste at the point of generation in Nigeria. To encourage the sorting of waste, Colour-Coded Bags are distributed to households by recyclers and volunteers assigned to the different Local Governments and Local Community Development Areas. The collected bags are then transported to designated Community Recycling Centre in those areas, where the recyclables will be sorted and sold to off-takers.</i>		
<ul style="list-style-type: none"> <li>• Attract Major investors, create green jobs and further strengthen the sector</li> <li>• Increase economic security by tapping the domestic source of the material</li> </ul>	<ul style="list-style-type: none"> <li>• To capture about 50% of recyclables upstream which contributes to a cleaner environment for residents of the city</li> <li>• Increased collection of recyclables creates job opportunities and social upliftment for the informal waste management operations</li> <li>• Re-orientation of scavengers and Integration as Resource Managers at the Community Recycling centres where their expertise will be needed, reducing the negative impact on their livelihood</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage zero waste generation in the State and promote a healthier and cleaner environment</li> <li>• Reduce carbon footprint</li> </ul>

## 3.2 Future Impacts and benefits

As the Nigerian economy moves away from a traditional linear economy towards a more circular economy, this will be expected to have economic, social and environmental impacts. The following subsections present our modelling results, highlighting the direction and magnitude of potential impacts of the circular economy in Nigeria.

### 3.2.1 Modelling approach and framework

The modelling of the macro-economic impacts of the circular economy transition in Nigeria was carried out using Cambridge Econometrics' E3ME model. This is a global macro-econometric model that builds on a historical database of econometric data and projects forward annually until 2030, covering 43 sectors (for more details see Annex B1).

A conventional difference-to-baseline approach is followed. The circular economy (CE) scenario is compared against a baseline<sup>2</sup> in which no explicit assumptions are made about CE activity (a 'business-as-usual' scenario, in other words), in order to compare outcomes between the two.

We have adopted an 'activities' approach (rather than a 'policies' approach) to modelling the CE scenario. This choice means that the analysis does not assess potential impacts of specific policies but instead looks directly at the links between specific changes in an economy and the direct, indirect and induced effects, without making any explicit assumptions about whether these changes are driven by policies, behavioural change or new technology.

<sup>2</sup> The baseline is E3ME's standard projection to 2030 for the Nigerian economy, based on official published economic and energy forecasts. See Annex B for more details.

### 3.2.2 Modelling inputs for the CE scenario

#### Circular economy narrative

Based on our research on the trends in and opportunities for circular economy activities in the eight case study countries, five priority sectors have been chosen to be covered in the modelling exercise. Those are the waste sector, electronics manufacturing, the plastics sector, the agri-food sector and the construction sector. It should be noted that some specific circular activities that are currently commonly mentioned within the European policy and industry context were left out as we did not consider them realistic to be implemented within the coming decade, due to a lack of industrial development or circular economy awareness or the fact that the impacts will only materialise on a longer timescale (e.g., building design for de-construction or modular building design).

The sectors that we have focused on are the waste sector, the plastics (packaging) sector, electronics, agriculture and construction. The waste sector is an important enabler of a (more) circular economy and to be effective in this waste collection rates and recycling rates need to increase. Plastic (packaging) waste is a daunting problem in most African countries, a combination of more effective plastic waste collection and the recycling of plastic waste into new plastic packaging can make an important contribution to solving this urgent problem. E-waste is another challenge in several African countries, but with proper and safe treatment practices in place it also represents an opportunity for reusing and remanufacturing, resulting in an increased supply of affordable EEE products as well as an opportunity for recycling of valuable materials present in the E-waste, when high-value CE strategies are not feasible. Agriculture is still a critical part of the economy in many African countries. In this sector, substantial potential resides in the improvement of handling, storage and distribution of food products to prevent losses and to increase the use of organic fertilizers. Lastly, construction is a booming activity in Africa, but up to now circular practices are virtually absent. Therefore, for the short term there seems to be potential for increasing the use of secondary materials in this sector, either directly or via construction products that incorporate by-products or waste materials.

#### Modelling assumptions

Where possible the aforementioned sectoral narratives have been translated into modelling assumptions. It should be noted that the aim of the exercise has not been to forecast the future in 2030, but to explore the impacts that more increased circularity could have by that year, were this to become a reality. To this end, we made evidence-based assumptions about the form and scale circular economy activities could take in Nigeria by 2030 and used these as exogenous inputs into the model. These model inputs are summarised in **Error! Reference source not found.**

**Table 3-2: Circular economy activities and corresponding modelling inputs**

Category	Circular economy activity	Modelling input
Waste management	Improved waste collection rate	Increase in waste sector output
Electronics, electric equipment & E-waste	Improved recycling of valuable materials in e-waste	Investment in recycling sector to improve health & safety standards (50% funded by industry, 50% funded through public/ODA financing)
	Increased use of recycled materials in electronics production, replacing virgin metals and plastics	Exports of materials recovered from e-waste recycling
Agriculture		Shift in plastics' intermediate demand: reduced purchases from metals and plastics sectors, replaced by purchases from recycling sector
		Substitution of agricultural imports by domestic agricultural production

	Prevention of food loss in agricultural supply chain through improved storage and logistics	Investment in storage and logistical capabilities (50% funded by industry, 50% funded through public/ODA financing)
	Increased use of organic fertilisers materials in agriculture, replacing use of mineral fertilisers	Shift in intermediate demand in agriculture: fewer purchases from chemicals, more purchases from agriculture
Plastics packaging	Increased use of recycled feedstock in plastics production, replacing virgin feedstock	Shift in plastics' intermediate demand: reduced purchases from chemicals sector, replaced by purchases from recycling sector
Construction	Increased use of recycled minerals in construction, replacing virgin minerals (glass, cement, sands, ceramics)	Shift in plastics' intermediate demand: reduced purchases from non-metallic minerals sector, replaced by purchases from recycling sector

### Modelling limitations

As shown in the table, the circular economy activities and the related modelling assumptions focus on recycling and trade activities as well as on raw material inputs. There are two main reasons for this. First of all, due to the lack of well documented data, other activities ranking higher in the waste hierarchy, such as high-quality refurbishing (e.g., in the EEE sector), had to be neglected. Secondly, the technical construction and set up of the E3ME model restricted the type of assumptions and inputs that could be used. For instance, as the model is a demand-driven one, it is difficult to model a policy-driven increase in recycling when this is not fully coupled to an increase in demand for recycled materials across sectors. As such, growing activity in the waste sector was limited to increasing waste collection rates. Furthermore, some activities are hard to represent in the modelling as the sectoral aggregation is too coarse to allow for modelling for changes in production processes within sectors. These limitations are important to take into account, when interpreting the results presented in the following sections. The impacts that circular economy could potentially bring to the chosen sectors and countries are thus not fully covered in the modelling and could thus differ from the modelling outcomes in reality.

### 3.2.3 Modelling results

The modelling results presented in this section reflect differences between the CE scenario and the baseline by 2030, rather than the net effect of economic developments occurring between 2020 and 2030. For instance, if the price level in the CE scenario is reported as -1% by 2030, this does not imply that deflation occurred in the CE scenario, but that inflation was slightly lower in this scenario than in the baseline scenario.

### Economic impacts and benefits

Our modelling suggests that circular economy activities in Nigeria would have a positive impact on the Nigerian economy. By 2030, Nigeria's GDP is projected to be around 3.2% higher in 2030 in the circular economy scenario compared to the baseline scenario. In other words, this suggests that the Nigerian economy would be slightly larger as a result of increased circular economy activity than it would be in a 'business-as-usual' situation. **Error! Reference source not found.** shows the CE scenario results for each of the components of GDP, as well as for the price levels. Results for the CE scenario are presented as differences from the baseline scenario by 2030, in absolute (monetary) and relative (percentage) terms.

**Table 3-3: Macro-economic impacts of the CE scenario**

Variable	Absolute difference from baseline scenario by 2030 (€2019)	Relative difference from baseline scenario by 2030 (%)
GDP	+ €15.2bn	+ 3.2%
Consumer	+ €8.4bn	+ 3.2%
Investment	+ €2.5bn	+ 3.0%
Exports	+ €0.0bn	+ 0.0%
Imports	- €4.2bn	- 11.6%
Inflation	-	- 0.8%

These results suggest that the consumption would be the main driver of the positive economic impact of the circular economy activities, alongside a slightly smaller contribution from investment and the trade balance. The additional consumption relative to the baseline would be driven by higher employment in key sectors, in particular agriculture and waste management (see next section), which would raise disposable incomes for Nigerian consumers. The employment boosts in these sectors would be a direct consequence of circular economy activities in that sector, as reduced food losses would lead to increased agricultural productivity, and waste management output and employment would rise to achieve higher waste collection rates. The benefits of higher consumption would spread through the economy to other sectors providing consumer goods and services, such as retail and professional services, and increase incomes and employment in those sectors, continuing the multiplier effect.

These employment and consumption impacts should be interpreted with caution, however, due to a limitation in the modelling methodology. The agricultural employment impacts observed in the CE scenario reflect an implicit assumption that the additional output in domestic agriculture due to prevention of food losses is as labour-intensive as other forms of agricultural production, when in reality it is likely that this circular economy activity would be much less labour-intensive than most agricultural production. If the employment were not to rise by as much as the results suggest, then it follows that we should not expect as large a consumption impact as the results suggest.

The modelling results also suggest that the trade balance would drive a significant part of the GDP impact. This trade balance impact is directly related to the size of our input assumptions, particularly those made regarding the extent of preventable food losses in Nigeria. It is assumed that around €4bn of an estimated €8bn worth of food losses in the Nigerian agricultural sector are preventable and that these prevented food losses (i.e., higher domestic production) can reduce Nigeria's dependence on imports of agricultural goods. Although the size of the final impact on imports seen in the modelling results is large (-€4.2bn), it is roughly the same size as the input assumption, reflecting the fact that the trade balance was otherwise little affected by circular economy activity. The large impact on imports therefore suggests that food losses in the agricultural sector are a source of great potential for circular economy activity, with a relatively large potential impact on economic outcomes.

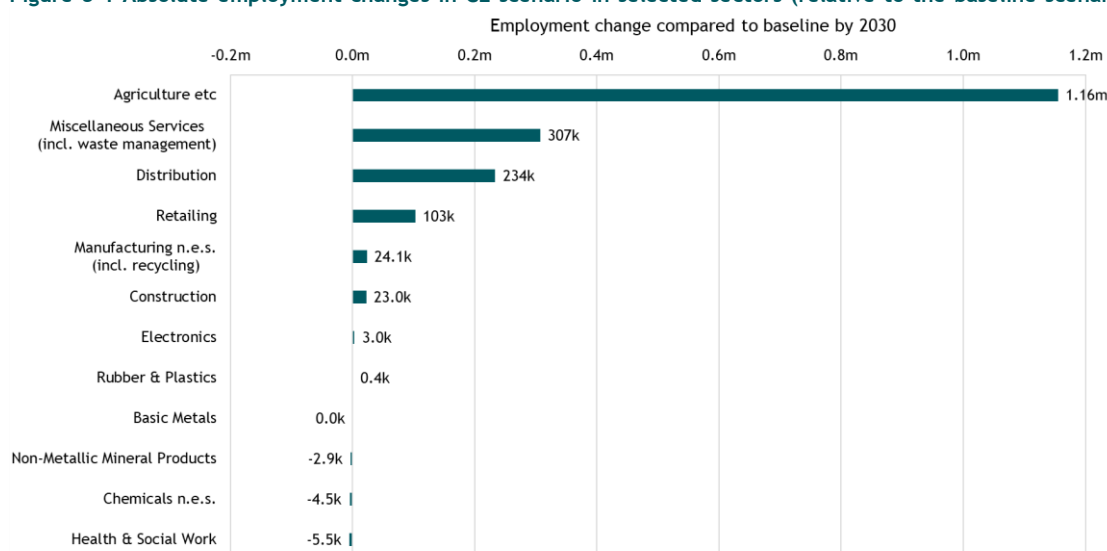
We can draw similar conclusions from the impact on investment, over half of which is driven by the input assumption of an additional €1.4bn investment by the agricultural sector to improve practices in storage and logistics. The remaining €1.1bn of the investment impact comes as a downstream impact of higher aggregate demand from businesses and consumers, as greater demand for goods and services leads firms to increase their investment expenditure to help meet this demand. For instance, the distribution sector would see a boost to intermediate demand from the agricultural sector and would in turn increase its investment expenditure.

When interpreting these economic results, it is important to note that not all of the projected impacts in the CE scenario would necessarily be sustained beyond 2030. On the one hand, we may expect a permanent impact from circular economy activities such as preventing food losses in the agricultural supply chain, or increasing waste collection rates, assuming efforts are made to maintain these practices in the future. On the other hand, some of the projected GDP impacts are a direct result of time-limited injections of funds into the economy, such as the assumed increase in investment in agriculture. We have assumed that half of this investment stimulus would be funded either through public deficits or official development assistance: if this type of funding were to be discontinued from 2030, then we would expect the GDP impact to be somewhat smaller from 2031 onwards.

### Social impacts and benefits

In line with the positive economic effects, the circular economy in Nigeria would also have positive employment effects. Overall, a net increase in employment relative to the baseline scenario of around 4.9% is projected, or approximately 1.9m additional jobs compared to the baseline (Figure 1).

**Figure 3-1 Absolute employment changes in CE scenario in selected sectors (relative to the baseline scenario)**



The job creation associated with circular economy activity would be concentrated in specific sectors of the economy.<sup>3</sup> Nearly two thirds of the additional jobs in the CE scenario relative to the baseline would be seen in the agricultural sector, which is by far the largest source of employment in Nigeria to begin with, and which in our scenario was the subject of the largest scenario assumptions in monetary terms (including an increase in investment and a substitution of imports by domestic production). As discussed in the previous section, however, the employment impacts in agriculture in particular should be treated with caution due to limitations in the methodology used to model reductions in food losses.

The waste management ('Miscellaneous Services') and recycling ('Manufacturing n.e.s.') sectors would also see employment gains as a direct result of circular economy activities, among the largest in percentage terms. The increase in demand for recycled goods follows from an increase in the circularity of industrial production, as sectors such as plastics, electronics and construction purchase more of their materials inputs from the recycling sector. We initially assumed no net change in demand across these sectors: the increase in demand for recycled materials was assumed to be equal to the decrease in

<sup>3</sup> For a detailed overview of employment impacts for all sectors see Annex F- Part 2.

demand for virgin materials. However, the employment results suggest that the gains to the recycling sector would outweigh the losses to producers of virgin materials (namely chemicals, plastics, non-metallic materials and basic metals), due to the increase in aggregate demand triggered by other circular economy activities. The rebound effect is sufficiently small, however, that demand for virgin materials is still smaller than in the baseline, suggesting that it is possible to generate positive economic impacts while also reducing consumption of these particular materials.

As explained throughout this report, the impacts of CE strategies on informal workers are very important in Nigeria. The model is only capable of quantifying changes in overall employment volumes, but not to assess the impacts of specific groups within the workforce in qualitative terms. This means that the shifts in economic activities in this assessment can affect the job types and skill sets required. Involving informal workers in the economic transformation process is thus crucial for achieving societally beneficial outcomes.

### Environmental impacts and benefits

Our model suggests that the economic growth seen as a result of circular economy activity in Nigeria would produce higher carbon emissions than in the baseline, with CO<sub>2</sub> emissions forecast to be 1.5% higher than baseline levels by 2030.<sup>4</sup> Overall the CE scenario impact on CO<sub>2</sub> emissions is smaller than the impact on GDP, suggesting that the economic gains from CE activities would have a relatively low carbon intensity.

The largest contributors to these additional emissions would be the recycling and power generation sectors. The recycling sector would see output emissions rise as a direct result of greater circular economy activity, while these activities would also indirectly affect emissions in the relatively carbon-intensive power generation sector, which would see electricity demand increase as a result of higher aggregate output in the economy. The increased emissions seen in these sectors would outweigh relatively lower emissions in sectors producing virgin materials, such as the chemicals and metals industries.

It is important to take account of some methodological limitations when interpreting these environmental impacts. Firstly, our modelling likely overestimates emissions impacts from certain circular economy activities, such as in agriculture, as we faced limitations in how accurately we could model these activities. For instance, we modelled the prevention of food losses in the agricultural supply chain as an increase in demand for domestically produced agricultural goods, to substitute for imports of those goods. This implies that preventing a given amount of food losses requires the same amount of energy as growing an equivalent amount of food. It is surely the case, however, that the former is more energy-efficient than the latter as this food was already produced in the baseline case, but no measures were taken to prevent it from being lost. Similarly, the model does not necessarily capture the effect that greater recycling rates would have on reducing landfill emissions, or the effect of reduced food losses on organic waste emissions, as our results only include emissions from energy use and process emissions.

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<sup>4</sup> The emissions results presented here include only CO<sub>2</sub> emissions, and only those produced as a result of energy use (such as burning of fossil fuels for energy) and industrial processes (for example CO<sub>2</sub> as a byproduct of the decomposition of limestone in lime production). The results therefore do not include emissions of other greenhouse gases (such as methane), or CO<sub>2</sub> emission from other sources, notably land-use and landfill emissions. This is due to a lack of reliable data for these emissions at the sectoral level required in this study. As a result, the CE scenario emissions results do not fully capture the climate impacts of CE activities, in particular in the agricultural and waste sectors

Secondly, it should be noted that the results presented here only project the emissions impacts in Nigeria, and do not attempt to project the net impact on global emissions. For instance, a substitution of imports for domestic production would, all else being equal, result in no net change in emissions, as production has simply relocated from one place to another. However, this development is represented in our results as an increase in emissions in Nigeria, without taking account of any corresponding decrease in emissions outside of its borders.

Thirdly, these emissions impacts should be seen in the context of environmental goals, more broadly defined. For instance, the increase in emissions as a result of circular economy activities must be weighed against the abatement of other forms of pollution, such as that generated by uncollected waste. Economic statistics such as national accounts generally don't capture the broader co-benefits of increasing waste collection output in terms of human health, ecosystem services, reduced pollution, resource savings and conservation of natural capital. However, due to the lack of data on sectoral resource consumption and waste generation, such impacts could not be quantified.



## 4 Cooperation between the EU and Nigeria

### 4.1 Policy dialogues

Due to Nigeria's population size, its large oil reserves and successful industrialisation efforts, the country is progressively engaging in political exchange with the EU. The dialogue efforts are focusing mainly on trade and development cooperation. However, in light of increasing environmental awareness and the pressures of climate change, circular economy related topics are coming to the fore.

One of the most important frameworks for high-level political dialogue between West Africa and the European Union is the revised Cotonou Partnership agreement. Under Articles 8 to 13 of the agreement the political dimension of the relations between Nigeria and the EU is articulated, while Article 8 in particular spells out the objectives and the key topics of the political dialogue. In 2009 Nigeria and the EU further agreed to intensify their dialogue and cooperation as part of the Nigeria-EU Joint Way Forward. As part of the agreement, both parties committed to yearly officials' meetings as well as a Ministerial dialogue. The priority areas for dialogue under these meetings included: Peace and security, good governance and human rights, economic development, including trade and regional integration, energy, environmental sustainability and climate change ([EU delegation Nigeria](#)). The last ministerial meeting between Nigeria and the EU took place in Brussels on 15 March 2016 (*ibid.*). However, the appointment of the new Nigerian government and the arrival of the new EU leadership may provide a good opportunity to revitalise high-level political exchanges in a wide range of areas of mutual interest. Currently, a new ministerial meeting is being considered for autumn 2020. This meeting could provide an opportunity to define new key areas for action and sectoral dialogues, including a dialogue green economy issues, covering, among other things, the transition to a circular economy.

A continuous political exchange between Nigeria and the EU also takes place on the level of International conferences and stakeholder forums. The EU's week of climate diplomacy, for example, is not only designed to raise public awareness of CE-related issues, but also serves as a key event for building relations with local civil society, business and government actors. Some of the previous Climate Diplomacy Weeks (EC, 2020) placed a particular focus on recycling initiatives and encouraged further exchange between participating stakeholders. Another notable exchange platform for CE-related activities is the EU-Nigeria Business Forum (EUNBF, 2020). During the forum, participants could exchange ideas and experiences to promote the development of circular initiatives. In the 7<sup>th</sup> edition of the Forum, the 2<sup>nd</sup> session was held under the theme "Circular Economy: Exploring opportunities for Nigeria". The EU also hosted a session on "The Green New Deal and Circular Economy" during the International Energy Forum, co-organised by Nigeria: New Opportunities for Europe, North Africa and the Middle East". Although the session did not foresee direct participation of Nigerian stakeholders, both parties attended the event (IEF, 2020). The 8<sup>th</sup> edition of the Business Forum, which was scheduled for April 2020 and would have taken place at the same time as the CE Mission to Nigeria, would also have focused on the transition to CE, but was cancelled due to the COVID pandemic.

