

Circular Economy in Africa-EU Cooperation

Country Report Morocco



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Acronyms

ACEN	African Circular Economy Network
ADEREE	National Agency for the Development of Renewable Energy and energy Efficiency
ANAPEC	Agency for the Promotion of Employment and Skills
ANDA	National Agency for the development of aquaculture
BMZ	German Federal Ministry of Economic Cooperation and Development
C&D	Construction and demolition
CAM Foundation	Fondation Crédit Agricole du Maroc pour le Développement Durable
CDM	Clean Development Mechanism
CEDEAJ	Monitoring, Environmental and Legal Affairs Directorate
CGEM	Confédération Générale des Entreprises Marocaines
CMPP	Moroccan Centre for Clean Production
CNEDD	National Charter of Environment and Sustainable development
COVAD	the Coalition for the Recovery of Waste
CSEFRS	Higher Council for Education, Training, and Scientific Research
DCFTA	Deep and Comprehensive Free Trade Area
DFI	Direct Foreign Investment
DFI	Development Finance Institutions
DH	Moroccan Dirham
DMA	Household and similar waste
EC	European Commission
EEE	electrical and electronic equipment
EIB	European Investment Bank
FALIEU	National Fund for Liquid Sanitation and Wastewater Treatment
FIDE DPF	Financial Inclusion Digital Economy Development Policy Financing Project
FNE	National Environment Fund
FODEP	The industrial depollution fund
FP7	EU Framework Programme 7
FRAMES	Framework for Modelling Economies and Sustainability
FTA	Free Trade Area
GDP	Gross Domestic Product

GEFF	Green Economy Financing Facility for Morocco
GGGI	Global Green Growth Institute
GIZ	German Technical Cooperation
GMP	Green Morocco Plan
GNP	Gross National Product
GVC	Green Value Chain
IRESEN	Research Institute for Solar Energy and Renewable Energy
MASEN	Moroccan Agency for Solar Energy
MCPD	Sustainable Consumption and Production Modes
MedSpring	Mediterranean Science, Policy, Research & Innovation Gateway
MENA	Middle East & North Africa
MGBC	Moroccan Green Building Council
MICEVN	Moroccan Ministry of Industry, Trade, Green and Digital Economy
MICEM	Ministry of Industry, Commerce, Investment and the Digital Economy
MORSEFF	Morocco Sustainable Energy Financing Facility
PACC	cooperation programme for “competitiveness and green growth”
PFI	Participating Financial Institutions
PNAM	Rural Sanitation and Wastewater Reuse Program
PNVD	National Program for the Recovery of Waste
PRIMA	Partnership for Research and Innovation in the Mediterranean Area
SCP	Sustainable Consumption and Production
SNDD	National Strategy for Sustainable Development
SwitchMed	Switch Mediterranean
TEST	Transfer of Environmentally Sound Technologies
UAE	United Arab Emirates
UNIDO	United Nations Industrial Development Organization
YEM	Youth Employment Mediterranean

Executive summary

Morocco has committed at the highest level in putting in place policies and taking regulatory measures in favour of the environment and to fight climate change, which also take into account principles of the circular economy. However, the circular economy in Morocco as a concept is fairly new. It is predominantly focusing on the economy of waste (waste management and recovery) in accordance with the waste hierarchy. Both the public and private sectors are putting a considerable amount of effort and resources into the end-of-life stage.

Circular economy trends in Morocco

This report focusses on the following four sectors identified as most promising, politically important and economically relevant for the EU-Morocco cooperation:

- agriculture and food production;
- waste with a focus on household waste;
- water and wastewater;
- construction and demolition.

Agriculture and food production

The agriculture sector plays a significant role in the Moroccan economy and labour market. It remains the main user of natural resources but fails to ensure their sustainability. Water and soil resources are overexploited, degraded and threatened while the notion of sustainability remains poorly integrated. However, recognising these issues and the potential of increasing the production and use of organic fertiliser, which remain relatively low, as well as the increasing demand for bio-food from the European market and its stricter becoming regulation, the Government has dedicated several political initiatives to it. For instance, assigning more land to organic agriculture or financially supporting small-scale farmers to obtain an organic agriculture certification. It also demands a more holistic approach as agriculture is a cross-cutting sector. As such, all components of the agricultural system as well as the interactions between them, should be considered: this includes soil quality, final agricultural products, seeds and water, as well as valorising by-products which can create new value-chains and economic opportunities.

Waste with the focus on household waste

Urban household waste dominates the total waste generation in Morocco. Considering its very low recycling rate, the management of this waste stream still holds huge potential to apply circular models and align to the waste hierarchy, particularly for plastic, paper, glass and e-waste. For instance, by increasing the separate collection and recycling rates, the industrial sorting and valorisation of different wastes, secondary material markets will be strengthened while unlocking economic opportunities at the same time. The development of a structured and integrated waste management approach for both urban and rural areas, will also create new jobs. This further offers the opportunity to formalise the predominantly informal nature of waste management in Morocco. This requires a strong development in the industrial and service sectors. While Morocco's economy is growing, and the consumption and waste generation are increasing, the waste industry should be considered as an important enabling sector for the CE transition as it supports the decoupling of resource consumption from economic growth.

As the largest share (70%) of Morocco's household waste is made of organic waste, there is great potential to use synergies between the waste and agricultural sector. Appropriately collected organic household waste can serve as a significant contributor notably to the production of organic fertiliser. The two most important components here are, firstly, the inclusion and formalisation of the informal sector in waste collection and, secondly, giving households ownership and responsibility to properly separate the waste generated. But it should be noted that this waste stream is only one part of the whole waste system which has to be put in place.

Water and Wastewater

Being located in an arid area, prone to drought, and highly dependent on a water-intensive agricultural sector, Morocco faces several water management issues, including water scarcity and bad sanitation. The discharge of urban and industrial wastewater increases the threat of water

pollution and reduces the availability of water resources, also provoking health problems. In response to this, the Moroccan Government has developed various plans, including funding to tackle water management and distribution, water use efficiency as well as water treatment. Grey water systems have high potential for the CE and are considered in the afore-mentioned plans. However, efforts have not been followed up for a rapid transition, and big delays have resulted meaning that the sanitation and wastewater treatment especially in rural areas have fallen behind. It is, therefore, important to follow-up and strengthen the projects and action emerging from political plans with stakeholder involvement and investment incentives.

Construction and demolition

The construction industry is responsible for producing large amounts of building-related waste which are often disposed of in landfill sites. Inert waste makes up the majority of construction and demolition (C&D) waste. It is often mixed with other categories of waste which makes it more difficult to identify inert materials. Yet, there is no agreed approach to quantification. A possible solution to this problem is the development of two planning laws requiring the improvement of waste management, including C&D waste collection, selective sorting and ecological treatment. Reducing, reusing and recycling C&D materials are key. There is a clear need for re-use and for recycled materials to be included in material specifications, building codes and standards which can be developed from best practice examples and lessons that can be learnt from other African countries.