In addition to the classic policy dialogues, activities within the framework of development cooperation offer an additional platform for the exchange between actors from the EU and Nigeria. Since development programs often target rural areas, the related project meetings can provide a forum for dialogue between actors at local level (see [4.1.2](#)). Broader development cooperation programs on the other hand can offer

opportunities for engaging in policy dialogue with national authorities and other key stakeholders. Existing policy dialogues such as the EU-Nigeria Business Forum show that exchange on CE-related issues is already taking place on various levels. However, there is sometimes a perception of an asymmetrical relationship that is predicated on the motivation of the European Union to advance its strategic interests in Nigeria (Bakara, 2019). Going forward, policy dialogues thus need to continue to be cognisant of the inclusion of just transition principles that do not negatively impact on the vulnerable in Nigerian society.

The following table presents opportunities and potential barriers for the development of future CE-related policy dialogues between Nigeria and the EU.

**Box 4-1 Opportunities and Barriers for future CE-related policy dialogues between Nigeria and the EU**

- Re-vitalising a high level policy exchange between the EU and Nigeria, for instance during the ministerial meeting that is being considered for autumn 2020, could provide valuable opportunities to define new key areas for action and sectoral dialogues, including a dialogue on the transition to a circular economy.
- The existing CE-related policy dialogue and exchange platforms for CE-related topics present a good opportunity for Nigeria to establish a more coordinated approach for joint policy development.
- The relationship between Nigeria and the EU is - based on the European Union's motivation to advance its strategic interests in Nigeria - often seen as unbalanced by Nigerian stakeholders. Going forward, policy dialogues need to continue to be cognisant of the inclusion of just transition principles that do not negatively affect the country and especially not the vulnerable within the Nigerian society.

## 4.2 Development cooperation initiatives, including by EU Member States

Nigeria and the EU have a long history of development cooperation, as the first interaction between the EU and Nigeria dates back to 1976, a follow-up of the Lomé 1 convention (ECIS, 1977). Priorities of development cooperation projects have greatly differed over the years - the initial focus was on trade development, export of primary produce and supporting the mining sector, the focus increasingly shifted to human resources development in the rural sector as well as democratic governance, human capital, economic development and energy (EC, 2020<sup>B</sup>). After a brief suspension of bilateral exchange between the countries in 1995, due to the violent interventions of the military government, the EU and Nigeria resumed their partnership in 1999. This was followed up with the drafting of a support strategy for Nigeria, which was signed in 2002 by the EU and Nigeria. The main instrument for EU development cooperation is the European Development Fund (EDF). Most European Union development cooperation activities in Nigeria are funded primarily through the allocation of EUR 689 million from the 10th European Development Fund (EDF) to the EU/Nigeria National Indicative Programme (NIP) and a EUR 562 million allocation from the 11th EDF NIP for the 2014-2020 period ([EU delegation Nigeria](#)). The focal sectors under the 11<sup>th</sup> EDF are: Health, nutrition and resilience (€ 280 M), Sustainable energy and access to electricity (€ 150 M), Rule of law, governance and democracy (€ 100 M) (EC, 2020<sup>B</sup>).

The EU has ever since been actively involved in supporting development programmes in cooperation with Nigerian stakeholders, however these rarely have an explicit CE-thematic focus. Therefore, the following table lists some of the most relevant EU-Nigeria development cooperation projects that are related to aspects of the CE.

Table 4-1 Ongoing CE-related development cooperation programmes of the EU in Nigeria

EU support to sustainable waste management and environmental protection in Borno state		
<b>Objective:</b> Rebuild the resilience of conflict-affected communities in Borno in a sustainable and environment friendly way.		
<b>Expected results:</b> <ul style="list-style-type: none"> <li>• Institutional capacity of agencies involved in waste management (BOSEPA &amp; Ministry of Urban Planning) is strengthened for <b>effective waste and hygiene management</b> in a gender- sensitive manner;</li> <li>• Community awareness regarding hygiene and waste management significantly improved;</li> <li>• Vulnerable households in target communities are provided with immediate employment opportunities (cash-for-work) in the area of waste management and community hygiene in a gender sensitive manner;</li> <li>• Vocational and entrepreneurial skill of target populations and vulnerable households in target communities are improved in waste management in a gender sensitive manner.</li> </ul>		
Total budget: EUR 7 Mio	Implementing period: 3 years (2018 - 2021)	Implementing agency: UNDP
Restoring and promoting sustainable agriculture-based livelihoods for food security, employment, and nutrition improvement in Borno state		
<b>Objective:</b> The overall objective of this action is to build the resilience of conflict affected people and public sector institutions in Borno State in an environment-friendly way. The specific objective is to enhance social protection, through creation of employment and the promotion of environment and climate-friendly livelihood opportunities (with a special focus on women, youth and vulnerable households) with the aim of increasing access to basic needs, significantly reducing malnutrition and strengthening resilience in communities affected by the insurgency.		
<b>Expected results:</b> <ul style="list-style-type: none"> <li>• Result 1: Small holder farmers (men, women and youth) have enhanced skills and knowledge to implement good agricultural, nutrition, and gender practices;</li> <li>• Result 2: Smallholder farmers (men, women and youth) have diversified food source and income;</li> <li>• Result 3: Smallholder farmers (men, women and youth) have opportunities for markets and business development.</li> </ul>		
Total budget: EUR 22,1 Mio	Implementing period: 36 months (2018 - 2021)	Implementing agency: FAO, UN Women and WFP
West Africa competitiveness programme - (Nigeria component) Nigeria competitiveness project (NICOP)		
<b>Objective:</b> To improve the performance, growth and contribution to industry, regional trade and exports of selected value chains; and to improve the climate for businesses at national and regional levels.		
<b>Expected Results:</b> <ul style="list-style-type: none"> <li>• Competitiveness at firms' level is improved;</li> <li>• Intermediate organizations of the selected value chains are strengthened and service delivery to MSMEs is improved and expanded (quality, norms/standards, <b>new green solutions</b>, market access, etc.);</li> <li>• Regional policies in favour of industrial competitiveness are mainstreamed in the country and help enable a business-friendly environment.</li> </ul>		
Total budget: EUR 11 Mio	Implementing period: 4 years (2018 - 2022)	Implementing agency: GIZ
West Africa competitiveness programme (phase 1&2)		
<b>Objective:</b> The programme aims to support value chains at national and regional level to promote structural transformation and better access to regional and international markets, while taking into account social and environmental concerns. The proposed action incorporates these priorities and aims to "Strengthen the competitiveness of West Africa and enhance the countries' integration into the regional and international trading system". Specific objectives are to: "improve the performance, growth and contribution to industry, regional trade and exports of selected value chains" and "improve		

the climate for business at national and regional levels". The programme is implemented with a subsidiarity approach through different components covering ECOWAS and the West African countries.

**Expected results/Output:**

- Competitiveness at firms' level is improved, especially through the Clusters' approach;
- Intermediate organisations of the selected value chains are strengthened and service delivery to MSMEs is improved and expanded (quality, norms/standards, **new green solutions**, market access, etc.);
- Better regional linkages among selected value chain actors are promoted and key regional intermediary organisations are supported;
- Regional quality infrastructure system is strengthened, with a view to **promote environmental issues**;
- Regional policies in favour of industrial competitiveness are mainstreamed in the country and help enable a business friendly environment;
- Regional policy and framework to improve industrial competitiveness are harmonised, formulated and monitored;
- The capacity of ECOWAS Commission, UEMOA Commission and Member States to successfully manage, coordinate and monitor the programme is strengthened.

Total budget: EUR 120 Mio	Implementing period: 5 years (2018 - 2023)	Implementing agency: Indirect management with the partner country; with GIZ (in Togo and Nigeria)
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**Nigeria Climate Change Response Programme (NCCRP)**

**Objective:**

The Programme funded under the Global Climate Change Plus initiative provides Technical Assistance to the Department of Climate Change of the Federal Ministry of Environment with the objective to support the country's economic growth and development strategies while meeting its conditional 45% NDC targets by 2030.

**Expected results/Output:**

- The establishment of the MRV framework and the implementation of sustainable sectoral MRV systems for waste and energy;
- Dissemination of Climate Change knowledge through awareness-raising campaigns towards youth, civil society, stakeholders and policy makers;
- Establishment of a National and two States waste baselines and emission profile associated with sustainable capacity building on best practices.

Total budget: EUR 6,9 Mio	Implementing period: 4 years (2020 - 2024)	Implementing agency: Conseil Santé, SOFRECO, FACTOR, CITEPA with Federal Ministry of the Environment
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Apart from EU-funded development cooperation, several EU-member states are also involved in collaboration and development cooperation projects in Nigeria. However, most of these projects are not related to CE. One exemption is the Green Innovation Centres for the Agriculture and Food Sector (GIC) project, conducted by the German Gesellschaft für Internationale Zusammenarbeit (GIZ). The project, which is implemented between 2014 to 2023, aims at increasing innovations and incomes of small farming enterprises in the agriculture and food sector, while also boosting employment and improve the regional food supply in the rural target regions in Nigeria. The Green Innovation Centres promote the expansion of innovations by providing advisory services, organising educational and training courses, and facilitating access to loans. These innovations may be technical in nature, such as mechanisation within agriculture or improved seeds, fertilisers and food cooling chains. In many cases, they focus on new channels for cooperation, such as setting up producer associations, specialised enterprises or interest groups. Whenever possible, the program cooperates with existing agricultural schools, knowledge hubs and research institutes, such as the Africa Rice Center or the International Institute of Tropical Agriculture. In addition, the Centre for Development Research within the special initiative conducts accompanying international research ([GIZ, 2020](#)).

In addition to German Development Cooperation, Finland has - in the form of a bilateral partnership - also been involved in CE-relevant cooperation activities in Nigeria. The so called “*Circular Economy Innovation Partnership*” is proposed as a vehicle for deepening circular economy transition and adaption in the private sector within the African Circular Economy Alliance (Nigeria, Rwanda and South Africa). The partnership is supported by the Finnish Government and the African Development Bank (Odutola, 2019).

There are also several small-scale development projects, particularly in the waste sector, conducted by various EU-affiliated embassies. The “*Stop Don't Drop*” public waste management initiative, for instance, has a long history of collaborating with representatives of the EU member states. Most recently, the embassy of Sweden collaborated on the campaign and started donating their recyclable waste streams in an effort to ensure a more sustainable treatment of the waste streams of the embassy. The German Embassy launched the “*NO THANKS!*” campaign together with “*Stop Don't Drop*”, where they provided collection stations for plastic bottles and aluminium cans, which were to be deployed in Abuja ([Twitter, 2019](#)).

Notable non-EU development cooperation with a focus on CE in Nigeria includes the cooperation between Japan's International Cooperation Agency and local ministries to set up a draft for an end-of-life vehicle recycling law and vehicle recycling system (ACR+, 2017).

#### Box 4-2 Opportunities & barriers for future CE-related development cooperation between Nigeria and the EU

- The multitude of Ce-related development programmes currently supported by the EU in Nigeria form a great entry point for the rollout of future cooperative approaches with an increased focus on CE.
- Both the ongoing development cooperation programmes in Nigeria and the upcoming new programming period offers significant opportunities to establish both the EU and Nigeria as a front-runner in the context of Circular Economy. Projects such as the Integrated Waste Management in Western Africa (IWWA) may be further developed and expanded to increase the focus on relevant CE-aspects such as EPR, recycling and reuse of waste.

### 4.3 Activities by the EIB and EU-based Development Finance Institutions (DFIs)

To support sustainable economic development within West Africa and Nigeria the EIB collaborates with multiple partners, such as Ecobank Group, the United Bank of Arica (UBA) or the African Development Bank (AfDB), both financing large infrastructure projects and businesses in the private sector and supporting SMMEs in West Africa with Microfinance solutions. As part of theses collaborations, the EIB and the UBA in 2016 agreed on a EUR 60 million lending programme to support private sector investment across Nigeria. The credit line will allow the UBA to provide longer term loans than currently available to private companies in Nigeria. In 2019 the lending programme was extended by an additional EUR 60 million ([EIB, 2016](#)).

In 2018 the EIB further agreed to support the creation of the new Development Bank of Nigeria and to strengthen lending for business and agriculture investment in the country, finalising a USD 20 Million equity stake, alongside USD 50 Million equity participation from the AfDB. The Development Bank of Nigeria, which was created by the Federal Government, particularly aims to supports MSMEs and has incorporated an Environmental and Social Risk Management Policy, which seeks to introduce a systemic approach of addressing both social and environmental issues (DBN, 2020).

To assist female entrepreneurs in Nigeria and across Africa in developing business skills and improve their capacity, the EIB has also created a lending initiative called 'SheInvest'. Its goal is to support a higher female economic participation in Nigeria and other African countries. The initiative will promote gender-related climate change investments in reference to the EU border engagement program (Okunade, 2019).

The IEB was further closely involved in the development of the EU External Investment Plan (EIP), launched in 2017. The EIP is designed to attract future investment, in particular from businesses and private investors, in countries near the EU ('EU Neighbourhood') as well as in Africa. It will strengthen existing partnerships by promoting inclusive growth, job creation and sustainable development. The EIP targets five key investment windows, including (1) Sustainable Energy and Connectivity, (2) Micro, Small and Medium Sized Enterprises (MSMEs) Financing, (3) Sustainable Agriculture, Rural Entrepreneurs and Agribusiness, (4) Sustainable Cities; and (5) Digital for Development. At the core of the EIP lies the newly established European Fund for Sustainable Development, which is expected to trigger additional public and private investment volumes, mobilising total investments of up to EUR 44 billion, based on EUR 4.1 billion contribution from the EU budget and the European Development Fund (TRALAC, 2018). Together with the newly formed European Business organisation (EBO) the EIP is also expected to play a critical role in future dialogue on CE between the EU and Nigeria ([EU delegation Nigeria, 2018](#)).

Besides the investments from EIB other EU DFIs are also involved in Nigeria. Among them is the Compañía Española de Financiación del Desarrollo (COFIDES), which recently supported efforts of DeltacomGroup to establish repair services on an international scale. The group operates in the telecommunications repair service sector for telecommunications operators as well as equipment manufacturers and is made up of a series of subsidiaries, such as in Spain, Russia, Mexico and soon, Nigeria. COFIDES will contribute EUR 180,000 to DeltaComGroup for the establishment of a new repair centre in Lagos, Nigeria. This financing is provided through a co-investment instrument taken from COFIDES's own resources (25%) and the FONPYME Fund (75%). The total investment, including the promoter's contribution, amounts to EUR 260,000 (Cofides, 2020).

The French Agence Française de Développement (AFD) and the Dutch Entrepreneurial Development Bank (FMO) are also involved in development corporation projects in Nigeria, particularly in the waste sector. In Ogun State both DFIs support a waste to energy project, further complementing an intervention of the AFD in the solid waste management sector. One of the objectives of the project is to establish a framework for advanced treatment of waste: existing collection and disposal systems are reinforced, and the conversion of waste to fuel is introduced as an additional processing step (EU delegation Nigeria, 2017).

The mapping exercise above shows that CE has so far not played a central role within the framework of DFI investments in Nigeria, which so far primarily focused on private sector development, socio-economic infrastructure development, mitigation and adaptation to the effects of climate change and regional integration. Nevertheless, based on the existing structures a range of opportunities for future CE-related activities can be identified:

**Box 4-3 Opportunities and Barriers for future CE-related policy dialogues between Nigeria and the EU**

- International development finance institutions and banks are increasingly starting to establish circular economy investment funds and programmes in Europe. Building on an already large number of CE projects in various sectors, future investments in Nigeria or other African countries can be designed to support the transition towards a CE. However, just transition principles are yet to be applied to many of these new finance mechanisms and should be integrated into development finance to support the circular economy transition.
- Newly established financial institutions such as the Development Bank of Nigeria or the African Guarantee Fund offer significant potential to contribute to the promotion of a sustainable economic development in Africa. Future CE-related DFI activities may benefit from a cooperation with these institutions.
- The EIB's has recently launched its new global climate strategy and Energy Lending Policy. The new strategy will end financing for fossil fuel energy projects from the end of 2021 and instead focus on accelerating clean energy innovation, energy efficiency and renewable energies. Under the strategy, the EIB Group financing will unlock EUR 1 Trillion worth of climate action and environmentally sustainable investment in the decade to 2030. This offers significant potential for the financing of future climate- and environmentally friendly CE projects in both Europe and Africa.
- In order to ensure a just transition towards a CE in African countries, many of the new financing mechanisms still need to be adapted to the African context. Although the EIP is already adapting EU financial instruments to the development financing context, it will be important to monitor the rollout and further adjust the financing mechanism if needed. Furthermore, the integration with existing development finance must be guaranteed.

## 4.4 Trade and investments related to Circular Economy

Nigeria's trade-related legislation has remained largely unchanged in the recent years. Many outdated laws are still in place, while several bills, for instance concerning competition, the metallurgical industry, postal services, and transport (eight bills), are awaiting approval by the National Assembly (WTO, 2015). Nigeria currently grants customs duty concessions to imports of, inter alia, agricultural inputs such as fertiliser, seeds and machinery to improve agricultural productivity. Duty-free imports of plants and machinery for the mining sector are allowed. The country also maintains several industrial policies to promote local raw materials use, and local value added/manufacturing (*ibid.*). The country further imposes several politically mandated restrictions on imports and exports in order to support their local industries. In addition, trade barriers negatively affect the supply chains of exporters to Nigeria, and of local manufacturers either importing inputs or exporting from Nigeria. As a result, import and export costs in Nigeria are almost double those in East Asia & the Pacific region (WEF, 2020).

As a founding member of the Economic Community of West African States (ECOWAS) Nigeria was fully engaged in negotiations to establish an Economic Partnership Agreement (EPA) between the ECOWAS and the EU. Similar to other EPAs, the ECOWAS EPA serves as a guiding document for trade relations, emphasising more comprehensive trade activities between the two economic zones as well as the support of sustainable development within the ECOWAS states. Although the EPA was already concluded in 2014, Nigeria has not yet signed the agreement. The reluctance to accede to the agreement may partly be due to the fact that West Africa, more than half of the region's exports to the EU are made up of mineral products, predominantly crude oil from Nigeria (EP, 2018; EP, 2020).

Despite not having signed the ECOWAS EPA, Nigeria is signatory to several international conventions and treaties that aim to support a more sustainable trade of goods and services, while promoting a viable environment. The National Authority Federal designated for the implementation of these international conventions is (in most cases) the Ministry of Environment. This also covers conventions concerning E-waste and other circular economy related issues.

Despite the efforts aimed to make the trade of hazardous E-waste in sub-Saharan African countries illegal, in particular the Bamako Convention, E-waste continues to flow into Nigeria. It is estimated that the country receives 71,000 tons of used consumer goods through the two main ports in Lagos from the European Union and other more industrialized economies every year (UNEP, 2019). A source-analysis of e-waste imports conducted by the Basel Convention, shows that the UK (Felixstowe port) dominates export with almost 60%, followed by Germany (Hamburg port) with 16% (Ogungbuyi *et al.*, 2012). The analysis concluded that additional measures for an improved control of used and end-of-life product exports from Europe to Africa are necessary and further recommends the training of enforcement officers from African countries in Europe. Moreover, international co-operation between African small and medium enterprises (SMEs) and recycling companies operating in industrialised countries needs to be explored and encouraged. This approach could allow companies in both the EU and Nigeria to combine their knowledge and gain valuable competitive advantages in the dismantling of e-waste and material recovery (Öko-Institut, 2012).