Policy frameworks supporting circular economy

Morocco is showing political will to advance towards sustainability and the circular economy. The **National Strategy for Sustainable Development 2030**, launched in 2019, sets targets for the timeframe of 2017-2030, identifies operational measures and ensures their monitoring and implementation. It covers CE-related plans on water, energy, forest, agriculture, cities, transport and waste. In 2011, Morocco adopted a **National Charter of Environment and Sustainable Development**, and in 2014 a **Framework Law of environment and Sustainable Development** in order to register all public policies as part of the national strategy.

For the agricultural sector, the **Green Morocco Plan** (GMP), launched in 2008, is specifically relevant. It aims to develop this sector to one which is open to foreign investment, locally diversified and sustainable. One of its pillars is the mobilisation of public and private investment as well as new investment incentives that aim to strengthen the weight of agricultural sectors with high productivity and added value.

For the waste sector, the most important initiative is the **National Program for the Recovery of Waste** (PNVD), launched in 2008. The strategy defines the objectives and strategic axes for the reduction and recovery of waste, including measures to reach national waste management targets such as a 100% collection rate by 2030 or a 20% recycling rate by 2020.

These important political initiatives act as steppingstones for the transition towards a circular economy. However, there is a strong need for developing a clear and dedicated strategy, which is structured by priority sectors and describes the roles of government, private sector and civil society.

Trade and investment in the circular economy in Morocco

Morocco has a strong role in international trade, especially with the EU as its most important trade partner. Its trade policy is aimed at making the economy more competitive while growing inclusively and creating additional jobs.

Morocco's trade balance shows a constant and balanced trend throughout the last few years. While trade costs are relatively high, the 'Ease of Doing Business' index reveals enabling custom and administrative conditions for Moroccan businesses. However, many businesses, especially small-scale ones, lack access to finance. This represents investment opportunities for the EU and the Moroccan government to financially support Moroccan industries and businesses for the purposes of strengthening the economic and labour force as well as transitioning towards a more local and circular economy. This should also include the stimulation of trade in environmental goods and services. The potential for circular economy activities exists across many sectors in Morocco. This represents a trade and investment opportunity for European businesses. For instance, the EU may help solving the waste problems in Morocco, e.g. through investments in recycling and remanufacturing facilities.

Existing awareness and capacities on circular economy in Morocco

Although still not the centre of interest, the national awareness for the circular economy concept is clearly on the rise in Morocco. Enterprises and industry initiatives are increasingly concerned with the economic potentials of new resource-saving and environmentally friendly business models. These efforts are now more frequently supported by national institutions. However, the financial success of large-scale CE business projects is often hampered by a lack of consumer awareness, which is usually linked to consumers' financial constraints.

For education, curricula are still scarce with little meaning of CE in the majority of environmental education programmes. Overall, the Moroccan education system fails to sufficiently qualify graduates for a career in branches of the modern economy and green jobs, all of which offer a good opportunity to facilitate Morocco's transition towards a CE. The same applies to technical subjects, e.g. Vocational Education and Training programmes broadly do not yet have a CE or environmental focus. Notable efforts in this regard include activities under SwitchMed, aiming to facilitate a green entrepreneurship ecosystem in Morocco which can provide a basis for future development.

Existing and future economic, environmental and social impacts and benefits

Over the last few years, there has been a growing number of project developments, programs and businesses engaged in CE activities in Morocco which are now recognised as opportunities by the government, private sector, public sector, civil society and local communities. However, evidence has yet to emerge of the impacts from these local initiatives. The monitoring and quantification of economic, social and environmental impacts are still limited. However, the information and data available confirm the following impacts.

The most important **economic impacts** are job creation, investments into the waste management and recovery sectors, higher crop yields, reduced transport costs, the integration of the informal recycling sector, and the emergence of several start-ups, projects and cooperations.

Most relevant **social impacts** are the provision of jobs for women and the youth, improved life quality through reduced pollution from untreated waste, increased access to sanitation, and awareness-raising on the preservation of the environment; benefits will also include secure working conditions (e.g. social security and medical insurance), staff training and capacity building around sustainable practices in agriculture, construction, and water and waste management.

The major **environmental impacts** include increased waste collection rates and controlled disposal which reduce the risk of water, air and soil pollution, and the reduction of waste generated as well as water, energy and CO₂ savings.

In this study, we have also undertaken 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, electrical and electronic equipment (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 by 2030.

- **Economic benefits:**
 - A 0.7% increase of GDP (+€1.3 bn) compared to business as usual;
 - An improvement of the trade balance, through a reduction in imports worth € 354 m;
 - 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:**
 - 25,700 additional jobs would be created compared to business as usual, which is equivalent to an increase of 0.2%;
 - 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, construction, post and ICT as well as financial intermediation and business

activities. The largest job loss occurs in the chemicals sector, due to product substitutions.

Mapping of CE-related cooperation activities between the EU and Morocco

While the legal basis for the partnership between Morocco and the EU is provided by the Association Agreement between the EU and Morocco, the current agenda of **EU-Morocco relations** is spelled out in a joint declaration, formulated during the most recent Association Council meeting on 27 June 2019. During the meeting, both parties declared their wish to continue the bilateral cooperation and give a new impetus to their strategic, multi-dimensional and privileged relationship. Within the declaration the EU and Morocco, agreed, among other things, on enhancing the exchange of good practices regarding social dialogues, strengthening value chains through better industrial integration, the promotion of entrepreneurship and innovation as well as the joint support for the green economy in Morocco. However, a dedicated focus on CE-dialogue is, however, still missing in the Council's activities.

Several initiatives provide structures for CE-related cooperation, like SwitchMed or the Morocco-EU cooperation programme for "competitiveness and green growth" (PACC). These serve as a base to further expand and build upon the momentum achieved in knowledge dissemination and funding of the CE transition as well as the pace and frequency of the exchange of CE-related and enabling policies between the EU and Morocco.

The ongoing discussions between the European Commission (EC) and Morocco for the creation of an EU-Morocco green strategic partnership is an important element that could provide a renewed momentum to put green topics at the core of the EU-Morocco relations. However, the mapping exercise done in this study shows that there are still significant gaps to this regard.

Many of the CE-related **EU development cooperation projects in Morocco** have in the past been channeled notably through the EU's Switch Mediterranean (SwitchMed) Programme, launched in 2013, funded and managed by the EU, with technical support of the United Nations. SwitchMed aims to promote Sustainable Consumption and Production policies, as well as financially and technically supports established and small companies on their Sustainable Consumption and Production journey of which CE sometimes is part of, and lastly enhances collaboration amongst green entrepreneurs. A more recent framework for CE-related development cooperation between Morocco and the EU is provided by the Morocco-European Union cooperation programme for "Competitiveness and Green Growth" (PACC). With a financial contribution of € 30 million, PACC is actively supporting sectoral reforms towards a green transition in Morocco.