Although CE-related trade in Nigeria is currently dominated by e-waste, there has been some diversification in particular in the renewable energy sector, where local solar companies increasingly import technologies from Original Equipment Manufacturers (OEMs) mostly based in Asia (primarily from China, India and in a few cases Malaysia), Europe (mainly Germany) and North America (primarily United States of America and Canada). A few companies are currently also working towards a full local manufacture or assembly of solar panels in the future (ACE, 2020). Especially the import of solar technologies is, however, still hampered by a 10% import duty levy placed on solar panels by the Nigerian Customs Service (Heinrich-Böll-Stiftung, 2020). The socio-economic benefit of making affordable power accessible to everyone via renewable energy could thus be supported by reduced duty being levied on products that support a green transition.

The mapping exercise above shows that current trade and investment in environmental/ CE-related goods and services in Nigeria can still be improved. The following table lists a range of opportunities as well as potential barriers to future activities in this regard:

#### Box 4-4 Opportunities and Barriers for future trade and investments in environmental goods and services

- The efforts of international and local companies to work towards the establishment of local value chains (e.g., for solar panels) offers great potential to increase Nigeria's trade in CE-related goods and services. In this context, updated trade regulations could play a key role in ensuring the feasibility of such endeavours.
- In order to solve Nigeria's pressing problem with imported electronic waste, the control of exports of used and end-of-life products from Europe to Africa must be improved. In this context, the training of enforcement officers from African countries in Europe could be considered. In addition, international cooperation between Nigerian small and medium-sized enterprises (SMEs) and recycling companies from industrialised countries could enable both sides to pool their knowledge and gain valuable competitive advantages in the dismantling of electronic waste and material recovery.
- Despite the growth of environmental goods and services markets and increasing acceptance of the need to switch to a green economy, comprehension of potential opportunities and challenges of trade in environmental goods and services remains inadequate. This is due to both the size and complexity of the sector, and the lack of an internationally agreed definition and classification. Currently no African country is part of the ongoing negotiations on the WTO Environmental goods agreement. As the agreement has significant potential to promote green growth and sustainable development, knowledge transfer and even the diversification of exports, an active involvement of Nigeria and other African Countries offers great opportunities to support trade and investments in environmental goods and services.

## 4.5 EU companies with circular economy operations in Nigeria

The following table (4-2) lists the major EU companies that are involved in CE-related operations in Nigeria. The list is a selected overview.

**Table 4-2 Major EU companies with circular economy operations in Nigeria**

<b>Lafarge</b>
Lafarge is a Paris-based company which manufactures building material and operates in Nigeria as well as in over 80 countries worldwide. The company considers circular economy as part of their core strategy which they aim to achieve through long-lasting design, maintenance as well as repair, reuse, remanufacturing, refurbishing and recycling. In the beginning of 2018, Lafarge launched “Geocycle” in Nigeria. Geocycle claims to be the country’s first full-fledged professional waste management service provider, handling waste from different sectors in a safe, sustainable and environmentally friendly manner. The business collects waste directly from municipalities and industries, pre-processing it in platforms and co-processing (or reuse) it in their cement plants. Through co-processing (the complete destruction of waste in cement kilns). Lafarge further recovers energy and recycles materials from different types of waste. Current waste materials handled are PETs, waste tyres, laminated plastics, laminated papers, waste oils, spent bleaching earth, wood wastes, palm wastes, waste oils, agro-processing wastes, treated drilling mud ash and other special wastes. According to the company, the activities of Geocycle also provide strong environmental benefits for the local communities, as they reduce the volume of landfilled waste, save public funds and create a cleaner living environment.
<b>BASF West Africa</b>
BASF West Africa Limited was opened in 2012 in Lagos. The company is actively pursuing circular economy initiatives including the Waste2Chemicals (W2C) pilot in Nigeria, which focuses on chemical recycling of plastic waste. BASF West Africa is currently looking to expand the pilot for instance through the export of component materials from W2C. Their overall objective is to seed the construction of local value chains and establish an innovative local chemical industry based on secondary materials (see section 2.1.4).
<b>Presco (Siat Group)</b>
The Siat Group, which was originally a Belgian agro-industrial company founded in 1991, operates a subsidiary called Presco in Nigeria. The company utilises organic waste generated in their rubber-mills and palm-oil plantations both as a natural soil enhancer and bio-fuel for green-power-turbines. This allows rubber-mills and palm plantations to operate an integrated waste disposal system. Presco also recycles residues from the mills (empty fruit bunches, fibres, kernel shells, ash, palm kernel cake (PKC) and effluent).
<b>Schneider Electric</b>
Schneider Electric is a French company operating in Nigeria that aims to assist enterprises in the digital transformation of energy management and automation. The company is following a sustainability strategy with a strong focus on CE-based approaches. Their circular value proposition prolongs products’ lifespan through leasing, pay-per-use, refurbishing or modernization - leveraging the power of connectivity and digitization. Secondly, their circular supply chain promotes take-back schemes, aiming for zero waste. Finally, their products are designed under circular criteria such as recycled content, supporting recyclability of resources and end-of-life guidance. On a global scale, Schneider has committed to recovering 100 % of the industrial waste at their 200 manufacturing sites by 2030. They offer different services under their <a href="#">EcoStruxure</a> program to drive both operational and energy efficiencies at external partners, while applying this concept in their own Smart Factories. Moreover, they offer advisory services to understand sustainability risks and rewards, leading to a strategy that delivers tangible benefits within the regulatory framework and optimises the technology available at their sites.

### Closing the Loop

In collaboration with the Dutch government and smartphone developer Samsung, the Dutch company Closing the Loop, has established a “one for one” concept. Within this concept every purchase of a new Samsung Galaxy S10 E model will be ‘offset’ by recycling one discarded phone in one of the four typical African e-waste recycler countries, including Nigeria. The recycling scheme is further supported by the telecommunications company T-Mobile, which is offering it in 124 stores across the Netherlands.

To support German businesses in establishing and expanding their business relations with foreign countries, the Chambers of foreign Trade (AHKs) in Germany are closely linked to the network of German Chambers of Industry and Commerce (IHKs). In Nigeria this function is fulfilled by the Delegation of German Industry and Commerce. They offer the benefit of a strong business-to-business network and increase visibility in the German-Nigerian business environment. Additionally, they offer training and career programs, which qualify employees and managers for the German-Nigerian market. Competencies developed are focused on (1) Energy and the environment, (2) Skills development and (3) Innovation and start-ups.

Similar to the German model, finish businesses abroad are supported by the Team Finland Network. The network provides focused information on the development of business environment and facilitates market access of Finnish companies. Team Finland, among other things organises business events in Nigeria and Finland, supports the exchange of trade missions between the two countries and is actively looking for new approaches to increase the Finnish businesses’ presence in Nigeria. The priority sectors of the Team Finland network in the year 2019 were education, health care, innovation and ICT, energy, agri-technology, waste management and circular economy.

The mapping of EU companies with a circular economy in Nigeria shows that the country has already successfully attracted a number of multinational companies, each having a strong focus on CE. The following table lists potential opportunities to further facilitate both existing and future business activities, as well as potential barriers for companies with CE operations within the country.

#### Box 4-5 Opportunities and barriers for future CE-related operations of EU-companies in Nigeria

- Multinational companies in Nigeria have started to arrange themselves, cooperating on selected overarching topics such as those related to trade and policy-frameworks. These cooperation’s offer the opportunity to extend this dialogue to a dedicated work stream focused on the transition to a circular economy. The imperative lies with the private sector to collaborate on establishing local circular economy driven value chains. Technologies for waste treatment and beneficiation are reasonably available but challenges need to be addressed regarding access to waste, creating sustainable employment opportunities and sufficient materials being available. Partnerships in the development of these circular economy value chains are key.
- Expanding these serviced by providing additional guidance on CE-related business approaches could offer a good opportunity to support CE-approaches of multinational companies within Nigeria.
- The experience and lessons learnt of CE-related private sector activities by the Delegation of German Industry and Commerce and the Team Finland Network, constitute a good opportunity to improve and scale up CE B2B connections in Nigeria

## 4.6 Research and technical cooperation

Currently there are no bilateral agreements on joint research initiatives or other framework documents that govern technical cooperation between the EU and Nigeria. However, Nigeria has been a participant of several cooperation initiatives, which were implemented in order to establish and nurture the scientific exchange network between European and African researchers. The cornerstone of the exchange on science and technology stems from the *Coordination and Advancement of sub-Saharan Africa-EU Science & Technology Cooperation Network (CAAST-NET)* project, initiated in 2008. The project, in which Nigeria was represented by the National Office of Technology Acquisition and Promotion, helped to establish a scientific network between Nigerian and European researchers and scientists and created valuable linkages to other EU-Africa research initiatives ([Cordis, 2020<sup>A</sup>](#)).

CAAST-NET was followed up by RINEA, the Research and Innovation Network for Europe and Africa. The RINEA project strengthened the quantity and quality of partnerships between innovation and research actors in the EU, Nigeria and other African partner countries, by supporting bi-regional policy dialogue and disseminating research and innovation partnerships offered by the EU ([Cordis, 2020<sup>B</sup>](#)). RINEA was eventually replaced by the *Long-term EU-AU Research and Innovation Partnership for Food and Nutrition Security and Sustainable Agriculture (LEAP4FNSSA)*.

The projects were primarily implemented to develop a foundational scientific network however with no thematic focus on circular economy related research partnerships. Hence, there has not yet been a coordinated CE-related research cooperation between the EU and Nigeria. Instead, smaller individual research projects are the most frequently implemented forms of joint effort in the fields of science, technology, and innovation. The following subchapter gives an overview of CE-related research and technical cooperation projects, which were implemented with Nigeria actors or featured participating research institutes from Nigeria.

The ELITE research project, 2015-16, aimed for a better understanding of water stress and water management practices for cultivation of potatoes. Through an assessment of impact values and identification of other scientifically relevant parameters, the project aimed to develop the necessary knowledge and tools to properly measure water efficiency during cultivation. The project was funded under the FP7 Peoples program ([Cordis, 2020<sup>C</sup>](#)).

A similar research project, which was funded under the FP7 KBBE program on Food, Agriculture and Biotechnology was initiated by the University of Greenwich. The project, which was titled *Gains from Losses of Root and Tuber Crops* (2012), was implemented in several countries, which were chosen according to the involved partner organisations, of which three operated in Nigeria. *Gains from Losses of Root and Tuber Crops* examined post-harvest losses from yam and cassava production and subsequently explored pathways to process the harvest waste into potentially valuable products ([Cordis, 2020<sup>D</sup>](#)). Another intra-regional project, which featured a participating Nigerian research institute, was the *Integrated Waste Management in Western Africa* project (2010). The main gaps and constraints to implementing an integrated solid waste management system were analysed in the targeted countries. The results of this analysis were basis for inputs delivered to local authorities and policy makers during participatory workshops, to develop strategies such as national actions plans ([Cordis, 2020<sup>E</sup>](#)).

As the EU's main strategic RDI cooperation initiative, Horizon 2020 also forms the basis for many smaller complementary RDI projects. Accordingly, several CE-related projects supported by Horizon 2020 also take place in Nigeria. One of these is the *ECO-innovation and the Dynamics of External Knowledge Sourcing* project, which is coordinated by the Euro-Mediterranean Centre on Climate Change and aims to support a circular industrial transformation through the introduction of new sustainable industrial processes in Nigeria. More specifically, the research project targets an examination of eco-innovations in the business sphere in Nigeria and contributes to policies, which aim to further green economy approaches and drive sustainability in the private sector ([Cordis, 2020<sup>F</sup>](#)).

Another research initiative stemming from the Horizon 2020 program is the *Circular Economy: Sustainability Implications and guiding progress* project, which features an involvement of Nigeria, as the University of Ibadan is listed as a project partner. Although the project website does not declare the extent of involvement of the University, the CE-focus of the research project is to be highlighted. The project is heavily focused on researching and managing possible CE-practices and the subsequent integration of such processes into current systems ([Cresting, 2020](#)). The University of Lagos is involved in a Horizon 2020 project as well. The project on *Synergising International Research Studies into the Environmental Fate and Behaviour of Toxic Organic Chemicals in the Waste Stream* aims at a more specific investigation of toxic organic chemicals in waste streams and encompasses a research and training program, which foresees an exchange of best practice methodologies for analytical chemistry techniques.

Cooperation in CE-related fields can also be observed in joint research projects. In 2011, the Institute for Applied Ecology released a report on the informal e-waste management in Lagos titled: *"Informal e-waste management in Lagos, Nigeria - socio-economic impacts and feasibility of international recycling co-operations"*. The report is a result of a project funded by the European Commission, the Government of Norway, the Government of United Kingdom and the Dutch Association for the Disposal of Metal and Electrical Products and was released as part of the e-Waste Africa Project managed by the Secretariat of the Basel Convention. Fieldwork was primarily carried out and conducted by the Öko-Institute.V. and the Basel Convention Coordinating Centre for the African Region, while local organisations and partners actively supported the project in various ways. The involved institutions included the Ministry of Environment, the Nigeria Customs Service, the Nigerian Ports Authority, the Lagos State Environmental Protection Agency as well as the Lagos State Waste Management Authority, as well as the Computer and Allied Products Association of Nigeria (Manhart *et al.*, 2011).

Although the above stocktaking shows that CE is not yet a focus of research and technical cooperation between Nigeria and the EU, there are first discernible initiatives that can be drawn upon in future circular economy research efforts. The following table lists some of the opportunities as well as barriers for future circular economy-related research and technical cooperation activities in Nigeria.

**Box 4-6 Opportunities and barriers for future research and technical cooperation activities in Nigeria**

- There is still room for improving the networking and collaboration, e.g., via joint events, and even pooling resources for joint initiatives, between EU Members States and Nigeria. To this regard the development of a clear, long term national strategy on research and technical cooperation with Nigeria provides an opportunity for strengthening cooperation and testing new approaches such as a transformative innovation policy.
- In order to effectively facilitate local research and development, it is key to consider the peculiarities of the local situation in Nigeria. EU research and technical cooperation need to further strengthen the link with local research institutions and continue to build local technology capacity and competencies. In this respect, the joint development of new and innovative academic paths offers a good opportunity to support local research. For doing so, the EU can draw on an established network of research experts in Nigeria.
- Significant opportunities, especially regarding the further development of the principles of the circular economy and its local application, might be realised through enhanced cooperation between local and international research and innovation centres. Such cooperation should focus on improving the quality of research output and mutual development. This would also provide opportunities for multinational, EU-related companies and Nigerian enterprises to support local stakeholders in developing their value chains and to build a local ecosystem that creates a pipeline for capacity building.
- The current lack of bilateral agreements on joint research initiatives or other framework documents that govern technical cooperation between the EU and Nigeria might hinder coordinated R&T cooperation in the future.



## 5 Recommendations

Throughout the report, we have provided an overview on the status of the circular economy in Nigeria with a focus on priority sectors in the Nigerian policy context and that also coincide with the circular economy priorities in the EU Circular Economy Action Plan.

### 5.1 General findings and recommendations

In addition to the need for awareness of circular economy in terms of waste management, awareness is crucial regarding resource management. Alternative ownership models can be explored which can either extend product life or decrease demand. These models entail varying degrees of ownership, from sharing economy to leasing models (WEF, 2015).

#### 5.1.1 *Coordination and alignment between government departments*

Nigeria does not yet have a national policy or strategy focused on circular economy. The focus is on economic transformation, and recovery from the impacts of COVID-19, which can leverage greening principles to drive a transition to a circular economy.

- To support a circular economy transition, there needs to be coordination and alignment between government departments;
- In particular, support is needed to align federal departments of environment, agriculture, information and culture, science and technology, trade and investment, and finance;
- Integration of federal, state and local role-players is key, particularly in complex sectors such as waste management:
  - Coherent strategic planning can facilitate implementation of circular economy concepts on federal, state and local levels;
  - This is something for the EU and its member states to keep in mind when engaging on policy or other related dialogues. To be able to have an effective impact, several governmental departments will need to be engaged with in a concerted manner.
- The circular economy cannot exist as a silo, it should be addressed in a holistic manner with a view on the entire economy.
- Finally, the promotion of CE aligns well with policies aimed at promoting the further development of the manufacturing industry, as the presence of a strong manufacturing base makes it easier to close loops domestically. As such it is recommended to integrate CE aspects in existing industrialisation policies.

#### 5.1.2 *A just transition*

Circular economy approaches need to be mainstreamed in all economic and social development programs, in particular the creation of sustainable employment opportunities in the identified priority sectors. Nigeria's strategic objectives also includes investing in people by increasing social inclusion, creating jobs, and improving the human capital base of the economy. Implementation of transition measures needs to combine circular economy policies with social protection measures. Emphasis on a just transition based on inclusivity ensures that the burden of efforts to promote circularity will not fall on the poor through worsening working conditions and health impacts, reduced livelihoods, or job losses. Therefore, to be successful, a circular economy transition strategy should:

- Include active engagement of girls and women in the future labour market, while paying particular attention to the strategic imperative: access to education, training, and skills to prepare individuals for future green industries;
- Include support to awareness raising and capacity building initiatives;
- A focus on building a globally competitive economy by tackling the obstacles hindering the competitiveness of Nigerian businesses, notably improvement of infrastructure and the business environment needs to be emphasised and included at all levels of engagement;
- Consider the engagement with and, where needed re-skilling or upskilling of informal workers to provide them with a future-proof skill set. This has the potential to enable them to engage in innovative CE activities and reduce the health and safety risks related to working with potentially hazardous products or materials through raising awareness.

### 5.1.3 Capacity building

- In order to support local value chains, robust capacity building measures need to be implemented. Capacity building and skills development need to be focused on circular and green industries to develop local capacity in the necessary fields. Training programmes should focus on design for circularity, waste management and also on agricultural processes;
- Exchange programs and vocational building programs with the EU and its member states should help accelerate this process. Best practices in terms of the above-mentioned focus areas can be demonstrated;
- Existing vocational training frameworks need to be strengthened to up-skill people for jobs in the circular economy. Engagement with successful programs already developed in the EU, with some local context and customisation, should help accelerate the transition;
- Private sector-led apprenticeships can ease access to industries that are emerging and may not have established academic institutions offering relevant training. This is a role that EU multinationals with a local presence can play;
- Technical and academic cooperation between Nigeria and the EU, including the sharing of innovations and technologies is necessary for adoption of imported technologies and services;
- Academic institutions need to be strengthened through collaborative research activities that showcase local innovations supported by international institutions.

## 5.2 The role of development cooperation programs in CE development

### 5.2.1 Continue successful development cooperation programmes and expand the role of CE within those

There are already several successful EU-funded development cooperation programmes active in Nigeria, but up to now the role of circular economy within those activities has been limited. Including a circular economy focus as part of the EU's development cooperation programmes in Nigeria offers significant opportunities to establish both the EU and Nigeria as a front-runner in this area. Therefore, it is recommended that:

- Circular economy is included as a thematic priority in the next financial programming, for example through the definition of an EU Team Europe Green Economy flagship programme;
- Projects such as the Integrated Waste Management in Western Africa (IWWA) could be developed and expanded to increase the focus on relevant CE-aspects such as EPR, recycling and reuse of waste;
- The transition to a circular economy in Nigeria will require the mainstreaming of new consumption models such as leasing/renting models for resources and products and increased

consumer awareness of environmental issues, this may provide a unique starting point of intervention for development cooperation projects supported by the EU or its Member States. Interventions that focus on creating a shift from ownership to services can be an easy entry-point for many consumers.

### **5.2.2 Linking development cooperation with policy development**

Capacity building for the design and implementation of circular economy policy is needed. There can be more avid support for policy implementation if implementing agencies have clear roles and responsibilities and are well-capacitated in the relevant skills, such as governance and technical competence, to ensure understanding of the policy needs as well as the most viable path for implementation and enforcement. There is better likelihood to influence policy if the policy dialogue is accompanied with capacity building and technical assistance. As such there are opportunities for leveraging European experience with policy development in the area of circular economy through support of the Nigerian government in the development of a circular economy policy framework, or sector-specific legislation. This can happen in an on-demand fashion where European organisations provide feedback and technical support on circular economy policy design. Such activities are already taking place in other African countries such as Kenya, where the organization Sustainable Inclusive Business, which is funded by the Dutch government, supports the national government and industry associations in the design of CE policies, including extended producer responsibility schemes.

A transition that considers the social and environmental impacts, which ensures that basic human needs are met in a sustainable manner and that does not negatively impact on social transformation in terms of poverty alleviation, human rights, equality, and access to resources, is crucial. This link is important because there are unintended social and political consequences that need to be considered for the transition to a circular economy. Existing social divides (gender, education level) should not be exacerbated by the transition, while sustainable resource use needs to be balanced with livelihood preservation. The imperative for a just transition (see general recommendations) is pertinent for policy dialogues in terms of alignment to national priorities and the social dimension of a CE transition.