Despite the landscape of development cooperation projects and initiatives in Morocco covering a diverse range of issues, CE promotion is seldom addressed as a specific objective. This applies to both EU-directed cooperation activities and programmes/projects funded by EU Member States. Nevertheless, the existing framework of development cooperation projects and programs does offer a range of opportunities for future CE-related activities. With additional financing, awareness rising and capacity building as well as stronger legal frameworks, this is expected to be exploited in the near future. Twinning approaches such as those led by France (leader) and Austria, through the PACC since 2019, are already starting to address this gap by, for instance, supporting the implementation of National Charter of Environment and Sustainable development (CNEDD).

Existing initiatives that benefit the development of the Moroccan industrial sector by promoting the efficient use of resources and CE such as PCP Maroc, GGGI (Global Green Growth Institute) may form a good basis for enhanced CE-related development cooperation between Morocco and the EU. In this regard, measures relating to the promotion of CE under the European Green Deal will constitute an axis for future cooperation with Morocco.

Development Finance Institution activities in Morocco currently show a strong focus on improving the Moroccan water infrastructure and distribution networks as well as promoting access to more sustainable energy sources. However, a clear focus on supporting Morocco's transition towards a circular economy is still generally lacking. Addressing this gap will require an intensified collaboration of EU DFIs and local financial service providers in Morocco, such as the Bank of Africa, as they can assist DFIs to expand their support to projects on a smaller scale and in sectors other than water initiatives while at the same time reducing the financial risks involved in such investments.

Having a strong **trade relationship**, Morocco and the EU established under their Association Agreement, entered into force in March 2000, a Free Trade Area (FTA) liberalising two-way trade in goods. The FTA was developed further through an agreement on trade in agricultural, agro-food and fisheries products and a protocol establishing a bilateral dispute settlement mechanism. Building on these agreements, negotiations for a Deep and Comprehensive Free Trade Area (DCFTA) between the EU and Morocco were launched in 2013. The ongoing negotiations may create new trade and investment opportunities while supporting the integration of the Moroccan economy into the EU single market and aligning the Moroccan legislation with that of the EU in trade-related areas.

Currently the Moroccan trade environment already shows many prerequisites, which can be considered necessary to develop strong trade relations of CE-related goods and services between the EU and Morocco. In order to strengthen and expand the trade and investment of CE-related goods and services, trainings on green trade or a stronger collaboration between research and industry related to potential environmental challenges could be incentivised.

With its market-based approach, Morocco has been able to attract many **EU companies** to engage in CE-related activities, especially from French speaking countries, like Sovameo or Elephant-Vert. However, currently most EU companies with operations in Morocco focus on recovering resources. An increased collaborative engagement with local companies and service providers could increase recovering rates and promote general awareness of CE in the country.

Following past **research and technical projects**, the EU and Morocco established in 2018 a formal cooperation framework for scientific and technologic research and have signed the international agreement on Morocco's participation in the "Partnership for Research and Innovation in the Mediterranean Area" (PRIMA). PRIMA covers the priority areas of water management, farming systems and agri-food value chains. In line with the recently adopted Circular Economy EU package and Action Plan, PRIMAs annual work plan 2020 is, among other things, prioritising the transition towards a circular economy in the Mediterranean Area. Accordingly, CE plays a central role in the 2020 Calls for project proposals for all three thematic priority areas. Future cooperation activities could draw on the expertise and experience of local research institution that have already been involved in CE-related projects in the past (e.g. MAScIR or Amades).

Snapshot of Recommendations

EU-Morocco Policy Dialogue and Cooperation

- Integrate the Circular Economy as specific focus in the EU-Morocco Dialogue, notably in the context of the development of a future green partnership between EU and Morocco
- Advocate for, advise and support the development of an integrated and participatory governance system on CE, where expectations of different stakeholders (government, private sector, research institutions, Civil Society) are taken into account and translated into a measurable action plan to allow transition to CE at a national level.
- Unite and expand all support means for CE businesses; this could comprise a CE one-stop-shop (circular hub) building on existing structures, like those from SwitchMED and where best practices from the EU could be used as examples;
- Create a platform for international CE private actors to allow networking, training, scouting and capacity building that promote activities with more potential and benefits than only waste management, such as industrial symbiosis or eco-conception; well-established partners, like the Chamber of Commerce, could be involved;
- Build on and scale-up existing successful CE-related cooperation programme (like SwitchMed or PACC) and consider further using the EU's twinning instrument for institutional cooperation between Public Administrations of Morocco and EU Member States.
- While strengthening the EU-Morocco partnership, transfer of know-how and support, the promotion of training, R&D and technology transfer should be facilitated as well as integrating the enhancement of the trade of environmental and CE-related goods and services in DCFTA negotiations;
- Promoting and encouraging partnerships between universities & private sector through an enabling ecosystem for open innovation;

Sector-specific recommendations — Agriculture and food production

- Increasing awareness and capacity building of farmers regarding sustainability, circularity and their benefits through training courses, national campaigns and local events;
- Sharing best practices and innovative start-ups in the agritech and biotech sectors with other African countries and Europe through online platforms, workshops and international conferences;
- Setting up financial incentives and easier access to funds to encourage the stakeholders along the value chain to integrate circular economy in their operations;
- Supporting local production and consumption of Moroccan organic farming by promoting the “Maroc Bio” label and structuring the distribution channels of organic products;
- Investing in R&D in the field of organic fertiliser and pesticides.

Sector-specific recommendations — Waste with a focus on household waste

- Integrating informal waste pickers in local waste separation and collection projects by e.g. setting up a simple registration system for them in dedicated cooperatives or recycling plants;
- Making households one of the main actors of the municipal waste management strategy by raising awareness and incentivising appropriate waste disposal;
- Integrating and supporting innovations start-ups tackling intelligent waste management, with the EU as supporter and driver.

Sector-specific recommendations — Water and wastewater

- Reinforcing the legal and institutional framework for water resource, e.g. by setting a clear and enforceable water code or setting up a conducive framework for investment into the water sector;
- Supporting the development of environmental-friendly water treatment technologies and solutions. This can include the support and encouragement of easy-to-implement solutions, like methane fermentation or phyto-purification;
- Reinforcing the framework for investments in water sector by e.g. regulating and structuring investment decisions with standardization of feasibility studies, investment opportunities challenged according to financial criteria;
- Strengthening the involvement of stakeholders and operationalising the convergence of public policies in programmes, sectorial master plans, donors and territorial development plans;
- Encouraging users to play an active role in the water resource management by setting up fiscal benefits and incentives for users to have a rational use of water.

Sector-specific recommendations — Construction and demolition

- Promote local, low-cost and natural building materials and techniques by creating a bridge with European associations, professional bodies, EU-funded projects which are promoting construction with mud and other natural materials or raising awareness of local authorities about the value-added and benefits of using local and environmentally friendly materials and techniques;
- Focus on amendment and levelling of legislation related to the management of C&D waste as well as the normalisation aspect of the products resulting from their valuation;
- EU advocacy support for local actors, especially start-ups and SMEs through involvement in policy dialogues;
- Encourage the use of recycled materials for buildings where possible by, for instance, developing a framework for networking, exchange, transfer of knowledge and technologies between local construction professionals and European and other African innovations and programs with regards to secondary building materials.

1 Introduction

1.1 This report

This report is one of eight ‘country reports’ to be produced as part of the study ‘Circular Economy in the Africa-EU Cooperation’¹. 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 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 Morocco. It explains the potential economic, environmental and social impact of the transition to the circular economy in Morocco 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 Morocco, 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 and connection to the European agenda*

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 Deal² agenda, and notably of its international dimension. Elements developed in the Circular Economy Action Plan³, but also in other EU strategies such as the Farm to Fork Strategy⁴ or in EU Waste prevention and management policies⁵ 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 chosen African countries. Connections between the African and European policy agendas are shown throughout the report and potential future links are included in the recommendations chapter.

1.1.2 *Methodology*

The report has been prepared by Trinomics B.V., adelphi and Cambridge Econometrics in close cooperation with **the African Circular Economy Network (ACEN) and its Morocco country experts, Mona**

¹ Country reports have been produced also for Nigeria, Ghana, Egypt, South Africa, Morocco, Rwanda and Kenya.

² European Commission (2020) [European Green Deal](#)

³ European Commission (2020) [EU Circular Economy Action Plan](#)

⁴ European Commission (2020) [Farm to Fork Strategy](#)

⁵ European Commission (2020) [EU Waste prevention and management policies](#)

Alami and Salma Bougarrani who have contributed local knowledge to the analysis across all sections of the report. In addition, the EU delegation in Morocco 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 international and national datasets have been analysed to be able to understand the status of the circular economy in Morocco (Chapter 2).

Interviews with 18 relevant circular economy stakeholders from the public as well as private sector have been carried out. This includes the Embassies of Spain and Finland, COVAD, the EU Delegation in Morocco, Amaz, Ecodome Maroc, GIZ-CESAR, Credit Agricole, CIMAR, Ecofertil and Green WATECH, have served to complement Chapter 2, 3 and 4. For further details on the interviews please refer to Annex A.

The modelling of impacts and benefits on Chapter 3 has been carried out using Framework for Modelling Economies and Sustainability (FRAMES)⁶. 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.

1.2 Reading guide

This report has been structured as follows:

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

⁶ FRAMES is a new Input-Output (IO) tool with E3 linkages, capturing both direct and indirect (supply chain) impacts from a shift towards a more circular economy. FRAMES is particularly suitable for those countries not represented in E3ME due to data limitations, while its key features are similar to E3ME.

2 Status of the circular economy in Morocco

Section 2.1 briefly summarises the place that the circular economy has in Morocco. Section 2.2 provides an overview of the economic trends that impact the current circular economy transition in Morocco in different life cycle stages. Specific sectors have been identified as priority sectors because of their important contribution to the national economy and potential role in circular economy, namely agriculture and food production, water and wastewater, construction and demolition as well as waste management, which are discussed in Section 2.3. Section 2.4 provides an overview on the current policy frameworks in Morocco. Section 2.5 shortly addresses Morocco's trade and investments situation, as these can influence CE developments. Finally, Section 2.6 details the awareness and capacities of CE in Morocco.

2.1 Morocco and the circular economy

The kingdom of Morocco is a lower-income country located in North Africa and spans over an area of 710,000 km².⁷ The country follows a constitutional, democratic, parliamentary and social Monarchy and operates under the new Constitution, reformed in 2011⁸. With a total population of 34 million, Morocco has the fifth-largest African economy with a growing trend.

Behind South Africa, the country is the EU's second most important trade partner from the African continent and the 20th most important global trade partner.⁹ For Morocco, the EU is the most relevant partner when it comes to trade – in 2018, around 65% of Morocco's exports were going to the European Union and similarly around 55% of the imports originate from the European Union.

Morocco's economic structure is dominated by the agricultural sector which employs nearly 38% of the workforce and contributes to 12.3% of GDP¹⁰. Besides, the industry and service sector are emerging and hold opportunities to reduce the dependency on the agricultural sector. Morocco's largest share of resource extraction is made of agricultural minerals, like phosphate, while almost half of the exported products are machinery and transport related.

Morocco is committed to meeting the challenges of the 21st century by making sustainable development a serious project and a new development model. This has resulted in successive reforms aimed at building solid foundations for economic development, improve social conditions and accelerate the pace of environmental achievements through both preventive and corrective measures.¹¹ In addition to this, in 2011, Morocco adopted a National Charter of Environment and Sustainable Development, and in 2014 a Framework Law of environment and Sustainable Development in order to register all public policies as part of the National Strategy for Sustainable Development (SNDD) 2030, launched in 2019. The SNDD aims at a long-term contribution of 4% of GDP and the creation of 25,000 jobs. The circular economy is a key element of the SNDD. For instance, under the waste management it is mentioned as means to increase waste (energy and material) recovery rates and mitigate the increase of hazardous waste produced, coming along with a growing GDP. This direction is also supported by the National Program for the Recovery of Waste (PNVD). However, there are more initiatives and opportunities in other sectors related to the circular economy which will be disclosed throughout the report.

⁷ World Bank Group (2018) [Kingdom of Morocco - Governing towards efficiency, equity, education and endurance](#)

⁸ Constituteproject.org (2012) [Morocco's Constitution of 2011](#)

⁹ European Commission (2020) [Client and Supplier Countries of the EU27 in Merchandise Trade -](#)

¹⁰ Societe Generale (2020) [Morocco: The Market](#)

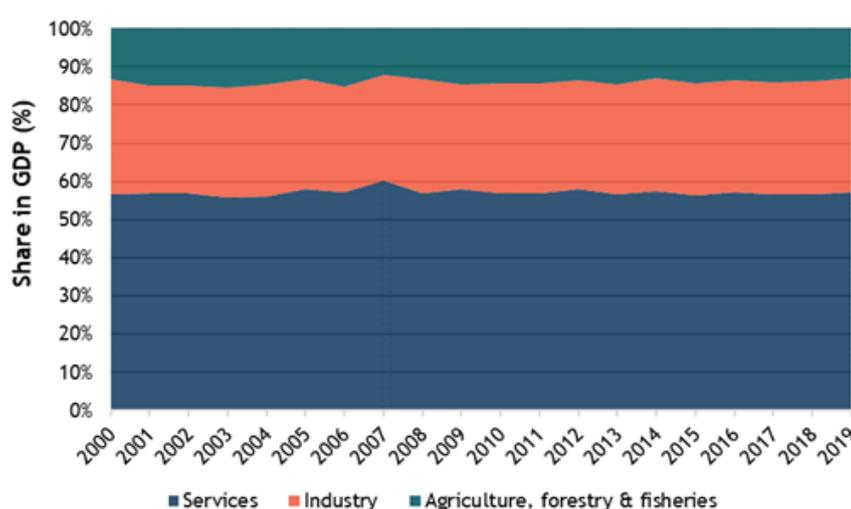
¹¹ Secrétariat d'état chargé du développement durable (2017) [Stratégie Nationale de Développement Durable 2030](#)

2.2 General trends in Morocco: economy, resource extraction, export and resource consumption

2.2.1 Economic structure

The structure of the Moroccan economy has been very stable over the last two decades (Figure 2-1), with services accounting for around 55% of the country's GDP, industry for around 30% and agriculture, forestry and fishing for the remaining 15%. Compared to other economies in Africa, an apparent difference is the relatively high importance of services in Morocco's economy. Compared to the other countries in the MENA region, the contribution of Morocco's industry to GDP is somewhat smaller than the regional average. When comparing it to the global average we see that the share of agriculture in Morocco's agriculture is relatively high, whereas the share of services is lower (Figure B-1, Annex B). This distribution implies a more diversified economic structure, relying less on industry, compared to other African countries.