## **5.3 The role of the private sector and financial institutions in the CE transition**

### **5.3.1 Establishment of collaboration platforms and business dialogues for Nigerian and EU businesses**

Apart from stronger cooperation at the public level, increased cooperation and knowledge exchange at the private sector level could also promote the development and uptake of more circular business models and activities in Nigeria. Private sector stakeholders from the EU could engage with Nigerian companies via dedicated International conferences and stakeholder forums. Strong involvement of the Nigerian private sector can also increase the effectiveness of initiatives such as the postponed EU Circular Economy Mission. Chambers of Commerce, industry associations and embassies of EU Member States can play an active role in the organization of business network events and the development of structural bilateral business cooperation.

Technologies for waste treatment and beneficiation are reasonably available but challenges need to be addressed regarding access to waste, creating sustainable employment opportunities and sufficient materials being available. Partnerships in the development of these circular economy value chains are key. International cooperation between African small and medium enterprises (SMEs) and recycling companies operating in industrialised countries needs to be explored and encouraged.

This approach could allow companies in both the EU and Nigeria to combine their knowledge and gain valuable competitive advantages in the dismantling of E-waste and material recovery.

### 5.3.2 Effective cooperation with the EIB and other EU-based Development Finance Institutions (DFIs)

The importance of climate-proof and societally inclusive economic investments by (semi-)public financial institutions is growing. International development finance institutions and banks are increasingly starting to establish circular economy investment funds and programmes in Europe, as reflected in the recently published circular economy investment guidelines from the EIB (EIB, 2020). Building on an already large number of CE projects in various sectors, future investments in Nigeria or other African countries can be designed to support the transition towards a CE as well. EU and other international finance institutions could support a CE transition in Nigeria by:

- Ensuring that **circularity promotion is better mainstreamed in the existing private funds**/financial instruments of key European DFIs (and notably through the EIP);
- Increased **cooperation between EU-based financial institutions and Nigerian and regional financial institutions**. Newly established financial institutions such as the Development Bank of Nigeria or the African Guarantee Fund offer significant potential to contribute to the promotion of a sustainable economic development in Africa. Future CE-related activities may benefit from a cooperation between the EIB or European DFIs with these local and regional financial institutions. These regional finance institutions could also play a role in translating the generic CE eligibility criteria and principles from investment guidelines to the practical context of actual financeable projects and assist EU-based financial institutions in judging the environmental and economic potential of such investments.

Specially, the EIB could support CE activities in Nigeria through:

- InnovFin, which helps bring successful research and innovation projects closer to market. The scope of this instrument could be expanded to non-EU countries including Nigeria;
- The EIB's recently launched new global climate strategy and Energy Lending Policy offers significant potential for the financing of future climate- and environmental-friendly CE projects in both Europe and Africa as it can act as a framework. However, many of the new financing mechanisms still need to be adapted to the African context.
- Although the EIP is already adapting EU financial instruments to the development financing context, it will be important to monitor the rollout and further adjust the financing mechanism if needed. Furthermore, the integration with existing development finance must be guaranteed.

## 5.4 The role of EU-Nigeria Trade and investments in the CE

Improving the overall trade and investment climate in Nigeria will be an important prerequisite to also unlock investments in circular business activities and trade in CE-related goods and services. Furthermore, there is scope for better regulation and cooperation with EU member states when it comes to (illegal) waste shipments and the trade in secondhand products and secondary materials.

To solve Nigeria's pressing problem with imported electronic waste, the control of exports of used and end-of-life products (e.g., WEEE and ELVs) from Europe to Africa must be improved. In this context, the training of enforcement officers from African countries in Europe could be considered. It is important to ensure that EOL products are only exported to Nigeria in a way that is compliant with EU waste shipment regulations and that ensures that the external costs incurred by the local treatment of such wastes are

covered by the exporter as the financial and environmental burden should not rest with the local waste industry. Furthermore, potential trade deals between the EU and Nigeria could favour the re-import of secondary materials from Nigeria through preferential tariffs

Currently no African country is part of the ongoing negotiations on the WTO Environmental goods agreement. As the agreement has significant potential to promote green growth and sustainable development, knowledge transfer and even the diversification of exports, an active involvement of Nigeria and other African Countries offers great opportunities to support trade and investments in environmental goods and services.

The African Conference of Ministers of Environment (AMCEN) plays a key role in facilitating equitable social, environmental and economic development in Africa. Considering the social and environmental implications of sustainable development, AMCEN contributes to strengthen Africa's participation and active involvement in both global negotiations and international environmental agreements. This makes it a favourable platform for the EU to engage with.

## 5.5 Advance research and technical cooperation between the EU and Nigeria

Circular Economy is a relatively new theme in Nigeria, and this also holds for Nigerian knowledge institutions. Therefore, it could be of added value to develop links with local research institutions to build local (technology) capacity and competencies. The EU can support local research with development of academic pathways. There is an established network of research professionals in Nigeria and access to local expertise.

Collaboration between local and international research and innovation hubs for the advancement of circular economy principles and its local adoption should be promoted. This does not only hold for academic institutions but also for R&D departments of multinational and EU-based companies that can bring in more applied knowledge on how to develop circular value chains and build a local ecosystem that puts a capacity building pipeline in place. Cooperation between research institutes and the private sector can drive scalability of pilot projects. Involvement of local organisations is key to ensure that the solutions that are being developed fit the local context.

Technical cooperation can facilitate the exchange of technologies between the EU and Nigeria. As an example, Finnish organisations view Science Technology Innovation cooperation with their African partners as key (Kagiri-Kalanzi, & Avento, 2020). Cooperation fosters network formation that supports knowledge exchange and global responsibility, but the emphasis appears to be on research collaboration and knowledge exchange.

## 5.6 Sector-specific recommendations

In the following tables some sector-specific recommendations have been formulated for sectors with high circular economy potential in Nigeria.

Table 5-1 Findings on potential CE activities in the agri-food sector &amp; associated recommendations

Agri-food	
Circular approaches for agriculture are key to address the challenges that the sector faces. Across the value chain there are several opportunities for optimisation. Reduction of food loss and waste, as well as beneficiation of surplus organic material contributes to food security as well as soil improvement. <b>Opportunities exist to reduce post-harvest food losses</b> and to optimise the utilisation of the remaining organic waste.	
Findings	Recommendations
There are opportunities in Nigeria for improving the use of organic wastes	<ul style="list-style-type: none"> <li>To ensure feedstock, there is a need for domestic separation of organic waste. This will require coordination between local waste management, both formal and informal, and awareness raising campaigns.</li> <li>Industrial organic waste collection, with support from EU counterparts to guide implementation of an organic waste collection mechanism for the food and beverage and hospitality industries.</li> <li>Investments in better utilization or treatment of organic wastes, such as technologies that extract valuable components (e.g., proteins) or composting equipment could be supported.</li> </ul>
Post-harvest losses of food products can be reduced through investments in better means of (cold) storage, improved transportation methods and better logistics	<ul style="list-style-type: none"> <li>Innovative solutions that integrate renewable energy (such as solar-powered cold storage rental) can serve as case studies for the viability of circular solutions in local context. Coldhubs can be engaged to share key learnings. The opportunity exists to build on existing model (solar-powered cold storage in agricultural and market hubs). Coldhubs is a startup that demonstrates successful collaboration of a research institute and the private sector. The EU should support innovation in the local context and support start-ups that showcase such local ideas.</li> <li>In addition to guidance and technical support for cold chain, food loss and waste can be addressed by the emergent plastics industry by packaging the most perishable goods in a sustainable manner. Designing out waste will play a key role in finding a balance between food waste and plastic waste.</li> <li>Investments in better storage facilities and equipment (e.g., storage bags that protect from water and pests), equipment for transport (e.g., crates), either through investment support or leasing models could be supported by financial instruments from the EU or its Member States.</li> <li>EU knowledge on how to set up efficient distribution chains to speed up the transport of food products to the consumption centres and support for related investments could contribute to reduce post-harvest losses.</li> <li>Investments in road infrastructure, which is currently in a poor state in Nigeria, can act as a facilitator of faster and improved transport and distribution of food products across the country.</li> </ul>

Table 5-2 Findings on potential CE activities in the plastics sector &amp; recommendations for how to promote those

Plastics	
Findings	✓ Recommendations
<p>Circular activities in the plastics industry could benefit from support for the development of industry-led Extended Producer Responsibility (EPR) programmes, but this also applies to other sectors.</p> <p>Bolstering the secondary resource market can shift dependency away from oil extraction by supporting production from secondary materials (such recycled polymers), and the use of renewable resources such</p>	<ul style="list-style-type: none"> <li>The EU Plastics Pact can play a role in the support and knowledge sharing to strengthen existing capacities in Nigeria. Lessons learnt can be shared.</li> <li>Expertise is not yet available locally and organisations like EPRON, will require support for the next stages, to develop a roadmap for implementation of the proposed EPR scheme.</li> <li>The development of a robust market for recycling will support both the recycling and packaging industries. The imperative lies with the private</li> </ul>

<p>natural fibres for textiles and construction. Also, this would reduce Nigeria's dependence on importing processed oil products.</p> <p>There is immense scope for application of circular models to the plastics industry, including engagement on development of materials as well as designing for end-of-life. The industry is positioned to benefit both formal and informal actors, empowering role-players across the value chain - this should be a key economic driver, from an inclusivity and job creation perspective. The involvement of international players could help facilitate a pivot to closed-loop systems for the industry, where Nigeria can leapfrog and become a leader in innovative, sustainable plastics production and management.</p>	<p>sector to collaborate on setting up local value chains.</p> <ul style="list-style-type: none"> <li>• After consumption, plastics often end up in environment. Work with collectors, and other parts of the recycling value chain to support mechanical recycling in Nigeria.</li> <li>• Establishing zero waste ecosystems: look at other applications for the recovered materials.</li> <li>• The informal sector, challenges with collection, and priorities related to value of waste need to be considered.</li> <li>• Incentivising small businesses with resources and grants to play a role in the recycling, up-cycling and waste management value chains.</li> </ul>
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**Table 5-3 Findings on potential CE activities in the waste sector & recommendations for how to promote those**

Waste Management	
Theme	Recommendations
Extended Producer Responsibility	<ul style="list-style-type: none"> <li>• Regulatory and control mechanisms need to be developed that encourage industry to shift to closed-cycle manufacturing and efficient take-back schemes for remanufacturing and recycling (a paradigm shift from linear to circular economy). EPR programmes need to be developed by local stakeholders, with technical assistance and guidance from external players such as the EU.</li> <li>• Development of funding mechanisms for EPRs and the establishment of Producer Responsibility Organisations (PROs) should be endorsed.</li> <li>• The local reality that Nigeria's e-waste producers are importers and distributors and not OEMs, is pertinent in planning for next stages. Environmental impact is not always appreciated and there is a dire need for support in enforcing the EPR process.</li> <li>• The EU can also assist NESREA with support to the roll-out of the EPR in sectors or waste streams such as Food &amp; Beverages, Battery and healthcare waste (especially with the advent of COVID-19).</li> <li>• Creating standards or prohibiting entirely certain operations and activities which absolve producers from responsibility over their products.</li> </ul>
EU support for NESREA	<ul style="list-style-type: none"> <li>• Capacity development on International Best Practices for inspectors and other stakeholders in the waste value-chain</li> <li>• Capacity building and better monitoring of waste issues including factual analysis on trends of waste generation, collection and treatment and its impacts on pollution &amp; ecosystems (e.g., marine life).</li> <li>• Assist the Agency with programmes that would enhance the management capacity and improve policymaking mechanism regarding waste control.</li> </ul>
Engaging the consumer	<ul style="list-style-type: none"> <li>• Consumer education and awareness is critical to implementation of waste management strategies. Successful awareness campaigns will depend on the degree to which the end-consumers' experience is considered, which should be well-tailored to the Nigerian reality.</li> <li>• Innovative strategies need to consider the digital penetration rate, literacy and cultural norms.</li> <li>• Advocacy campaigns can also facilitate behaviour change for citizens and big companies. There are opportunities for promoting job creation in the private sector within a new circular paradigm.</li> <li>• Collaborative approach that allows for strong local drive with EU support will be most suited. Awareness of waste in Nigeria must balance environmental and social aspects with economic incentives, such as the points-based recycling systems currently implemented.</li> </ul>



## 6 Conclusions

### 6.1 State of play of circular economy activities

The need to decouple the economy from oil dependence and support a secondary-resource market highlights the opportunities relating to the promotion of circular economy activities, where the waste sector, particularly in E-waste and plastics recycling, will play an important role. The predominantly informal nature of waste management in Nigeria needs to be leveraged to develop existing (informal) systems into integrated waste management approaches for urban as well rural areas. Additionally, a secondary resource market needs to be developed for components and material resources recovered from all kinds of waste sources, including plastics, E-waste and end-of-life vehicles.

E-waste is a growing concern for Nigeria, given the sheer growing volumes. Steps taken now towards circular resource and material use will mitigate an environmental and social disaster. Even though base metals such as ferrous metals, aluminium and copper, are generally recovered from E-waste, vast amounts of residual waste are often produced due to unsophisticated refurbishment and material recovery methods, and a lack of sophisticated recycling equipment. A large informal waste-picking and recycling industry consisting of scavengers/waste pickers, intermediaries, artisans, and small-scale enterprises is engaged in the recovering, re-manufacturing and reuse of particularly, E-waste but awareness on the impacts on environment and human health of hazardous disposal practices is low amongst these workers. This highlights the need for awareness raising and capacity building programs.

Nigeria relies heavily on the agriculture sector as an employer of a large proportion of the population, as well as for food security. Agriculture can benefit the growing population by embracing circular economy principles that focus on the minimisation of waste by means of the development of improved harvesting and better cold-chain logistics, in addition to beneficiation of agricultural and food waste for the production of feed and fodder, organic fertilizers, soil conditioning or the production of bioenergy. These strategies will contribute to the improvement of the livelihoods of farmers, reduction of food import dependence and growing food security.

### 6.2 Policy framework supporting circular economy activities

The desire to diversify the economy can be a driver of the circular economy agenda in Nigeria. However, a robust regulatory framework and effective enforcement of legislation will be needed to drive the transition to a green and circular economy and attract the required investments. The use of regulations is necessary to address all forms of unsustainable consumption and production patterns, either by creating standards or prohibiting entirely certain operations and activities. Standards can be effective in promoting markets for green goods and services, can induce efficiency and stimulate innovation and protect and support businesses that produce sustainable products from unsustainable competitors. Even though some scattered circular activities are happening in Nigeria, the country needs an holistic policy framework including a clear vision and an action plan with policy priorities at the sector level. Within such a framework, the promotion of circular economy activities can be a means to reduce environmental impacts while simultaneously addressing societal challenges such as unemployment and poverty.

### 6.3 Existing awareness and capacities on circular economy in Nigeria

National awareness of circular economy is still low in Nigeria, with most circular economy related concepts referring to waste management issues. Initiatives and awareness of challenges such as recycling and resource recovery on the other hand, have received ample attention from the government and waste management authorities. In industry awareness of circular economy is growing, but the majority of Nigerian industries are still unaware and as a result do not actively participate in the final disposal and processing of their waste. Extended Producer Responsibility exists as a voluntary program (EPRON, FBRA, ARBR) but is being developed further.

Capacities are not being developed sufficiently in either basic or vocational education streams. Most school and university curricula still do not include a specially designed program on environmental education. Instead, this is usually implemented through cross-curricular approaches in existing subjects. Technical, Vocational Education and Training programs broadly have not yet included circular economy or environmental focus. Notably, Enville Institute of Environmental and Safety Management Ikeja, Lagos does offer CE-related programs, e.g. by building entrepreneurial skills in "Waste-to-Wealth through waste recovery, recycling, repair and reuse". In order to ensure that Nigeria's workforce will be ready for a circular economy transition it is essential that such training programs are scaled up.

### 6.4 Existing and future impacts: circular economy in Nigeria

Most existing initiatives in the area of circular economy in Nigeria are taking place in the waste sector. Many of these are aimed at capacity building amongst (informal) waste pickers and scavengers and improving their economic position. Furthermore, several of these initiatives have had positive impacts on (environmental) education, access to education and environmental awareness. Last but not least, the initiatives contribute to a reduction in the pollution and health problems created by the dumping of waste and the associated damage to ecosystems. In agriculture, targeted policies like the GES helped to increase agricultural productivity, increase farmer income and reduce dependence on food imports as well as local food insecurity issues.

In this study we have also done a forward-looking assessment, where a macro-economic model was used to estimate the impact of a (limited) set of circular economy measures in the identified priority sectors Agri-food, plastics, construction, EEE products and E-waste and general waste. Overall, the circular measures assessed could lead to an increase in economic activity and create additional jobs, while leading (on the short term) to a small increase in national CO<sub>2</sub> emissions. The key findings are the following (for more detail see section 3.2.3):

- **Economic benefits:**
  - A 3.2% increase of GDP (+ €15.2 bn) compared to business as usual;
  - An improvement of the trade balance, through a reduction in imports worth € 4.4 bn;
  - Food loss reduction across the agricultural value chain and associated investments are the largest driver of the impacts found in our modelling assessment.
- **Social benefits:**
  - 1.6 million additional jobs would be created compared to business as usual, which is equivalent to an increase of 3.9%;
  - If done in the right way, increased activities in waste collection and recycling could strengthen the economic position of (informal) waste workers, and attention for capacity building and training can ensure that these people will benefit from the CE transition as well.

- The largest employment increases are found to occur in agriculture, services (largely driven by waste management), distribution, retail and manufacturing. The largest job loss occurs in the chemicals sector, due to product substitutions.

Overall, these findings show that even implementing a first set of circular measures could bring substantial benefits to Nigeria's economy. This illustrates that circular economy could be one of the cornerstones of Nigeria's economic diversification and green growth strategies.

## 6.5 Trade and Investment in CE related goods and services

When looking at EU-Africa trade we see that Nigeria is an important trade partner of the EU. At the moment Nigeria's exports are dominated by oil, while machinery and transport equipment, food products and processed material goods represent the largest part of the imported goods. The transition to a circular economy in Europe as well as the decarbonisation of the economy are likely to have significant impacts on the composition of these trade flows in the future. The same holds for Nigeria's policy agenda on economic diversification.

Next to the benefits that trade brings to Nigeria and the EU, there are also some negative impacts related to the (illegal) imports of end-of-life products, especially in the realm of electronics and end-of life-vehicles. In order to solve Nigeria's pressing problems with imported wastes, the control of exports of used and end-of-life products from Europe to Africa must be improved. This can be done through:

- The training of enforcement officers from African countries in Europe;
- International cooperation between Nigerian small and medium-sized enterprises (SMEs) and recycling companies from industrialised countries, enabling both sides to pool their knowledge and gain valuable competitive advantages in the dismantling of electronic waste and material recovery.

Compared to other African countries, the trade-intensity as well as the level of foreign direct investment inflows are rather low in Nigeria. This illustrates that there are still significant trade and investment barriers that need to be addressed. Important barriers for investment in Nigeria include corruption, limited access to finance and high levels of inflation. Improving the investment climate could help attracting investments that contribute to the development of local industries, leveraging on the experience of foreign companies with circular economy practices. One of the sectors that has a high potential in Nigeria in this respect is the chemicals sector, where local value chains can be built up to create chemicals from waste components.

## 6.6 EU-Nigeria circular economy related cooperation activities

### 6.6.1 Policy dialogues and development cooperation

Progressive political exchange engagement with EU is taking place, even though official policy dialogues dedicated to CE are not yet in place. Within the context of development cooperation programs and initiatives, there is currently very limited attention for CE-related activities. There is ample opportunity for increasing the role of CE in thematic areas that are important in EU-Nigeria development cooperation, such as agriculture. Here a circular economy strategy aimed at the optimisation of the use of organic waste and improvement of the handling, storage and distribution of produced crops to reduce losses across the value chain can be a successful means to achieve economic and environmental objectives simultaneously.

### 6.6.2 Activities by EIB and other DFIs

Investments will be key to drive a circular economy transition in Nigeria. The EU's External Investment Plan (EIP), aims to encourage investment in partner countries in Africa. The EIP aims to mobilise private capital investment towards development-orientated investment; many of instruments (guarantees) put at disposal of African countries (Nigeria included) have green economy, digital innovation prerogative.