Figure 2-1 Contribution of the primary sector, industry and services to the Moroccan economy



Source: World Bank - World Development Indicators

Covid-19 implications for the economy

The global Covid-19 crisis has put Morocco's economy into a severe recession. The GDP is expected to temporarily contract by 4%¹². This is primarily driven by a decrease in production of goods and services, disruption of global supply chains, decline in tourism as well as a reduction in exports. Resulting income and job losses have affected the formal and, in particular, the informal labor market. Despite the negative impacts the extent of consequences is considered as being manageable thanks to proactive governmental response initiating closing borders quickly, strengthening the health system or compensating households, including those working in the informal sector, impacted by the crisis. From the fourth quarter of 2020 onwards, a recovery is expected to occur in Morocco's economy, though with uncertainty about its length and pace. The situation demands to establish a stronger and more local economy, including the development of adaptation measures. This will lead to a recover from the economic shock as well as to more economic resilience which resonates with the overall high-prioritised green transition.

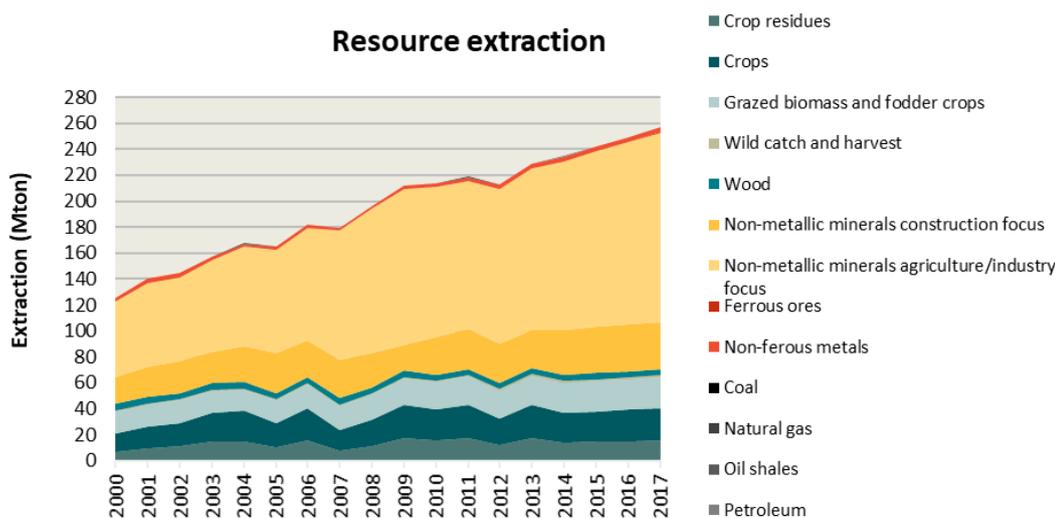
2.2.2 Resource extraction

When looking at the first stage of the value chain, the phase of resource extraction, we see that Morocco's resource extraction has been steadily increasing over the last two decades. The largest part of the resource extraction in Morocco relates to the extraction of non-metallic minerals (Figure 2-2), with agriculture-related

¹² Worldbank (2020) [Morocco Economic Monitor](#)

minerals (especially phosphate rock) accounting for the largest part of the production. In 2017, non-metallic minerals accounted for 71% of the country's resource extraction. Morocco is the world's largest producer of phosphate rock with the largest proven phosphate reserves. Phosphate rock is mainly used to produce mineral fertilisers. In 2018, Morocco's exported \$US 1.06 bn of crude fertilisers and fertiliser feedstocks. Biomass resources accounted for around 30% of Morocco's resource extraction in the period 2000-2017. In the same time period, the development of Morocco's GDP highly fluctuated between 1.0-4.0% (Figure C-7, Annex C).¹³ According to the IMF, the current situation and future outlook regarding the economic situation in Morocco look very positive, with a steady growth trend predicted from 3.7% in 2020 to 4.5% in 2024.

Figure 2-2 Resource extraction in Morocco by type for the period 2000-2017



Source: UN SDG Indicator 12.2 Domestic Resource Extraction

The contribution of extraction and trade in natural resources to the Moroccan economy is modest and close to the global average (Figure B-2, Annex B). Although resource rents were very low in the early 2000s, this started changing in 2008. Since then, resource rents accounted on average for around 3% of GDP. The majority of this GDP contribution comes from minerals (phosphate and phosphate-based fertiliser products) and from non-ferrous metals, like copper, lead and zinc (Figure B-3, Annex B)¹⁴. However, this is still lower than in some other countries in the MENA region, especially compared to countries in the Middle East.

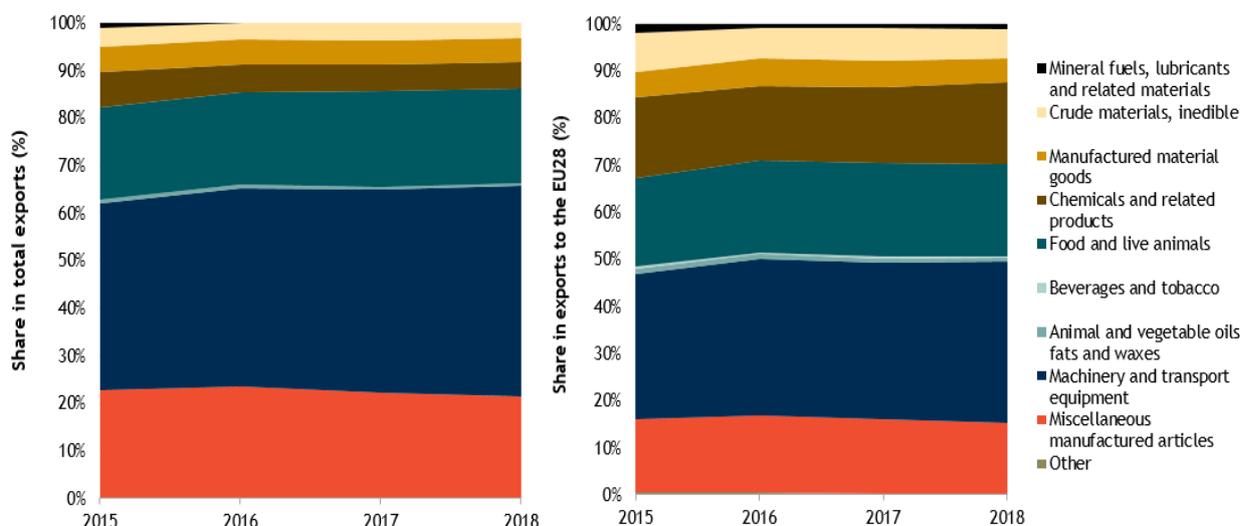
2.2.3 Export

Despite its large resource extraction in especially non-metallic minerals, Morocco's exports are dominated by manufactured articles as well as machinery and transport equipment. As it can be seen in Figure 2-3, raw materials, i.e. fossil resources (black) and minerals and ores (light beige), together with processed materials, i.e. processed metals (dark beige) and chemicals (brown) make a fifth in the total exports and a third in the exports to the EU. Compared to other African countries, the share of machinery and transport equipment as well as miscellaneous manufactured articles is exceptionally high. This shows the relatively limited importance of material resources and resource rents to the Moroccan economy. However, both manufactured and raw materials are relevant for Morocco's trade balance.

¹³ AfDB (n.d.) [Morocco's Growth Diagnostic](#)

¹⁴ UN Comtrade

Figure 2-3 the share of different products in total Moroccan exports in the period 2015-2018



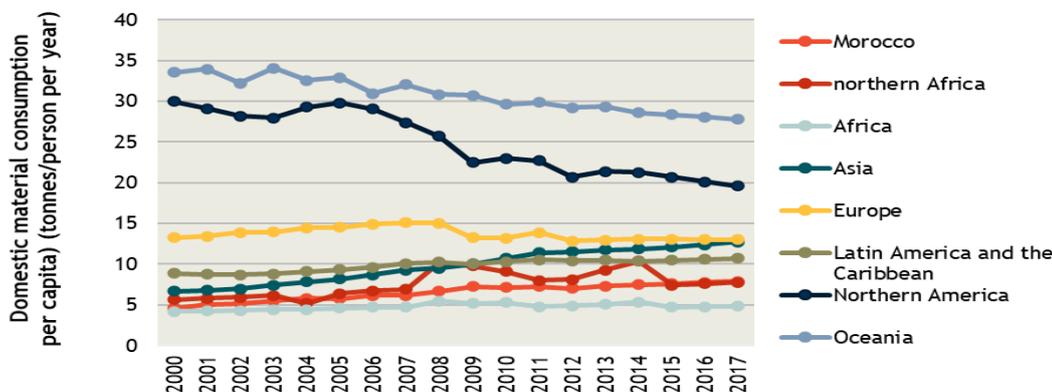
Source: UN Comtrade

2.2.4 Resource consumption

The overall consumption levels have been steadily growing in Morocco over the last two decades. During this period, per capita household expenditures increased with 64% (Figure B-3, Annex B), whereas the GDP per capita more than doubled. Still, per capita household expenditures in Morocco are only 57% of the average in the MENA region and only one third of the world average, but still around 40% of the world average, but this is without correction for purchasing power. On the other hand, the growth rate of per capita household expenditures grew faster in Morocco during the last two decades than the world average (Figure B-4, Annex B).

Along with the growth of the population and the economy, Morocco’s domestic material consumption¹⁵ has grown strongly as well. In the period 2000-2017, domestic material consumption has doubled and Morocco became the 6th largest material consumer in the African continent in absolute terms (Figure B-5, Annex B). Resource consumption per capita in Morocco is quite similar to the North African average, but 64% higher than the African average (Figure 2-4). Still, it is only about 61% of the average per capita resource consumption in Europe and 67% of the global average.

Figure 2-4 Material consumption per capita in Morocco compared to regional averages

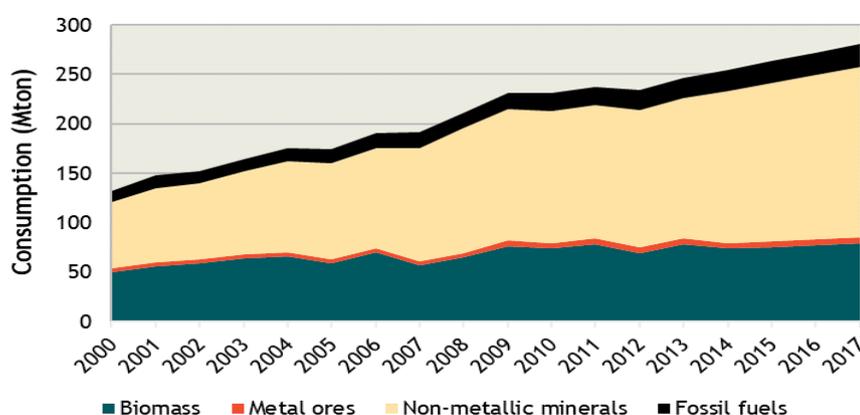


Source: SDG Indicators - Indicator 12.2.1 Domestic Material Consumption per capita

¹⁵ Domestic Material Consumption = Domestic Material Extraction + material imports - material exports

In 2017, the majority of Morocco's total resource consumption comprised of 61% for non-metallic minerals, which equals to 172 Mtons. The consumption of biomass decreased in relative terms from 38% to 28% between 2000 and 2017 (Figure 2-5), but increased in absolute terms from 50 Mtons to 78 Mtons. As the figure shows, all four material groups are consumed with an increasing trend.

Figure 2-5 Overview of domestic material consumption by type in Morocco for the period 2000-2017



Source: SDG Indicators - Indicator 12.2.1 Domestic Material Consumption by type

2.3 Circular economy-related trends in key sectors

The key sectors which have been identified to be focalised in this study are:

- Agriculture and food production;
- Water and wastewater;
- Household waste;
- Construction and demolition.

This selection, is based on the following rationale:

- Relatively high contribution of these sectors to the national GDP and percentage of labour force;
- The existence of policies and strategies that support the transition to circular economy in these sectors;
- Identification of opportunities in these sectors that contribute to the achievement of CE measures;
- Prioritisation of these sectors by the Moroccan Government for the recovery of value chain and the development of a sustainable waste management;
- Interlinking with the priorities of the EU's circular economy action plan.