- From the EU Nigeria Business Forum, circular economy emerged as a focus area within the dialogue between the EU and Nigeria and the newly formed European Business Organisation and External Investment Plan (EIP) are believed to play a critical role in this dialogue;
- International development finance institutions and banks, such as the EIB, are among the bodies beginning to establish CE investment funds and programmes. These programs need to be shaped in a flexible manner so that small-scale innovative companies with circular practices can receive funding, regardless of whether they brand themselves as 'circular';
- The African Guarantee Fund contributes to the promotion of economic development in Africa through provision of Partial Guarantees & Capacity Development to Financial Institutions to facilitate access to finance for Small and Medium-sized Enterprises.

### 6.6.3 EU companies with CE activities and footprints in Nigeria

European companies with a local footprint can play an important role in the upscaling of circular activities in a manner that is inclusive and avoids the displacement of vulnerable workers. They can actively engage (informal) actors across their value chains in Nigeria. With the right enabling conditions (including a comprehensive CE policy framework and improved investment conditions), the circular economy could provide new opportunities for economic diversification, value creation and skills development.

### 6.6.4 Research and technical cooperation

Currently, there are no bilateral agreements on joint research initiatives or other framework documents that govern technical cooperation between the EU and Nigeria. While there is no explicit circular economy focus, the work in water security, improvement of the productivity and sustainability of agricultural value chains, and waste management contribute to a transition to a circular economy.

- EU knowledge institutions are already developing a strong knowledge base on available circular economy measures, business models and the associated benefits and challenges. Increased cooperation between these organisations and Nigerian research institutions could spur circular economy development in the country.
- Bilateral cooperation between knowledge institutions and research institutes from EU Member States with those in Nigeria, could also play an important role in knowledge diffusion in the context of circular economy. This could be done through exchange programs, joint research projects or other forms of cooperation.

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## Annex A - Stakeholders

The following stakeholders have been interviewed as part of the data collection for this report.

Table A-0-1 Interviewed stakeholders

Organisation	Name	Position
Appleblossom M.I. Limited	Abayomi Magbagbeola	Partner
BASF West Africa	Akintayo Adisa (Dr.)	Manager Senior Projects Sustainability
BASF West Africa	Jean-Marc Ricca	Managing Director
Climate and Sustainable Development Network, Global Youth Climate Network, TiredEarth Teach SDGs Ambassador	Adesuwa Obasuyi	Social Development Expert
ColdHub	Nnaemeka C. Ikegwuonu	CEO
Delegation of German Industry and Commerce in Nigeria (AHK)	Godwin Aigbokhan	Head, Energy and Environment Competence Center
Delegation of German Industry and Commerce in Nigeria (AHK)	Katharina Felgenhauer	Delegate
Dow Chemicals	Adwoa Coleman	Africa Sustainability and Advocacy Manager
De Rijksdienst voor Ondernemend Nederland (RVO.nl)	Hanneke van Hoof	Private Sector Development Advisor
De Rijksdienst voor Ondernemend Nederland (RVO.nl)	Pyke Polderman	
Dutch Ministry of Foreign Affairs	Abel Neering	Vice Consul Economic Affairs
E-waste Producer Responsibility Organisation Nigeria (EPRON)	Ibukun Faluyi	Executive Secretary
EU Delegation	Katrine Mulvad THOMSEN	Delegate
EU Delegation	Godfrey OGBEMUDIA	Delegate
EU Delegation	Inga STEFANOWICZ	Delegate
EU Delegation	John TAYLOR	Delegate
EU Delegation	Luca TODESCHINI	Delegate
HYBR	Laura Talsma	
NESREA: National Environmental Standards and Regulations Enforcement Agency	Aliyu Jauro (Prof.)	Director General
REDIN: Recycling and Economic Development Initiative of Nigeria	Terseer Ugbor	CEO REDIN Executive Secretary ARBR
Rijkswaterstaat, Ministerie Infrastructuur en Waterstaat	Jeroen Nagel	Adviseur Circulaire Economie
Wecyclers	Olawale (Wale) Adebisi	CEO
Works and Physical Planning Department University Of Lagos	Abdul Ganiyu Omobolaji Adelopo (Dr.)	Honorary Senior Research Fellow, De Montfort University, UK Senior Quality Control Officer Univ. Lagos
Yar'Adua Foundation	Amara Nwanka	Director

**Table A-0-2 Other relevant stakeholders in relation to circular economy in Nigeria.**

Organisation	Name	Position
African Development Bank Group: Nigeria Country Office	Ebrima Faal	Senior Director
ALKEM Nigeria Ltd	Akshaya Nayak	Head PET Recycling
AMCEN	Mohamed Atani	Head of Communication and Outreach
Atlas Mara	Chidi Okpala	Group Managing Director   FinTech
Chanja Datti Recycling	Olufunto Boroffice (Mrs)	Managing Director
Consulate General of the Netherlands in Lagos	Ayinda Soul Kohndou	First Secretary Economic Affairs,
Cyrus45	Banjo Olabanke	Creative Director
De Rijksdienst voor Ondernemend Nederland (RVO.nl)	Hans van Ek	
De Rijksdienst voor Ondernemend Nederland (RVO.nl)	Unico van Kooten	
Del Waste Management Co	Brume Okoloko	MD / CEO
E-Terra Technologies Limited	Ifeanyi Ochonogor	MD / CEO / President
E-Terra Technologies Limited	Patrick Inoh	Plant Manager,
E-Waste Relief Foundation	Ifeanyi Ochonogor	President
Earthcare Nigeria Ltd	Gregory Ohiaeri	CEO
FBRA: Food and Beverage Recycling Association	Adekunle Muhammed Olusuyi	Executive Vice Chairman
FBRA: Food and Beverage Recycling Association	Agharese Lucia Onaghise	Executive Secretary
FBRA: Food and Beverage Recycling Association	Kemisola Ajasa (Mrs)	Director
Federal Ministry of Environment - Waste Management	Jacob Olajide Oladipo	Deputy Director
Geocycle - Lafarge Africa PLC	Abimbola Awonusi	
Geocycle Lafarge Africa PLC	Greg Salami	Operations Manager
Geocycle Lafarge Holcim	Temitope Dosumu	Commercial Manager
GIZ	Ina Hommers	Country Director
Green Campus Initiative (GCI) Green Institute Nigeria	Harrison Ekoh	Project and Program Manager at Green Initiative Nigeria
Green Environment & Energy Conservation Initiative	Farooq Bello	Chairman and Co-Founder
Heinrich Boell Foundation	Donald (Ikenna) 68foegbu Project Coordinator at Heinrich Boell Foundation	
Hinckley Group	Adrian Clews	Managing Director
Hinckley Group	Belinda Osayamwen	Business Development Manager
Holland Circular Hotspot	Freek van Eijk	
InCycle	Arewa Boluwatife	

Organisation	Name	Position
International Network for Corporate Social Responsibility (INCSR).	Mr. Eustace Onuegbu	
Jawura Environmental Services Limited Ashi	Oladele Osibanjo	CEO
Lagos State Environmental Protection Agency (LASEPA)	Dolapo Fasawe	General Manager / CEO
Lagos State Environmental Protection Agency (LASEPA)	Olayinka Omotosho	Head, Ecology and Conservation
Lagos Waste Management Authority	Ibrahim A. Odumboni	Executive Director
Lagos Waste management authority, LAWMA	Olumuyiwa Gbadegesin	CEO
Maanar	Olaolu Olaleye	Co-founder and CEO
Natural ECO Capital	Eugene Itua	CEO
Nigeria Climate Innovation Centre NCIC	Bankole Oloruntoba (Mr)	CEO
Paperbags by Ebees	Nnorom Chidiebere	Head Operations and Research/Social Impact Programs
RecyclePoints	Chioma Ukono	COO
Recyclepoints	Mazi Alison Ukonu	CEO / Co-Founder
RecyclePoints	Taiwo Adewole	Executive Director
Rivers State University, Port Harcourt	Paul Nekabari Visigah	Lecturer
TOTAL Nigeria	Leo Nwofa	Plastic Recycling & Circular Economy Manager
Ubabio Biomass Energy Solutions (UBES)	Ikenna Ubah	CEO
UNEP Resources and Markets Branch	Feng Wang	Programme Officer (electronics)
WestAfricaENRG	Lolade Oresanwo	COO



# Annex B - Method for modelling of impacts & detailed findings

## Part 1 Methodological details of the modelling approach

### The E3ME model

The process of estimating impacts of circular economy activities in Nigeria was carried out using Cambridge Econometrics' E3ME model. E3ME is a global, macro-econometric model of the world's economic and energy systems and the environment. It was originally developed through the European Commission's research framework programmes and is now widely used for policy assessment, forecasting and research purposes across different geographical areas.

E3ME's historical database covers the period 1970-2016 and the model projects forward annually to 2050. The main data sources for Nigeria are the World Bank, UN National Accounts, IMF and ILO, supplemented by data from national sources. Energy and emissions data are sourced from the IEA and EDGAR. Gaps in the data are estimated using customised software algorithms.

The current version of the model has the following dimensions:

61 regions - all major world economies (i.e., G20), the EU28 and candidate countries plus other countries' economies including Nigeria

- 43 industry sectors, based on standard international classifications
- 28 categories of household expenditure
- 22 different users of 12 different fuel types
- 14 types of airborne emissions (where data are available) including the six greenhouse gases monitored under the Kyoto protocol

The impact of policies and economic reforms can be simulated thanks to a detailed representation of sectors and spending categories built into the model: 43 industry sectors, based on standard international classifications; and 28 categories of household expenditure, 23 fuel users of 12 fuels and 15 users of 7 raw materials. As a general model of the economy, based on the full structure of the national accounts, E3ME is capable of producing projections for GDP and the aggregate components of GDP (household expenditure, investment, government expenditure and international trade), and other output indicators including employment by sector and GHG emissions. The 43 industry sectors available for Nigeria in E3ME are:



- |  |                                     |
|--|-------------------------------------|
| 1. Agriculture etc                       | 23. Gas Supply                      |
| 2. Coal                                  | 24. Water Supply                    |
| 3. Oil & Gas etc                         | 25. Construction                    |
| 4. Other Mining                          | 26. Distribution                    |
| 5. Food, Drink & Tobacco                 | 27. Retailing                       |
| 6. Textiles, Clothing & Leather          | 28. Hotels & Catering               |
| 7. Wood & Paper                          | 29. Land Transport etc              |
| 8. Printing & Publishing                 | 30. Water Transport                 |
| 9. Manufacture of Fuels                  | 31. Air Transport                   |
| 10. Pharmaceuticals                      | 32. Communications                  |
| 11. Chemicals n.e.s.                     | 33. Banking & Finance               |
| 12. Rubber & Plastics                    | 34. Insurance                       |
| 13. Non-Metallic Mineral Products        | 35. Computing Services              |
| 14. Basic Metals                         | 36. Professional Services           |
| 15. Metal Goods                          | 37. Other Business Services         |
| 16. Mechanical Engineering               | 38. Public Administration & Defence |
| 17. Electronics                          | 39. Education                       |
| 18. Electrical Engineering & Instruments | 40. Health & Social Work            |
| 19. Motor Vehicles                       | 41. Miscellaneous Services          |
| 20. Other Transport Equipment            | 42. Unallocated                     |
| 21. Manufacturing n.e.s.                 | 43. Forestry                        |
| 22. Electricity                          |                                     |

In addition to capturing direct and indirect impacts from the transition to a more circular economy, the model can capture the full induced effects, most notably rebound effects. A shift to a more circular economy involves reducing inputs to production (the direct effect), and this in turn affects demand along supply chains (i.e., the indirect effects<sup>5</sup>). In addition, these shifts create changes in demand and employment, for example through creating jobs in recycling, leading to higher aggregate wages in the economy, or from reducing prices faced by consumers and therefore allowing higher real consumption. This creates additional demand, and further boosts value added and employment (induced effects<sup>6</sup>). The rebound effect for the circular economy means that some of the initial reductions in resource consumption are eroded due to additional spending elsewhere in the economy.

For more information on the E3ME model, including the model manual, please visit [www.e3me.com](http://www.e3me.com).

### Treatment of the informal sector

The informal sector is an important consideration when modelling circular economy activities in Africa, as much economic activity may not be fully recorded in official national statistics. This issue is most relevant to agriculture, given the importance of smallholder agriculture in many African countries. E3ME is capable of capturing this part of the economy, as it is built using economic data from the World Bank and employment data from the ILO, both of which incorporate estimates of the informal sector in their data.

### Scenario design

E3ME is most used for scenario analysis, evaluating the impacts of an input shock to a reference scenario. An input shock may be either a change in policy, a change in economic assumptions or another change to a model variable. By comparing different scenarios - each representing an alternative future with

<sup>5</sup> Indirect effects are associated with input-output relationships between industries, and refer to the knock-on impacts on other industries in the supply chain. For instance, if circular economy activities reduce construction demand for raw materials, then the extractives sector will see a fall in demand. This will in turn cause falls in demand for their suppliers (e.g. business services), and so on.

<sup>6</sup> Induced effects refer to wider macroeconomic impacts. For example, if the construction sector operates more efficiently due to circular economy activities, it may be able to employ more workers or pay higher wages. This may ultimately increase demand for raw materials, so the net impact of all these effects on the extractives sector may be positive, even if the direct and indirect effects had been negative.

different policies and/or economic assumptions - it is possible to assess the impact of a change in policies and/or economic assumptions. For this report, the following scenarios were modelled: a baseline scenario and a circular economy (CE) scenario with a scale of circularity on top of the level embedded in the baseline (see Table B-1).

**Table B-1 Scenario design**

Scenario	Scenario Description
Baseline	A baseline constructed based on official published economic and energy-sector projections. The modelling baseline does not explicitly assume a certain level of circular economy activities.
Circular Economy	This scenario assumes an ambitious uptake of the circular economy, in addition to the baseline scenario. The base year for the modelling is 2020 and the target year is 2030.

We have adopted an ‘activities’ approach (rather than a ‘policies’ approach) to modelling the CE scenario. This choice means that the analysis does not assess potential impacts of specific policies but instead looks directly at the links between specific changes in an economy and the direct, indirect and induced effects, without making any explicit assumptions about whether these changes are driven by policies, behavioural change or new technology.

The activities approach implies generating modelling inputs from a sectoral perspective. Inputs are formed by studying the plausible circular economy activities that will take place in selected key sectors and their supply chains. This is to reflect that the impact of a transition to a more circular economy will vary between sectors, as sectors differ in the way in which resource flows and relationships with the consumer are organised.

Increased waste collection and recycling are modelled as central circular economy activities. In addition, activities for four additional sectors are modelled, selected based on existing policy priorities, but also on the basis of the anticipated scale of the potential benefits (in consultation with country experts): electronics (e-waste), plastics, agriculture and construction.

The selected activities are translated into modelling inputs and methods, so that the economic, social and environmental impact can be simulated in E3ME. Together, the selected activities should be broad enough to represent the most important circular economy changes and their potential impacts.

### Scenario assumptions

Table provides a summary of the selected circular economy activities and how the identified circular economy activities were translated to modelling inputs that have been implemented in E3ME.

**Table B-2 Scenario assumptions**

Category	Circular economy activity	Modelling input	Input size
Waste management	Improved waste collection rate	Increase in waste sector output	Increase from 25% to 75%
E-waste	Improved enforcement of e-waste trade restrictions	Reduction in e-waste (i.e., electronics) imports	€206m

	Improved recycling of valuable materials in e-waste	Investment in recycling sector to improve health & safety standards	€9m
		Share of recycling investment paid for by private and public sectors	50:50
		Exports of materials recovered from e-waste recycling	€44m
Agriculture	Prevention of food loss in agricultural supply chain through improved storage and logistics	Substitution of agricultural imports by domestic agricultural production	€3.95bn
		Investment in storage and logistical capabilities	€1.32bn
		Share of investment paid for by private and public sectors	50:50
Circular production	Increased use of recycled materials in industrial production	Electronics production: shift from virgin metals and plastics inputs to recycled inputs	20% of virgin inputs replaced by recycled inputs
		Plastics production: shift from virgin feedstock to recycled feedstock	25% of virgin inputs replaced by recycled inputs
		Construction: shift from virgin non-metallic minerals (glass, cement, sands, ceramics) to recycled minerals	10% of virgin inputs replaced by recycled inputs
		Agricultural production: shift from mineral fertilisers to organic fertilisers	20% of mineral fertiliser replaced by organic fertiliser

As indicated in the last two columns, the various economic changes associated with the circular economy are modelled through specific input assumptions. They mainly relate to gross output, input-output coefficients, investment and the trade balance.

#### *Gross output*

The increase in the waste collection rate is modelled as a change in output in the waste management sector. This increase in gross output can be thought of as resulting from a government mandate, rather than being caused by an increase in a component of demand.

#### *Input-output linkages (intermediate demand between sectors)*

We have modelled an increase in the circularity of production for a number of sectors through adjustments to the existing input-output structure of the model. This reflects changes to the supply chain of a sector as a result of higher circular economic activities. For example, if the electronics sector uses less metal and plastic material, and substitutes these for recycled parts from e-waste manufacturing, this change is entered to E3ME as an adjustment to the input-output linkages (i.e., coefficients) of the electronic sector: it purchases less from the plastic and metal sectors and more from the recycling sector.

#### *Investment*

Some of the modelled circular economy activities are associated with an increase in investment, such as the investment required to prevent food losses in the agricultural sector, or to increase health and safety in the recycling sector. In these cases, assumptions are also needed regarding the share of the investment costs that will be paid by the private and public (or aid) sectors: we have assumed a 50:50 split in all cases. In practice, this means that 50% of the investment input is represented as a cost to the investing

industry; the other 50% is assumed to be funded by deficit spending or official development assistance and is thus represented as an injection of funds into the economy.

#### *Trade balance changes*

In some cases, the modelled changes to the trade balances represent circular economy activities which directly relate to the trade balance, such as the reduction in imports of e-waste. In other cases, changes to the trade balance are a way to represent a change in productivity in a demand-led model. For instance, we have modelled a reduction in food losses in the agricultural supply chain (effectively an increase in agricultural productivity) as a reduction in imports of agricultural products, as domestic supply is better able to meet domestic demand. Similarly, some portion of the materials recovered from e-waste recycling are modelled as an increase in exports, as we do not assume that domestic demand for these materials has necessarily increased.

#### **Mapping inputs to E3ME sectors**

In some cases, the sectors available in E3ME were too broad to allow for the targeting of inputs at the level described in

Table B-2 above. For example, modelling the increase in waste collection rates required a given percentage increase in the output of the waste management sector. However, in E3ME, waste management is contained within a broader 'Miscellaneous Services' sector, and so the size of the waste management sector itself is not given.

Table provides an overview of how each of the modelled activities corresponded to the sectors available in E3ME. We produced estimates of waste management output and other missing datapoints using national accounts data, where possible, as well as other sources.

**Table B-3 Mapping to E3ME sectors**

Activity sector	E3ME Sector	Variables affected by modelling inputs
Waste management	41. Miscellaneous Services	Gross output
Recycling	21. Manufacturing n.e.s.	IO coefficients, Investment, Exports
Electronics	17. Electronics	IO coefficients, Imports
Plastics	12. Rubber & Plastics	IO coefficients
Construction	25. Construction	IO coefficients
Agriculture	1. Agriculture etc	IO coefficients, Investment
Metals	14. Basic Metals	IO coefficients (electronics input)
Chemicals	11. Chemicals n.e.s.	IO coefficients (plastic feedstock, mineral fertilisers)
Mining of non-metallic minerals	4. Other Mining	IO coefficients (construction materials)
Production of non-metallic minerals	13. Non-Metallic Mineral Products	IO coefficients (construction materials)

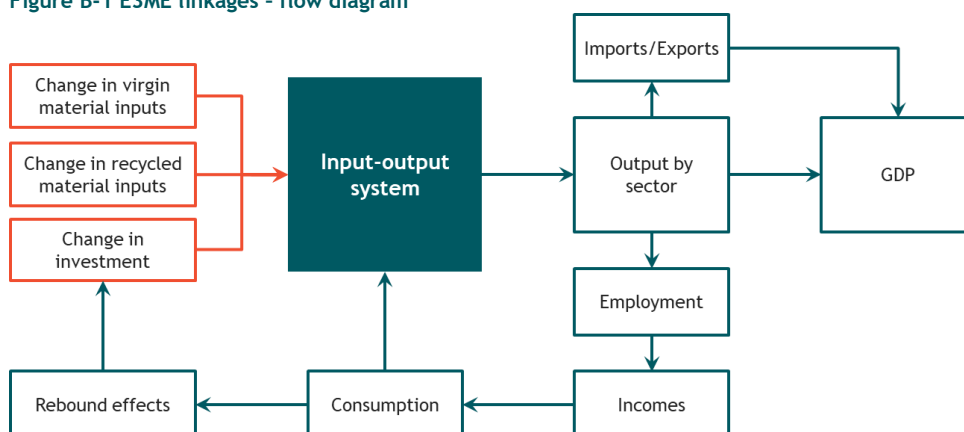
#### **Model linkages and feedbacks**

The impact of circular economy activities will not be linear. A change in investment or material consumption may have feedback effects that may in turn alter investment and consumption levels. A

full-economy model like E3ME is able to capture these complex interactions, enabling a deeper analysis of the trade-offs inherent in a circular economy transition, as limits are placed on certain economic activities while demand for others increases.