2.3.1 Agriculture and food production

Since its independence, Morocco has placed the agricultural sector at the center of its development strategy given the important impacts it has on the economic, social and territorial level. This sector has stood out over the decades by its spillover effects on the entire national economy through its own performance and its interactions with other economic sectors. As the agricultural sector in Morocco generates 14% of the GDP and employs 4 million workers¹⁶, the country's growth rate strongly correlates with that of agricultural production and it remains the country's main source of jobs for more than 40% of the population¹⁷. To consolidate the

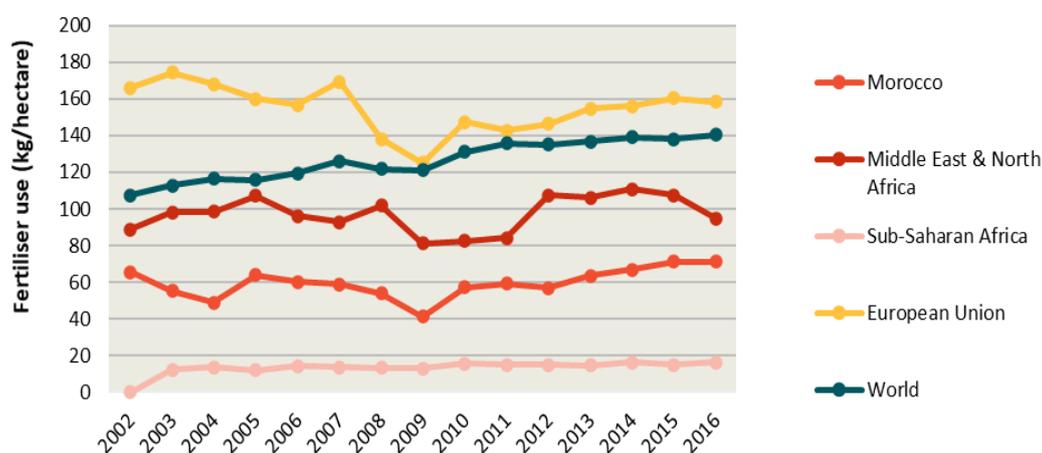
¹⁶ Heinrich Boll Stiftung (2019) [Secteur de l'eau Maroc: Pourquoi faut-il miser sur une gouvernance juste et durable?](#)

¹⁷ Agrimaroc.ma (2016) [Le secteur agricole au Maroc](#)

strategic vocation of this sector, a major turning point was made in 2008 with the launch of the Green Morocco Plan (PMV) driving a sustained mobilisation of investment, both public and private, strengthening the weight of agricultural sectors with high productivity and added value (arboriculture and livestock in particular). However, this sector remains the main user of natural resources and fails to ensure their sustainability. Water and soil resources are overexploited, degraded and threatened while the notion of sustainability remains poorly integrated in practice.

In terms of fertiliser usage, Morocco consumes 500,000 tons per year with one third being used for sugar crops and high-value added crops, that only occupy 5% of the cultivated area. However, half of the farmers do not use fertiliser, neither do most of them take use of production means, like soil analysis. This is mainly due to increased costs which are not offset by the level of prices for agricultural products¹⁸. Although the country uses more fertilisers per hectare than the average country in sub-Saharan Africa, Moroccan fertiliser use is still substantially lower than the north African average and equivalent to only half of the world average (Figure 2-6). This is a surprising observation as Morocco is one of the world's largest producers of phosphate fertilisers. It implies the opportunity to increase the use by falling back on eventually cheaper organic fertiliser instead of using phosphate. This way, the economic barrier of farmers to use fertiliser could be mitigated while nutrient loops are closed and the need for mineral fertilisers is reduced.

Figure 2-6 Fertilizer use intensity in Morocco compared to regional averages



Source:

World Bank - World Development Indicators. Potential for organic agriculture

The market for organic fertilisers and bio-pesticides is growing in size compared to a few years ago. It should reach 86.6 million DH (€ 7.9 million) in 2021, according to a study conducted by the analyst firm Micro Market Monitor. The growth of this market is the result of a set of factors such as the awareness of the authorities handling the functional properties of bio-pesticides, their ecological impact, as well as their use in integrated pest management and the increase in the production of organic crops.¹⁹ Therefore, largening the production and consumption of organic fertiliser, represents an immense opportunity. As yet only 0.01% of the total fertiliser consumption accounts for organic fertiliser²⁰. It can be a great tool towards a more circular economy as biological soil activity is a process in which the more is recycled, the less is polluted, especially with the production of compost. Despite the fact that Moroccan agricultural soil is very low in terms of organic matter,

¹⁸ Organisation des Nations Unies pour l'alimentation et l'agriculture (2006) [Utilisation des engrais par culture au Maroc](#)

¹⁹ L'Economiste (2019) [Bio-pesticides et bio-stimulants: Le marché accélère sa croissance](#)

²⁰ According to the International Fertiliser Association (IFASTAT), in 2019, Morocco's total fertiliser consumption was composed of 0,01% of organic fertiliser, 5% nitrogen, 12% phosphates, 4% potassium, 78% mixed/compound fertiliser.

composting the estimated 4 million tons of organic waste generated annually in the country (not counting organic agricultural waste and livestock waste) could be the easiest and least expensive option to recover the soils. This would reduce the usage of chemical fertilisers and contribute to a higher productivity and less water usage, thanks to its water retention capacity. This requires, however, investments and infrastructures to collect, transform and distribute the organic waste and compost. This approach could be complemented with the production of biogas from organic waste, in line with the Commission's Communication "The role of waste-to-energy in the circular economy"²¹. An additional factor to consider is the fact that Morocco is a major producer and exporter of phosphate fertiliser. It needs to be taken into consideration while exploring the opportunity of expanding the use of organic fertiliser, so that potential barriers or challenges between both can be mitigated or even prevented in early stages.

As a large producer and exporter of agricultural products, Morocco is also concerned by the global phenomenon of organic production and demand, especially during post covid-19, where organic food consumption has raised as the pandemic shifts consumer attention towards food safety and health. In addition to this, Morocco's strategic position between the African and European markets as well as its agro-ecological assets allowing it to convert thousands of hectares of wild aromatic and medicinal plants into certified organic products, demonstrates the existence of strong economic potential for organic agriculture while the government and the inter-professions (see Table B-2, Annex B) are showing their desire to develop this sector such as the implementation of a new public aid for organic certification representing 90% of the cost for farms between 0.5 and 5 ha²².

According to "Generation Green 2020-2030", the new agricultural strategy, that succeeds the Maroc Vert Plan, 100,000 additional hectares²³ will be devoted to organic crops, as part of the encouragement of high-yield sectors (the detailed presentation of this strategy, can be found in Table B-3, Annex B). In 2019, 9,850 ha were dedicated to organic farming, making only 0.11% of the total arable land of 8,700,000 ha²⁴. This is a relatively modest number compared to that of the other countries such as Tunisia which had in 2018, 380,000 ha dedicated to organic farming²⁵. Another effort which aims to strengthen the organic agriculture and product sector is a bill that regulates their certification realised by foreign private inspection and certification bodies. As yet, most of the agricultural organic inputs are sourced from Europe as there are only a few organic fertiliser (compost), seed and organic phytosanitary producers in Morocco.²⁶

Being a strategic sector with the ambition of doubling its GDP by 2030, agriculture emits large quantities of both organic and inorganic waste (plastics for more than 50%, metals for 35% and others, like tires, oils or batteries). Those wastes, mostly managed inappropriately, are polluting the soil, water, air and damaging the health of animals and human beings.