For instance, the shift towards recycled materials will tend to increase the labour intensity of production. On the one hand, we can expect that this will increase unit production costs, which may be passed on to consumers via higher prices. Such a negative supply shock would be expected to reduce consumption in the economy. Furthermore, increasing the capacity of recycling centres may require more advanced machinery of a kind that is not produced domestically, causing imports to increase and GDP to fall.

Figure B-1 E3ME linkages - flow diagram



On the other hand, the shift towards recycled materials may also be associated with increased employment, increasing disposable incomes and consumption. The additional investment required by the transition would also filter through the economy, increasing demand in the financial and construction industries, among others.

The overall consumption of raw materials is determined by these trade-offs within the economy. If the rebound effects from the additional demand are strong, the impact of circular economy activities may be to increase the extraction of raw materials more than ever, with improved resource efficiency offset by higher consumption overall. As the relative importance of sectors with different labour and carbon intensities changes as a result of the circular economy, we may expect to see similar dynamics in terms of employment and carbon emissions in aggregate, with employment and carbon emissions being added in certain areas of the economy while employment and emissions potentially being reduced in other areas of the economy. Through its model linkages and feedbacks, E3ME captures these various effects and estimates the net impacts.

## Part 2 - Detailed modelling results

Table B-4 Detailed employment results by sector

Sector	Baseline scenario employment 2030 (000s)	CE scenario employment 2030 (000s)	Absolute difference from baseline scenario in 2030 (000s)	Relative difference from baseline scenario in 2030 (%)
1 Agriculture etc	14486.4	15587.4	1101.0	7.6%
2 Coal	45.2	45.1	0.0	0.0%
3 Oil & Gas etc	204.8	205.0	0.1	0.1%
4 Other Mining	44.3	44.3	0.0	0.0%
5 Food, Drink & Tobacco	489.3	491.1	1.7	0.4%
6 Textiles, Clothing & Leather	154.2	158.0	3.7	2.4%
7 Wood & Paper	87.0	87.9	0.8	1.0%
8 Printing & Publishing	121.7	122.2	0.5	0.4%
9 Manufacture of Fuels	807.7	811.8	4.1	0.5%
10 Pharmaceuticals	44.5	44.5	0.0	0.0%
11 Chemicals n.e.s.	200.1	194.1	-6.1	-3.0%
12 Rubber & Plastics	114.7	114.8	0.1	0.1%
13 Non-Metallic Mineral Products	146.3	142.9	-3.4	-2.3%
14 Basic Metals	80.7	80.5	-0.1	-0.1%
15 Metal Goods	197.6	198.2	0.6	0.3%
16 Mechanical Engineering	285.6	289.7	4.1	1.4%
17 Electronics	153.9	156.4	2.6	1.7%
18 Electrical Engineering & Instruments	128.6	131.5	2.9	2.3%
19 Motor Vehicles	260.9	265.1	4.2	1.6%
20 Other Transport Equipment	52.1	51.6	-0.4	-0.9%
21 Manufacturing n.e.s. (incl. waste recycling)	123.9	146.9	23.0	18.6%
22 Electricity	113.2	113.2	0.0	0.0%
23 Gas Supply	21.0	21.7	0.7	3.3%
24 Water Supply	8.6	8.6	0.0	0.0%
25 Construction	1124.4	1142.9	18.5	1.6%
26 Distribution	4325.6	4452.9	127.4	2.9%
27 Retailing	3060.6	3083.9	23.3	0.8%
28 Hotels & Catering	1177.4	1180.4	3.0	0.3%
29 Land Transport etc	1676.9	1680.3	3.4	0.2%
30 Water Transport	218.5	218.5	0.0	0.0%
31 Air Transport	208.1	210.4	2.3	1.1%
32 Communications	657.1	657.1	0.0	0.0%
33 Banking & Finance	209.5	211.1	1.7	0.8%
34 Insurance	222.7	222.6	-0.1	0.0%
35 Computing Services	45.3	45.3	0.0	0.0%
36 Professional Services	664.5	666.2	1.7	0.3%
37 Other Business Services	687.1	687.1	0.0	0.0%

38 Public Administration & Defence	1608.7	1610.0	1.3	0.1%
39 Education	1730.8	1732.8	2.0	0.1%
40 Health & Social Work	1160.6	1160.0	-0.6	-0.1%
41 Miscellaneous Services (incl. waste management)	3959.3	4235.2	275.8	7.0%
42 Unallocated	0.0	0.0	0.0	0.0%
43 Forestry	0.0	0.0	0.0	0.0%
<b>TOTAL</b>	<b>41109.2</b>	<b>42709.3</b>	<b>1600.2</b>	<b>3.9%</b>



## Annex C - Gazetted Regulations at time of report

Table C-0-1 List of relevant environmental regulations already gazetted by the time of writing

Name of environmental regulation	Description
National Environmental (Wetlands, River Banks and Lake Shores) Regulations, S. I. No. 26, 2009.	Provides for the conservation & wise use of wetlands & their resources in Nigeria and ensures sustainable use of wetlands for ecological and tourism purposes and to protect wetland habitats for species of fauna and flora.
National Environmental (Watershed, Mountainous, Hilly and Catchments Areas) Regulations, S. I. No. 27, 2009.	Makes provision for the protection of water catchment areas.
National Environmental (Sanitation and Wastes Control) Regulations, S. I. No. 28, 2009.	Provides the legal framework for the adoption of sustainable and environment friendly practices in environmental sanitation and waste management to minimize pollution
National Environmental (Permitting and Licensing System) Regulations, S. I. No. 29, 2009.	Enables consistent application of environmental laws, regulations and standards in all sectors of the economy and geographical region.
National Environmental (Access to Genetic Resources and Benefit Sharing) Regulations, S. I. No. 30, 2009	Regulate access to and use of generic resources to ensure the regeneration and sustainability of threatened species.
National Environmental (Mining and Processing of Coal, Ores and Industrial Minerals) Regulations, S. I. No. 31, 2009.	Minimize pollution from mining and processing of coal, ores and industrial minerals.
National Environmental (Ozone Layer Protection) Regulations, S. I. No. 32, 2009.	Prohibit the import, manufacture, sale and the use of ozone-depleting substances.
National Environmental (Food, Beverages and Tobacco Sector) Regulations, S. I. No. 33, 2009.	Prevent and minimise pollution from all operations and ancillary activities of food, beverages and tobacco sector to the Nigerian environment.
National Environmental (Textile, Wearing Apparel, Leather and Footwear Industry) Regulations, S. I. No. 34, 2009.	Prevent and minimize pollution from all operations and ancillary activities from the sector to the Nigerian environment
National Environmental (Noise Standards and Control) Regulations, S. I. No. 35, 2009.	Ensure tranquillity of the human environment or surrounding and their psychological well-being by regulating noise levels.
National Environmental (Chemicals, Pharmaceuticals, Soap and Detergent Manufacturing Industries) Regulations, S. I. No. 36, 2009.	Prevent and minimize pollution from all operations and ancillary activities from this Sector in order to protect Nigeria environment.
National Environmental (Standards for Telecommunications/Broadcasting Facilities) Regulations, S. I. No. 11, 2011.	Protect the environment and human health, ensure safety and general welfare, eliminate or minimize public and private losses due to activities of the telecommunications and broadcast industry
National Environmental (Soil Erosion and Flood Control) Regulations, S. I. No. 12, 2011.	Check all earth-disturbing activities, practices or developments for non-agricultural, commercial, industrial and residential purposes.
National Environmental (Desertification Control and Drought Mitigation) Regulations, S. I. No. 13, 2011.	Provide an effective and pragmatic regulatory framework for the sustainable use of all areas already affected by desertification and the protection of vulnerable lands.
National Environmental (Base Metals, Iron and Steel Manufacturing/Recycling Industries) Regulations, S. I. No. 14, 2011.	Prevent and minimize pollution from all operations and ancillary activities of the sector in the Nigerian Environment.
National Environmental (Control of Bush/Forest Fire and Open Burning) Regulations, S. I. No. 15, 2011.	Prevent and minimize the destruction of ecosystem through fire outbreak and burning of any material that may affect the health of the ecosystem through the emission of hazardous air pollutants.

National Environmental (Protection of Endangered Species in International Trade) Regulations, S. I. No. 16, 2011.	Protect species of endangered wildlife from extinction through the prohibition of trade, importation, etc.
National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations, S. I. No. 17, 2011.	Prevent and minimize pollution from all operations and ancillary activities of the Domestic and Industrial Plastic Rubber and Foam Sector to the Nigerian environment.
National Environmental (Coastal and Marine Area Protection) Regulations, S. I. No 18, 2011.	Regulatory framework for the application of preventive precautionary and anticipatory approaches so as to avoid degradation of the coastal and marine environment.
National Environmental (Construction Sector) Regulations, S. I. No. 19, 2011.	Prevent and minimize pollution from Construction, Decommissioning and Demolition Activities to the Nigerian Environment.
National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, S. I. No. 20, 2011.	Restore, preserve and improve the quality of air. The standards contained herein provide for the protection of the air from pollutants from vehicular emission.
National Environmental (Non-Metallic Minerals Manufacturing Industries Sector) Regulations, S. I. No. 21, 2011.	Prevent and minimize pollution from all operations and ancillary activities of the Non-Metallic Minerals manufacturing sector.
National Environmental (Surface and Groundwater Quality Control) Regulations, S. I. No. 22, 2011.	Restore, enhance and preserve the physical, chemical and biological integrity of the nation's surface waters, and to maintain existing water uses.
National Environmental (Electrical/Electronic Sector) Regulations, S. I. No 23, 2011.	Prevent and minimize pollution from all operations and ancillary activities of the Electrical/Electronic Sector. This Regulation covers both new and used Electrical/Electronic Equipment (EEE/UEEE).
National Environmental (Quarrying and Blasting Operations) Regulations, S. I. No 33, 2013.	Control the effects of quarrying and blasting operations on the environment and human health as well as encourage the wise use and exploitation of natural resources and the protection of the ecosystem.
National Environmental (Control of Alien and Invasive Species) Regulations, S. I. No 32, 2013.	Prevent the decline, minimize the modification and destruction of ecosystem, economy and human health caused by Alien and invasive species.
National Environmental (Pulp and Paper, Wood and Wood Products) Regulations, S. I. No 34, 2013.	Prevent and minimize pollution from all operations and ancillary activities from this Sector in the Nigerian Environment.
National Environmental (Motor Vehicle and Miscellaneous Assembly) Regulations, S. I. No 35, 2013.	Prevent and minimize pollution and wastes from all activities of the Motor Vehicle (MV) and Miscellaneous Assembly sector to the Nigerian environment, and these Regulations shall cover new, used and end-of-life motor vehicles (UV/ELV).
National Environmental (Air Quality Control) Regulations, S. I. No 64, 2014.	Provide for improved control of the nation's air quality to such an extent that would enhance the protection of flora and fauna, human health and other resources affected by air quality deteriorations.
National Environmental (Control of Charcoal Production and Export) Regulations, S. I. No 62, 2014.	Protect Nigerians ecosystem from further depletion arising from charcoal production and handling, including its export, and in particular to regulate felling of trees for charcoal production.
National Environmental (Dams and Reservoirs) Regulations, S. I. No 66, 2014.	Control the effects of Dams and Reservoirs on the environment and human health as well as reduce or minimize environmental hazards and disasters such as dam break, sediment load and dam water releases causing downstream flooding and erosion.
National Environmental (Hazardous Chemicals and Pesticides) Regulations, S. I. No 65, 2014.	Protect human health and the environment from the harmful effects of hazardous chemicals and pesticides, and other agro chemicals. It also contributes to the sustainable development of agriculture and the conservation of the environment.

## Annex D - Waste generation and management

Table D-0-1 Solid waste management in Lagos State

Federal Ministry of the Environment		
<ul style="list-style-type: none"> <li>Issue waste legislation and policy guidelines at the federal level</li> <li>Develop a Solid Waste Management Master Plan</li> <li>Provide technical assistance to States and LGAs</li> </ul>		
<b>NESREA</b> <ul style="list-style-type: none"> <li>Enforce compliance with environmental laws, guidelines, policies and standards</li> <li>Conduct environmental audits</li> <li>Create public awareness and provide environmental education</li> </ul>		
<b>State Government</b> <ul style="list-style-type: none"> <li>Issue waste legislation and policy guidelines at state level</li> <li>Provide financial instruments for PSP</li> <li>Provide land for Solid Waste Management activities</li> </ul>	<b>LASEPA</b> <ul style="list-style-type: none"> <li>Advise the State Government on all waste management policies</li> <li>Carry out awareness campaigns on sound waste management</li> <li>Monitor waste management and environmental degradation in Lagos State.</li> </ul>	<b>LAWMA</b> <ul style="list-style-type: none"> <li>Responsible in practice for waste management in Lagos State</li> <li>Contract, supervise and control PSPs</li> <li>Clean public areas, manage TLSs and oversee dumpsites</li> </ul>
<b>LGAs and LCDAs</b> <ul style="list-style-type: none"> <li>Formally responsible for waste management in their area</li> <li>Ensure waste is properly collected</li> </ul>		
<b>Informal Sector   Private Sector Participants</b> <ul style="list-style-type: none"> <li>Collect, transport, and dispose of waste in a designated area</li> <li>Collect waste fees from citizens</li> </ul>		

Table D-0-2 Refuse deposited at landfill sites in Lagos State, 2017

MONTH	LANDFILL SITES				TOTAL (METRIC TONS)
	OLUSHOSUN	SOLOUS III	EWU ELEPE	EPE	ALL
JANUARY	78 067,00	28 912,00	14 141,00	8 681,00	129 801,00
FEBRUARY	69 147,00	24 470,00	11 045,00	8 221,00	112 883,00
MARCH	78 663,00	27 068,00	11 144,50	8 192,00	125 067,50
APRIL	82 432,01	48 871,23	10 652,00	6 299,00	148 254,24
MAY	73 118,16	49 098,92	10 978,00	6 722,00	139 917,08
JUNE	77 564,00	52 671,00	10 374,00	6 156,50	146 765,50
JULY	38 460,00	17 805,00	12 959,00	18 600,00	87 824,00
AUGUST	40 780,50	15 939,00	10 731,00	27 320,00	94 770,50
SEPTEMBER	42 689,50	9 764,50	10 457,00	21 298,10	84 209,10
OCTOBER	39 900,00	12 712,00	9 519,40	21 501,50	83 632,90
NOVEMBER	43 492,00	14 983,05	11 823,40	26 420,50	96 718,95
DECEMBER	45 550,00	13 848,00	12 160,40	27 608,00	99 166,40
TOTAL	709 863,17	316 142,70	135 984,70	187 019,60	1 349 010,17

Table D-0-3 Other recycling projects/companies/initiatives

Company Name	Focus area
<b>Chanja Datti Recycling</b>	<ul style="list-style-type: none"> <li>Recycling company, Abuja.</li> <li>Chanja Datti is a social enterprise that collects waste plastic (PET bottles, pure water sachet etc.) and other recyclables like aluminium cans, papers (old newspapers, old textbooks, cardboard, cartons etc.), tires, and glass bottles.</li> <li>Transforms them into flakes or bales, which are then supplied to off-takers/recyclers for use in the manufacture of various other products.</li> </ul>
<b>Wecyclers</b>	<ul style="list-style-type: none"> <li>Recycling collectors for BASF Waste2Chem Project</li> <li>Wecyclers is a for-profit social enterprise that promotes environmental sustainability, socioeconomic development, and community health by providing convenient recycling services in densely populated urban neighbourhoods.</li> <li>They give households a chance to generate value from their waste while providing a reliable supply of raw material to the local recycling industry.</li> </ul>
<b>LAWMA</b>	<ul style="list-style-type: none"> <li>LAWMA recovers reusable recyclable materials from landfill sites. Recovery of reusable material is done for the following waste types:               <ul style="list-style-type: none"> <li>Plastic Recycling: HDPE sachets, shopping bags, juice and milk containers, PET bottles</li> <li>Papers &amp; Cardboard: paper and cardboard supply to paper/tissue paper manufacturers</li> <li>Construction and Demolition Waste: concrete, bricks, rubbles, tiles, cardboard and wood</li> <li>E-waste: electrical and electronic equipment</li> <li>Organics waste: organic waste from markets and industries for production of composite fertilisers</li> </ul> </li> </ul>
<b>Green Campus Initiative (GCI) Green Institute Nigeria</b>	<ul style="list-style-type: none"> <li>Eliminate waste through proper waste collection, sorting, trading, reuse and recycling.</li> <li>The system rewards people who trade their valuable wastes and other unused materials with formal education, educational materials, and vocational training. <a href="http://www.greeninstitute.ng/research-programs/trash-for-education/">http://www.greeninstitute.ng/research-programs/trash-for-education/</a></li> </ul>
<b>Paperbags by Ebees</b>	<ul style="list-style-type: none"> <li>Established in 2015, Paperbags by Ebees (<a href="https://www.facebook.com/Paperbagsng/">https://www.facebook.com/Paperbagsng/</a>) is a company which produces high quality paper and biodegradable packaging for (especially SMME) businesses in food service, agriculture and fashion.</li> <li>Products include food bags, fashion carrier bags, pastry bags, food carrier bags, food boxes, shoe boxes, brown bag packaging for garri, flour, charcoal, tea boxes etc.</li> <li>In many cases, the biodegradable paper serves as a sustainable alternative for plastics packaging.</li> </ul>
<b>Cyrus45</b>	<ul style="list-style-type: none"> <li>Cyrus45 Factory describes itself as “an art-inclined home décor company passionate about upcycling waste items into bespoke and ultra-modern furniture pieces and homewares”.</li> <li>Waste tires play a key role in the furniture designs but glass and plastics are also applied.</li> </ul>

Table D-0-4 Legislative framework for waste management

Law / Regulation	Year	Level	Significance
<b>Harmful Waste Act</b>	1988 2004	F	Prohibits and declares unlawful all activities relating to the purchase, sale, import, transport, deposit or storage of harmful waste
<b>FEPA Act</b>	1988	F	Establishment of the Federal Environmental Protection Agency
<b>EIA Act</b>	1992	F	Legislation in the field of Environmental Impact Assessments
<b>Environmental Pollution Control Law</b>	1996	F	Requires the ministry of Environment and Physical Planning to educate the public on the types of disposal methods acceptable by the State Government for domestic and industrial wastes
<b>Lagos State EPA Law</b>	1996	L	Establishment of the Lagos State Environmental Protection Agency. LASEPA monitor and controls waste disposal in Lagos State and advises the State Govt on environmental management policies
<b>Constitution of the Federal Republic of Nigeria</b>	1999	F	(Section 20) states the federal government is empowered to protect and improve the environment and safeguard water, air, and land, forest and wildlife.

Law / Regulation	Year	Level	Significance
Lagos State Environmental Sanitation Law	2000	L	Requires the State citizens to clean their property on the last Saturday of the month
Policy guidelines on Solid Waste Management	2005	F	This document provides a good overview of how solid waste management should be organised in Nigeria, which organisation is responsible for what, etc.
NESREA Act	2007	F	Establishment of the National Environmental Standards and Regulations Enforcement Agency
National Environmental Regulations	2009	F	Legal framework for the adoption of sustainable practices in environmental sanitation and waste management to minimise pollution
Natl Env (WEEE) Regulations	2011	F	Imports of near end-of-life and waste electric and electronic equipment are banned
Lagos Waste Management Authority Law	2015	L	Legal basis for the establishment of the Lagos State Waste Management Authority (LAWMA)
Environmental Protection Law	2016	F	Stipulates that MoE will have advisory and mediating role; LAWMA in charge of licensing and regulating waste management, PUMAU in charge of developing a stratified billing regime
Solid Waste Management Policy	2020	F	<ul style="list-style-type: none"> <li>Promoting a clean and healthy environment for sustainable socio-economic development of the nation;</li> <li>Reducing and eventually eliminating illegally dumped solid waste and reduction in associated public health problems;</li> <li>Development of waste management infrastructures;</li> <li>Promoting private sector investments in Solid Waste Management;</li> <li>Promoting the Reuse, Reduce, Recycle and Recovery initiative;</li> <li>Restoring and Conserving natural resources;</li> <li>Creating wealth and employment from waste management.</li> </ul>
National Plastic Waste Policy	2020	F	<p>The overall goal of the National Policy on Plastic Waste Management is to promote sustainable use of plastic as a resource through its life cycle management. The focus is heavily on single use plastics.</p> <ul style="list-style-type: none"> <li>Develop legislative instruments, standards, trade measures, models and systems</li> <li>Limit the impact of littering of certain single use plastic packaging products and waste materials in the Nigerian environment.</li> <li>Reduce Plastic Waste Generation by 50% of its baseline figure of 2020 by year 2025.</li> <li>To effect levy and sector user charges on single use plastic under the Extended Producer Responsibility effectively from May 2021</li> <li>To transform all plastic products, packaging materials and its waste to a resource</li> <li>To ensure that all plastic packaging in the market meet at least two criteria of being recyclable or biodegradable or compostable or reusable by 2030</li> <li>To promote the sustainable use of alternatives to single use plastics e.g. Jute bags, leaves, paper glass bottles etc from May 2020.</li> <li>To generate a database on plastic from production through use to its disposal including import or export taking cognisance of lifecycle approach in the country for informed decisions on partnerships with relevant stakeholders (brands, retailers, manufacturers, recyclers, NGOs, governments and local authorities) around a specific goal.</li> </ul>

Legislative framework of waste management in Nigeria Federal level "F", and Lagos State "L"

<sup>7</sup> 2020. Environmental Law And Practice In Nigeria: Overview. [online] Available at: [https://uk.practicallaw.thomsonreuters.com/w-006-3572?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/w-006-3572?transitionType=Default&contextData=(sc.Default)&firstPage=true)

Table D-0-5 Description of voluntary EPR schemes in Nigeria

FBRA	<ul style="list-style-type: none"> <li>Voluntary initiative for the recycling of used food and beverage packaging waste.</li> <li>Founded in December 2013, with a view to recycle used food and beverage packaging waste into synthetic fibre and other uses.</li> <li>Members include: the Nigerian Bottling Company Limited/Coca-Cola Nigeria Limited, Nigerian Breweries Plc, Seven-Up Bottling Company Limited, Nestlé Nigeria Plc, Guinness Nigeria Plc, Intercontinental Distillers Limited, International Breweries Limited, Tulip Cocoa, and Prima Caps and Preforms<sup>119</sup>.</li> <li>Collection partners RecyclePoints, WestAfricaENRG and Chanja Datti among others.</li> <li>FBRA has conducted awareness campaigns in curbing environmental pollution caused by food and beverage packaging waste. Promotes proper disposal and separation of plastics.</li> <li>FBRA is a steppingstone towards a formal system of Extended Producer Responsibility in packaging in Nigeria, especially because all big players are already on board<sup>120</sup>.</li> </ul>
EPRON	<ul style="list-style-type: none"> <li>Incorporated in 2018 but has only been operational since 2019.</li> <li>Established by a local working group which includes OEMs, Philips, Dell, Microsoft and HP. Initial operations (the current pilot phase) is funded by GEF and UNEP<sup>121</sup>.</li> <li>Key initiative of the Government of Nigeria established to support and to coordinate the take-back and recycling of e-waste in strict compliance to regulatory specifications<sup>122</sup>.</li> <li>The EPR programme includes the following<sup>123</sup>:</li> <li>Every producer <b>importing, manufacturing, assembling or distributing</b> electrical and electronic equipment (EEE) in Nigeria is required to comply with the EPR programme as indicated in Regulation II (1)-(4) of the National Environment (EEE Sector) Regulations 2011.</li> <li>Producers are obliged to register with a Producer Responsibility Organisation, like EPRON.</li> <li>EPRON is exploring funding mechanisms based on a percentage contribution as levy. Contribution may be calculated based on membership tier. During the current pilot phase, joining fee is waived.</li> <li>The expertise is not yet available locally and EPRON will require support for the next stages, in terms of developing a roadmap towards implementation of the proposed EPR. The local reality that Nigeria's e-waste producers are importers and distributors and not OEMs is pertinent in planning for next stages as environmental impact of e-waste is not always appreciated and there is a dire need for support in enforcing the EPR process<sup>124</sup>.</li> </ul>
Alliance for Responsible Battery Recycling (ARBR)	<ul style="list-style-type: none"> <li>ARBR is made up of stakeholders from the battery sector with the mandate to collect recycling fees from battery producers and administrative fees from recycling companies, and use these funds to execute projects that upgrade the battery recycling value chain in Nigeria through training, capacity building, grants and loans for facility upgrades.</li> <li>Target is to reduce the amount of used batteries in the hands of informal and dirty battery recyclers and channel them to registered recycling companies.</li> <li>Collected and transported over 20,000 tons of used batteries in Nigeria. Their target is to ensure the sustainable collection and transportation of at least 100,000 tons of used batteries within the next 24 months. They are currently working with several investors to build modern and clean battery recycling plants in Nigeria.<sup>13</sup></li> <li>The lack of a strong regulatory environment has caused non-compliance with mandatory EPR in the battery sector. Many companies are not registered with the ARBR. The Federal Ministry of Environment is currently working on a used battery policy that mandates all companies producing or importing batteries into Nigeria to register as members of the ARBR before they can operate in the country, same for recycling companies. Currently, there are 10 registered recycling companies, 5 renewable energy companies and 1 local battery manufacturer registered as members under the EPR programme.<sup>131</sup></li> </ul>

## Annex E - Awareness initiative

Table E-0-1 Circular economy awareness creation initiatives in Nigeria

<b>Circular Economy Approaches for the Electronics Industry</b>
Among the most prominent CE-related awareness campaigns in Nigeria is the aforementioned “Circular Economy Approaches for the Electronics Industry” program co-funded by UNEP and GEF. The initiative focuses on raising awareness of the impacts of dangerous e-waste and strengthening the enforcement of Nigeria’s expanded regulations on supplier accountability.
<b>The Blue Box Recycling Initiative</b>
The Blue Box Program is a single stream recyclable collection program that aims to encourage the separation of recyclable materials from the general waste at the point of generation in Nigeria. To encourage the sorting of waste, Colour Coded Bags are distributed to households by recyclers and volunteers assigned to the different Local Governments and Local Community Development Areas. The collected bags are transported to designated Community Recycling Centre in each Local Government or Local Council Development Area where the recyclables will be sorted and sold to off-takers.
<b>Mental and Environmental Development Initiative for Children Nigeria</b>
The organization Mental and Environmental Development Initiative for Children Nigeria (MEDICNG), has been active in educating schoolchildren and rural communities in Lagos on the dangers of environmental degradation. The initiative organizes children to clean beaches, plant trees, sort and aggregate different kinds of plastics for recyclers, who then transport them to recycling facilities. In return, they provide the children with non-monetary incentives such as school bags and stationery.
<b>Greenhill Recycling</b>
Greenhill recycling mentioned under 2.4.2., runs community outreach programs where participants are taught how to recycle their refuse. Greenhill also organises GREEN rallies and clean-up activities to educate members in different communities within Lagos state, on the need for proper waste disposal and management as a tool to achieve environmental sustainability. Through their BAGit campaign, they are further trying to empower a culture change amongst individuals, trying to convince them to separate and bag their recyclable waste in branded collection bags for recycling.



## Annex F - Trade and investments in the circular economy in Nigeria

This section looks at the level of trade and foreign investments occurring in Nigeria and the factors that influence trade and investment. First, an overview will be given on the trends in trade and investment. Subsequently, several economic, financial and political factors that affect the level of trade and foreign investments are investigated.

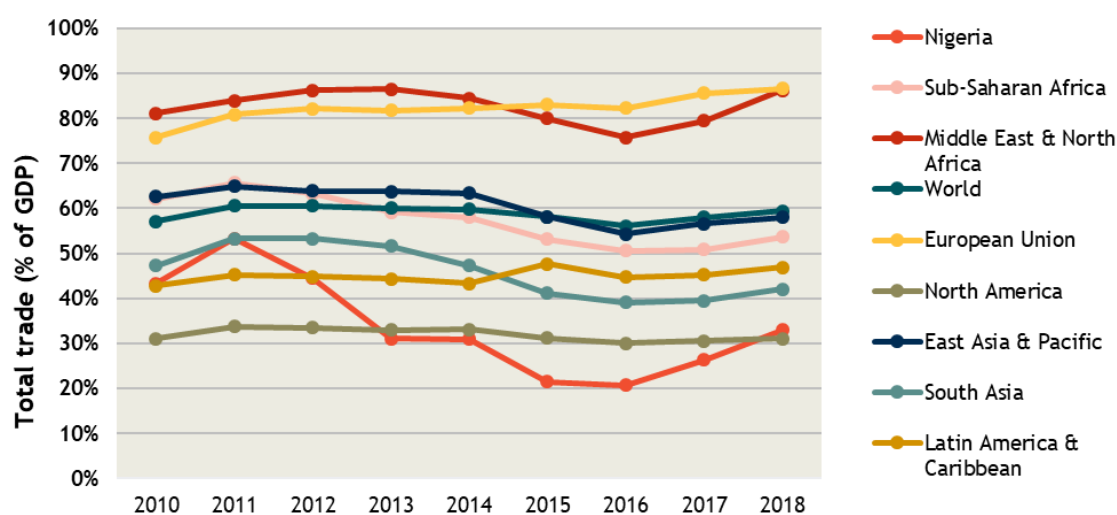
### F1 - Overview of ongoing trends in trade and foreign direct investment

#### Trends in trade

Nigeria's level of trade with other countries is relatively low (Figure F-1). In 2011, the share of total trade in GDP peaked above 50% but then started to decline up to 2016, when it reached a low of 21%. Since then, the relative importance of trade has been growing again, corresponding to 33% of GDP in 2018.

It should be noted that the importance of trade in the Nigerian economy is significantly lower than average in Sub-Saharan Africa. Although resource exports, particularly oil, are important for the Nigeria economy, the overall volume of exports is still relatively low. The total value of exports during the period 2010-2018 was on average 58% larger than the total import value. In the period 2010 - 2018, Nigeria's trade balance ranged from a USD 2 Billion deficit to a USD 107 Billion surplus. The average trade surplus in the period 2010-2018 was USD 38.2 Billion (although there was no data for 2015).

Figure F-1 Share of total trade (Imports + exports) in GDP (%) in Nigeria compared to regional averages for the period 2010-2018.



Source: World Bank - World Development Indicators - Trade (% of GDP)

Around 35% of Nigeria's exports are going to the EU and around 30% of the imports originate from the EU. This share has grown over the last decade.<sup>8</sup> Materials and natural resources account for on average 95% of the exports from Nigeria to the EU, 93% of which is oil. Conversely, in 2016, Nigeria accounted for approximately 0.5% of the total Extra-EU trade of the EU, for 0.4% of the extra-EU exports and 0.6% of

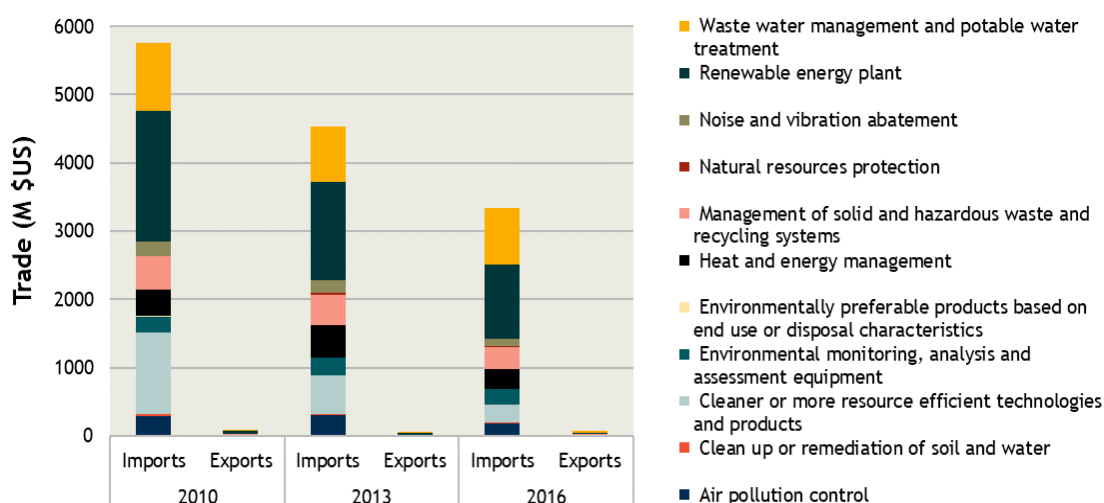
<sup>8</sup> UN Comtrade

the EU imports from outside the EU. In total around 12% of the EU exports go to Africa and around 5% of this goes to Nigeria.<sup>9</sup> When looking at the EU's imports from outside the EU, we see that Africa accounts for 5% of those imports, of which in turn 8% comes from Nigeria. As such, Nigeria is the 6<sup>th</sup> most important EU export partner in Africa and ranks as the 3<sup>rd</sup> largest EU import partner in Africa.

### Trade in environmental goods and services

In the late 1990s, the OECD has developed a list of sectors that deliver (as part of their output), environmental goods and services. The level of activity in these 'environmental goods and services sectors' is monitored in several economic databases to provide a proxy of the volume of trade in environment-related goods and services. It is important to note though, that only part of the goods and services that are generated in these sectors are related to the environment. In 2010, the environmental goods and services sectors accounted for 8% of the total trade volume and over time, this share decreased slightly to 7% in 2016. When looking at the trade balance, we see that imports dominate trade in environmental goods and services (totalling EUR 3.3 Billion compared to EUR 70 Million in exports), where renewable energy technologies as well as 'cleaner and more resource efficient products' account for the largest part of the imports (Figure E-2).

Figure F-2 Imports and exports of environmental goods and services in Nigeria for the years 2010, 2013 and 2016.



Source: OECD - Trade in Environmental goods and services.

### Foreign direct investment

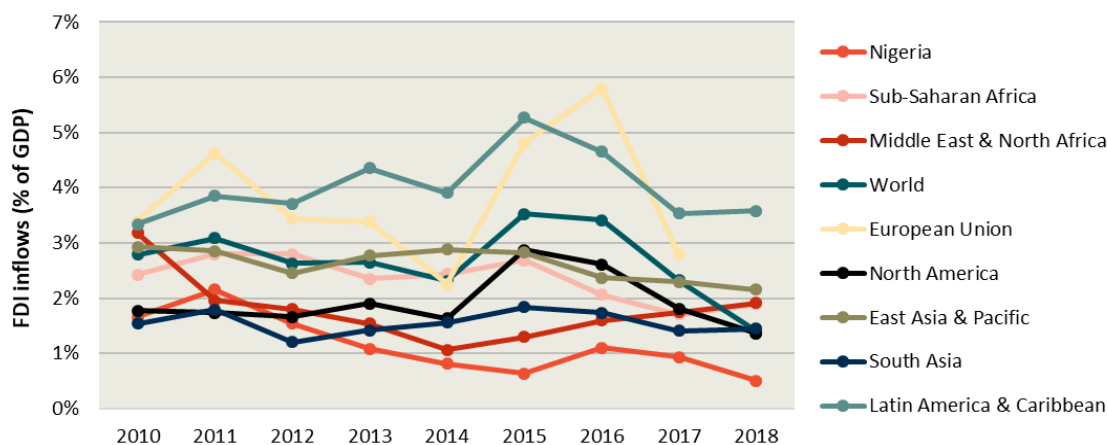
When looking at foreign direct investment in Nigeria, we see that the investment levels are very low, compared to regional averages in Africa, but also compared to other regions in the world (Figure E-3). Nigeria's unfriendly business environment is a barrier to attracting foreign direct investments as investors look to other African markets. The delays in Petroleum Bill Governance Act has also throttled investment. The lack of infrastructure to do business and optimise operations is also noted as a barrier to investment.<sup>10</sup> In 2011, FDI inflows peaked, with a value equivalent to 2.2% of GDP. Since then, the level of foreign investments has declined to an equivalent of only 0.5% of GDP in 2018, which is almost four times lower than the Sub-Saharan average. Nigeria is addressing this barrier with policy reforms to support an Enabling Environment for Business. This includes reforms to attract and retain investors (both foreign and

<sup>9</sup> Eurostat - International trade in goods by partner.

<sup>10</sup> Businessday NG. (2019). Why Nigeria's FDI fell 13-year low in 2018.

domestic); establishment of Special Economic Zones (SEZs) that would provide state-of-the-art economic infrastructure for improved productivity; and, structural reforms that will, inter alia, unify Nigeria's trade and investment policies and associated negotiations.<sup>11</sup>

Figure F-3 Share of Foreign Direct Investment (inflows) as share of GDP (%)



Source : World Bank - World Development Indicators - FDI inflows as share of GDP (%)

In conclusion, there is substantial trade ongoing between Nigeria and its international trading partners (dominated by oil exports), although the share of trade in the total economic output is still significantly below the world average and Sub-Saharan average. In terms of foreign investments, Nigeria is performing very poorly, which is strongly related to the perception of high corruption levels, as well as high levels of political and societal instability (see next section).

## F2 - Opportunities and barriers for trade

### Trade tariffs

When we look at trade tariffs in Nigeria, we can see a long-term downward trend. In the early 2000s, trade tariffs in Nigeria were over twice as high as the world average ( $\pm 25\%$ ) and this declined quickly after 2004 to just above 10% in 2005. Since then, the tariff levels have remained relatively stable (Figure F-4). This was as a result of substantial trade policy reforms as Nigeria aligned its tariff with the ECOWAS common external tariff.<sup>12</sup> In 2016, trade tariffs in Nigeria were 20% higher than the Sub-Saharan average and twice as high as the world average. Nigeria also charges hefty duties on certain goods - for example, imported rice faces a levy of 20%. Additional trade barriers negatively affect the supply chains of exporters to Nigeria, and of local manufacturers either importing inputs or exporting from Nigeria. Import and export costs in Nigeria are almost double those in East Asia & the Pacific region.<sup>13</sup> Therefore, tariffs can be seen as a major obstacle for trade growth in Nigeria. When asked for the biggest obstacle in doing business in Nigeria, 2.2% of companies mentioned customs and trade regulations in 2014.<sup>14</sup>

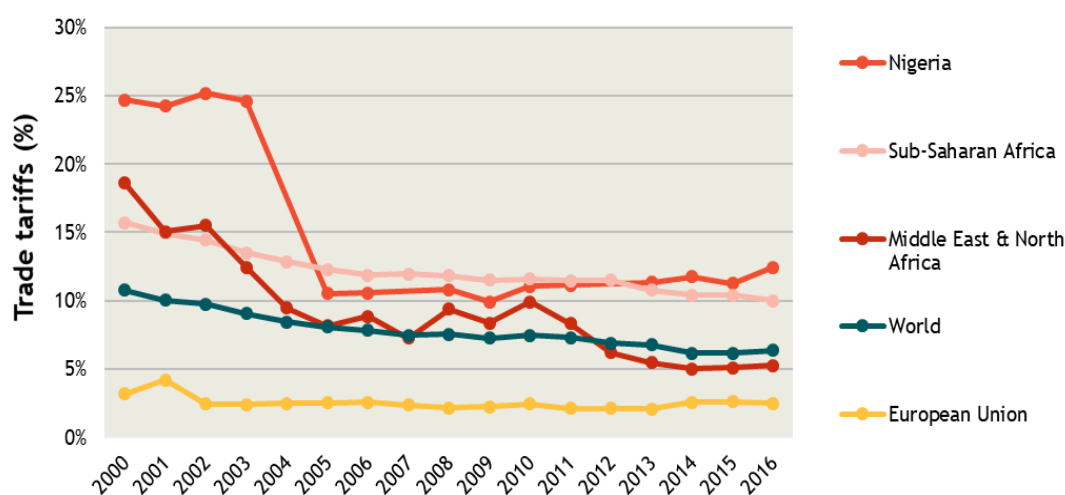
<sup>11</sup> CENTRE, T.T.L. (n.d.). 2017 Nigerian Annual Trade Policy Report.

<sup>12</sup> 2020. Nigeria WT/TPR/S/247. [ebook].

<sup>13</sup> Enabling Trade: Increasing the Potential of Trade Reforms. 2020. Enabling Trade: Barriers To Imports/Exports In Nigeria.

<sup>14</sup> World Bank - Enterprise survey (2016). World Bank. 2020. Explore Economies.

Figure F-4 Mean of the tariff rates applied to all products in Nigeria (%)

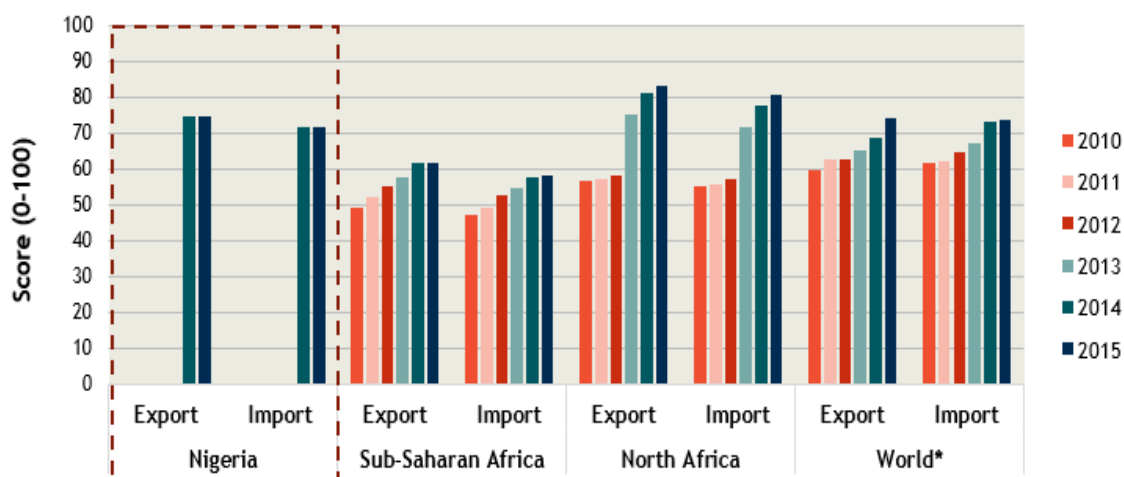


Source: World Bank-World Development Indicators-Tariff rate, applied, simple mean, all products (%)

### Trade costs

Apart from trade tariffs, there is a wide variety of costs associated with trade of products and services, including costs related to border compliance and documentary compliance. The Ease of Doing Business Index scores the trade costs of countries based on empirical research. Nigeria performs very well in this area. Nigeria outperforms the average score for Sub-Saharan Africa and scores just below the world average for import costs and similar to the world average for export related costs (Figure E-5).

Figure F-5 Score on cross-border trade costs for exports and imports in Nigeria in comparison to global and regional averages.

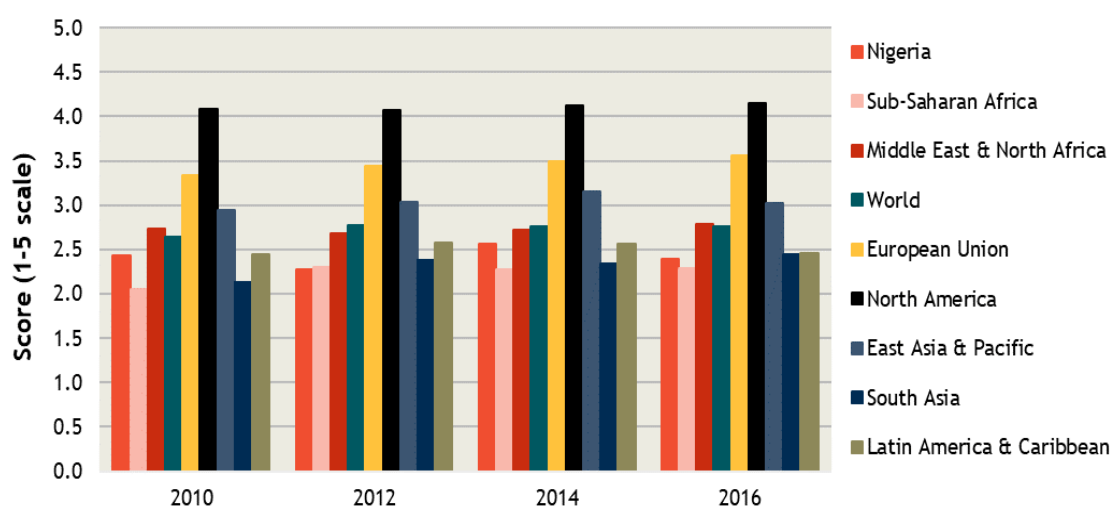


Source : World Bank - Ease of doing business - Trading across borders: Cost to export/import (USD per container) (DB06-15 methodology) - Score.

### Suitability of infrastructure for trade

In order to facilitate trade and reduce transport time and costs, the presence of good transport infrastructure is essential. The World Bank monitors the quality of transport infrastructure as part of the Logistics Performance Index (Figure F-6). According to the index, the quality of logistics in Nigeria is slightly above the Sub-Saharan Africa average, but has not improved significantly over the period 2010-2016. In 2016, the score further deteriorated compared to 2014. The Spanish bank Santander summarises the investment conditions for all countries and mentions poor transport and electricity infrastructure as an explicit weakness of Nigeria.

Figure F-6 Score of Nigeria in the Quality of trade and transport-related infrastructure compared with global and regional averages



regional averages

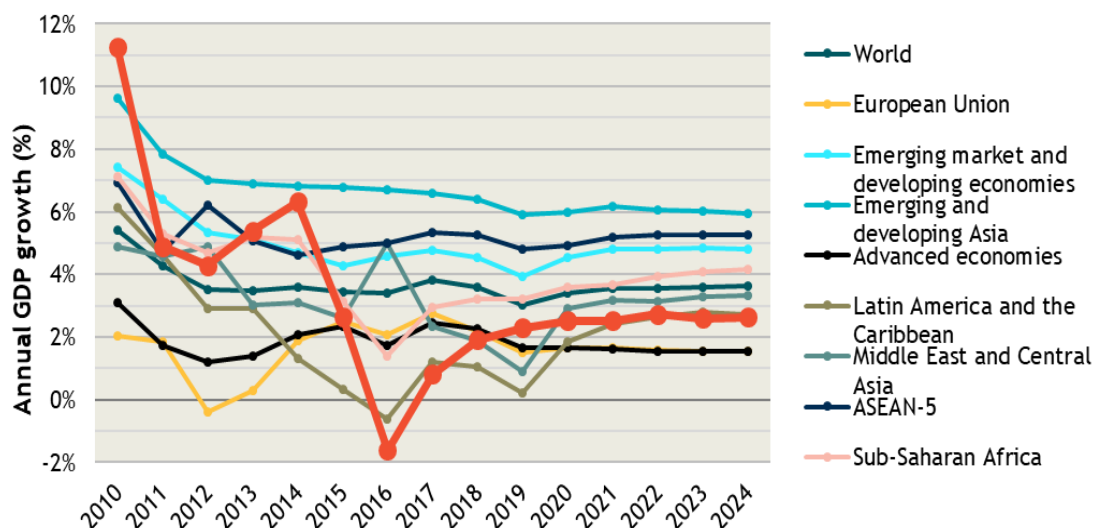
Source : World Bank - Logistics Performance Index - Quality of trade and transport-related infrastructure.

### F3 - Opportunities and barriers for investments

#### Economic opportunity

The economic situation in Nigeria appears to have normalised, since the economic collapse in 2016. (Figure F-7). The IMF estimates the annual growth rate for Nigeria for the period 2020-2024 to be on average around 2.6%, compared to 3.9% for Sub-Saharan Africa as a whole.

Figure F-7 Historical GDP growth and growth outlook until 2024 for Nigeria, compared to global and regional averages.



Source: International Monetary Fund - World Economic Outlook.

#### Ease of starting a business

Starting up business activities in another country can be cumbersome. Organisations need to become acquainted with all rules and procedures in their intended country. The World Bank monitors the ease of starting a business in its Doing Business Survey. Nigeria scored relatively well at 81 (0-100 scale) in 2018. This is an improvement from 74 in 2014. In contrast for the same period, the average score for European Member States increased from 88 in 2014 to almost 90 in 2018.

## Governance, political stability and regulatory quality

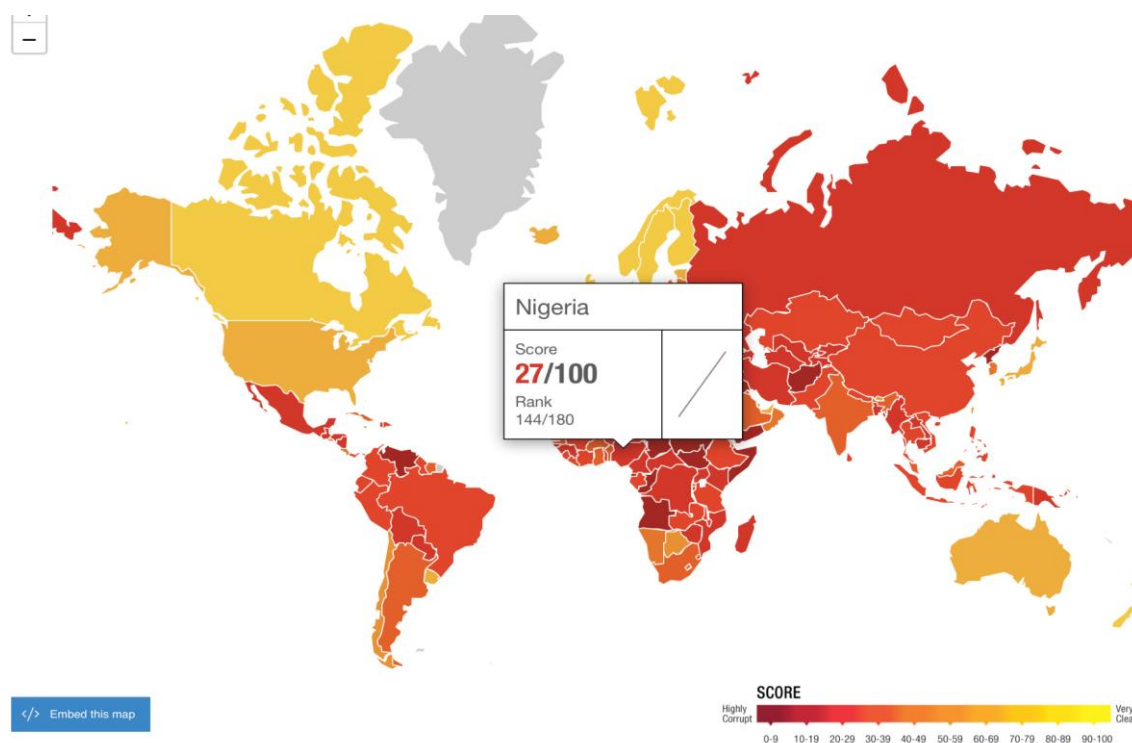
### Political instability & security

Political instability is perceived by many entrepreneurs as a major barrier for doing business in Nigeria. In the 2014 edition of the World Bank's Enterprise Survey, 4.4% of respondents identified political instability as the most important obstacle for doing business in Nigeria - whereby it ranked as the 6<sup>th</sup> most important obstacle identified in the survey. Nigeria's challenges are multi-faceted, fundamental, and reach from one end of the country to the other. Ongoing political crises undermine progress made in Africa's biggest democracy. Of note is the threat of Boko Haram to both civilians and military, religious turmoil and distrust in the federal government<sup>15, 16</sup>.

### Corruption

Corruption is still a large problem in Nigeria. This hampers economic growth and acts as a barrier for foreign entities to invest in the country. In the global Corruption Perception Index of 2018 (Figure F-8), Nigeria has a shared 144<sup>th</sup> rank<sup>17</sup> when ranking for the lowest level of corruption, with a score of only 27, on a scale from 0-100 (most corrupt to least corrupt). Hence, there is a need for transparent and accountable institutions to first be in place and ensure that just transition funds reach and benefit workers and communities affected by the transition to a circular economy.

Figure F-8 Global Corruption Perception Index 2018<sup>18</sup>



Within Africa, Nigeria has a shared 33<sup>rd</sup> place when ranking for the lowest level of corruption. In the enterprise survey conducted in 2014 by the World Bank<sup>19</sup>, corruption was mentioned by 12.7% of the respondents as the most important obstacle to doing business in Nigeria, making it the 3<sup>rd</sup> most important

<sup>15</sup> Council on Foreign Relations. 2020. Nigeria's Political And Security Crises Boiling Over Across The Country.

<sup>16</sup> Council on Foreign Relations. 2020. Nigeria'S Creaky Political System.

<sup>17</sup> Transparency.org. 2020. 2018 - CPI.

<sup>18</sup> Ibid.

<sup>19</sup> World Bank. 2020. Explore Economies.

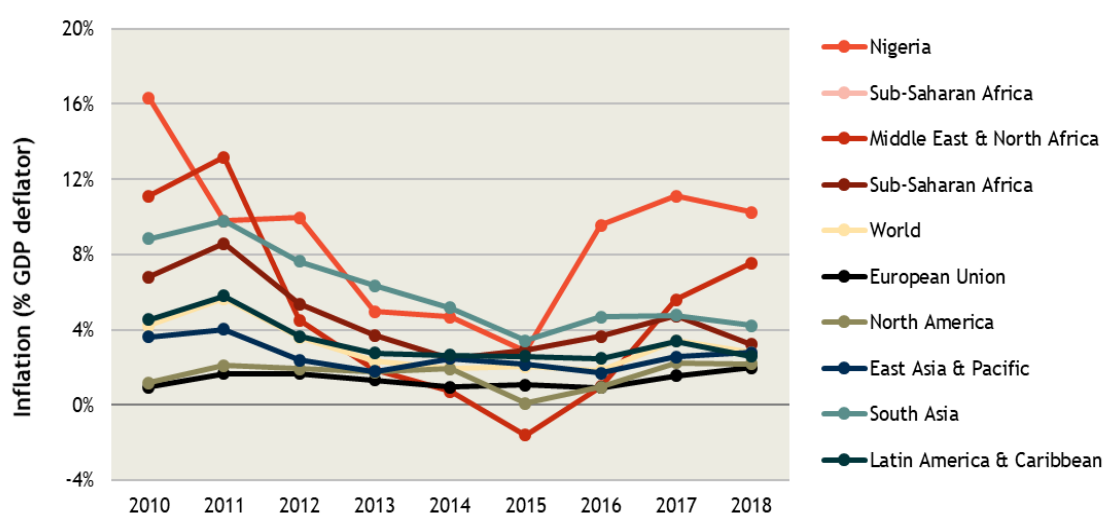
obstacle for doing business in Nigeria. Furthermore, 44.8% of the respondents identified corruption as a major constraint. In 2019, Nigeria ranked as the 146<sup>th</sup> least corrupt nation out of 180 countries, according to the 2019 Corruption Perceptions Index reported by Transparency International.<sup>20</sup>

## Financial stability

### Inflation

Nigeria has faced and is still facing strong inflation rates (Figure F-9). The inflation compared to GDP has been on average 8.8% during the period 2010-2018, compared to only 4.6% for Sub-Saharan Africa. Between 2010 and 2015 inflation declined strongly from over 16% to around 3%. However, since then the inflation rate has been growing again to stabilise around 10%.

**Figure F-9 Historical trends in inflation (GDP deflator %) in Nigeria compared to global, regional and continental averages.**



Source: World Bank - World Development Indicators - Inflation, GDP deflator (annual %).

### National creditworthiness

Where the inflation rate reflects the monetary stability in a country, the creditworthiness reflects the stability and sustainability of public finance. Of the twenty African countries that have recently received a credit rating from the rating agency Standard & Poor's (S&P), the majority of the countries received a B rating, while the lowest rating of CCC+ was given to two countries (Table F-1). On the high side of the spectrum, one country received an A- rating and three countries received a B+ rating. Nigeria's S&P rating was B, meaning that the country performs according to the African average. The rating agency also thinks that the rating will improve in the future and rated its outlook as 'stable'. The rating agency Fitch is more positive about Nigeria's creditworthiness and rated the country with a B+, but more negative about the outlook.

<sup>20</sup> Tradingeconomics.com. 2020. Nigeria Corruption Rank | 1996-2019 Data | 2020-2022 Forecast | Historical | Chart. [online] Available at: <<https://tradingeconomics.com/nigeria/corruption-rank>> [Accessed 24 June 2020].

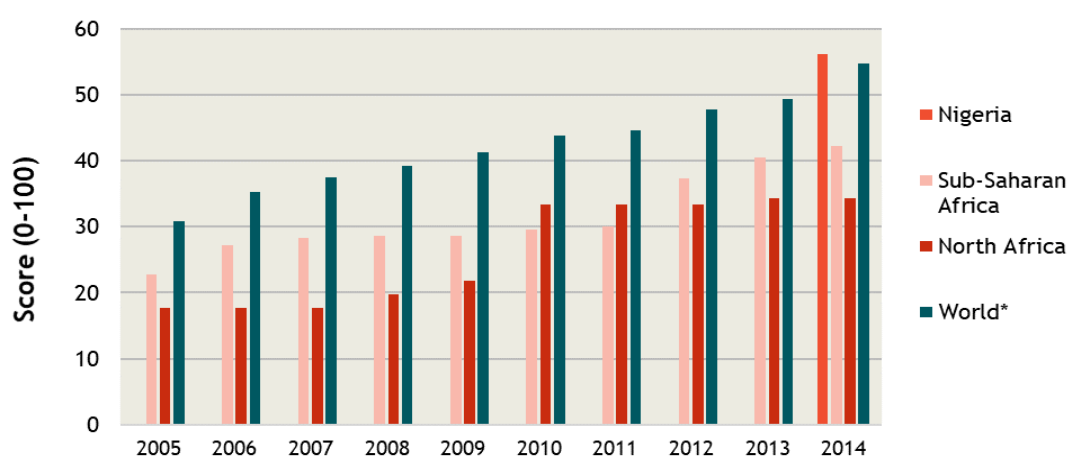
**Table F-1 Most recent credit ratings by Standard & Poor's for African countries and their outlook (N=20). Nigeria's rating is indicated in orange<sup>21</sup>**

S&P		Outlook		
A	1	Stable		12
B+	3	Developing		4
<b>B</b>	<b>10</b>	<b>Negative</b>		<b>4</b>
B	2			
BB	2			
CCC+	2			

### Ease of getting credit

Access to finance is an important factor for companies to do business. In the World Bank's indicator on the ease of getting credit, Nigeria's performance was assessed for the first time in 2014 (Figure F-10), when it achieved a score of 56 (0-100 scale), just above the world average of 55. It has to be noted, however, that in 2013 the lack of access to finance was mentioned by over 30% of the respondents as the largest obstacle to doing business in Nigeria, thereby making it the most important obstacle to doing business according to that survey. Commercial interest rates are currently stable around 15% p.a.<sup>22</sup>. However, they often exceed 20% p.a.

**Figure F-10 Nigerian score (0-100 scale) for the ease of getting credit compared to global and regional averages**



Source: World Bank - Ease of doing business - Getting credit (DB05-14 methodology) - Score.

<sup>21</sup> <https://countryeconomy.com/ratings/standardandpoors>

<sup>22</sup> Tradingeconomics.com. 2020. Nigeria Lending Rate | 1961-2020 Data | 2021-2022 Forecast | Historical | Chart | News. [online] Available at: <<https://tradingeconomics.com/nigeria/lending-rate>> [Accessed 24 June 2020].

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