Transforming this waste into resources is the path followed by the Fondation Credit Agricole du Maroc pour le Developpement Durable (CAM Foundation). The foundation is testing the introduction of the agricultural sector into a circular economy, allowing an improvement in yields and the preservation of natural resources. The objective is to bring the biggest horticultural, market gardeners and citrus fruit producers in the Souss Massa Region, emitting more than half of agricultural waste from Morocco, to join the circular economy by

²¹ European Commission (2017) [The role of waste-to-energy in the circular economy](#)

²² Agrimaroc (2020) [Agriculture biologique: comment bénéficier de l'aide à la certification?](#)

²³ Medias24.com (2020) [Emplois, PIB agricole, export, couches moyennes: l'essentiel de Génération Green](#)

²⁴ Agrimaroc (2016) [Au maroc, la surface agricole utile s'élève à 8,7 millions d'ha](#)

²⁵ Flehetna (2018) [L'agriculture biologique en Tunisie : Un secteur en plein essor](#)

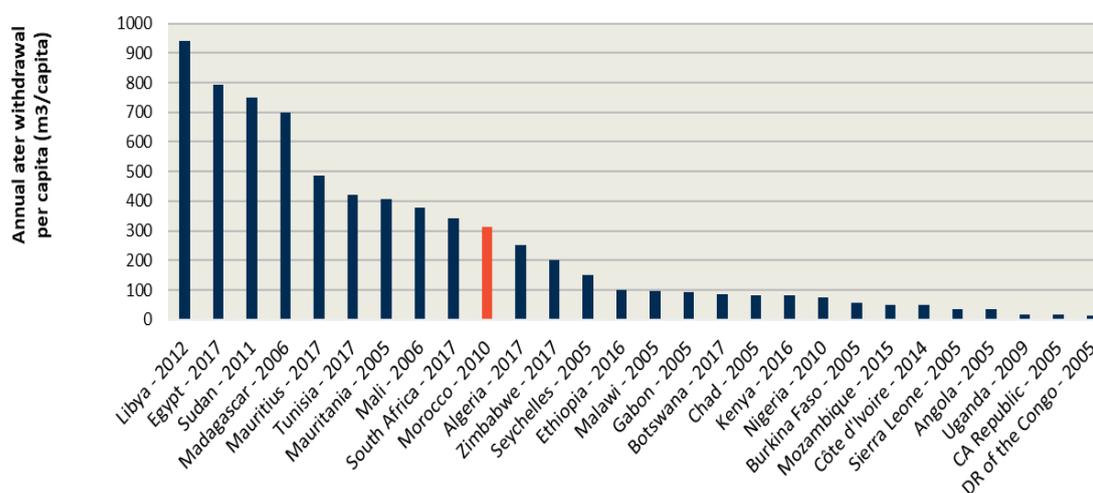
²⁶ Agriculture du Maghreb (2017) [La production biologique au Maroc](#)

introducing them to sustainable management of agricultural waste, particularly in irrigated areas. This project made it possible to establish an inventory of agricultural waste, to carry out an analysis of the current management of the different categories of waste, and to suggest possible options for disposal, recycling and recovery of this waste. (See Section 3 for results).

2.3.2 Water and wastewater

Water is a scarce resource in Africa and even more so in the northern countries of the continent. Still, Morocco's annual water consumption is relatively high, which occurs at the backdrop of very low water availability. Behind four other North African countries, Morocco ranks 10 (Figure 2-7).²⁷ Morocco's annual water withdrawal is equivalent to 60% of its available freshwater resources. More general information about Morocco's water resources can be found in Table B-4 in Annex B.

Figure 2-7 Water consumption per capita in Morocco compared to other countries. Year indicates the time of measurement



Source: FAO Aquastat - Total water withdrawal per capita (m³/inhab/year)

Besides the water scarcity, Morocco is confronted with dwindling groundwater reserves and a strong dependence on rain-fed agriculture²⁸. Water scarcity and changes in crop yields induced by climate change could reduce the GDP of Morocco up to \$ 6.7 billion (€ 5.7 billion) per year and eliminate many job opportunities, in particular in the rural areas²⁹. Current water needs increasingly exceed the available renewable resources, particularly as a result of demographic pressure, the degradation of water quality due to discharges and lack in sanitation service. The lack of a functioning sanitation network and wastewater treatment system also causes the already scarce water resources to become contaminated and unsuitable for multipurpose use, which also raises health concerns. The current global health crisis makes it more obvious that access to clean water and basic hygiene are key to confront pandemics like Covid-19.

The agricultural sector obviously relies heavily on the supply of sufficient water resources. Rainfall, hydroelectric dams, rivers and groundwater deliver daily water for the farmland. However, these water resources have known a drop in volume in recent decades due to difficult natural conditions, the lack of political management at the institutional level and the overconsumption of water by its users, including

²⁷ NB this top 10 is not based on all African countries but only on countries with data no older than 2005.

²⁸ L'économiste (2020) [Le programme prioritaire de l'eau sur les rails](#)

²⁹ Ministre de l'intérieure (2020) [PORTAIL NATIONAL DES COLLECTIVITES TERRITORIALES](#)

farmers³⁰. Indeed, this pressure led to water resources having severe impacts on the agricultural sector in many parts of Morocco and consequently on the entire economy.

The mentioned shortcomings call for extremely careful and interactive water resource governance to maintain the balance between supply and demand, while ensuring quality water for future generations³¹. A more participatory and concerted approach to resource management would be a path to be taken seriously. Morocco has launched several projects with high investment potential around the management of water demand, particularly in agricultural, with a budget of DH 115 billion (€ 10.6 billion) over the period 2020-2027, and Rural Sanitation and Wastewater Reuse Program (PNAM) with several objectives by 2030 with a budget of DH 50 billion (€4.6 billion). Additional efforts regarding climate change and water scarcity have been made by the public authorities to mitigate the effects of drought, improve the quality of the environment and meet the development needs of the populations. Many large-scale actions are continuing up to 2030³², which translate into national plans and strategies such as the National Water Plan (PNE) 2020-2050 with a budget of 384 billion DH (€ 35.4 billion) or the National Water Strategy (SNE) 2010-2030 with a budget of 82 billion DH (€ 7.5 billion) (See Table B-5, Annex B for full list). The objectives of those actions are essentially about a rational management of water demand and its development, the mobilisation and diversification of water supply sources, improving the quality of water resources and improving governance under the new Water Law (36-15)³³.

Wastewater production & treatment

The annual volumes of wastewater discharges have increased sharply over the last three decades. They increased between 1960 and 2005 from 48 million to 600 million m³ respectively and are forecasted to reach 900 million m³ by 2030.³⁴

A National Liquid Sanitation Program (PNA) was initiated by the public authorities in 2005 with the aim of mitigating the delay recorded in this sector. The main objectives of this program are to achieve an overall level of connection to the network of 80% by 2020 and 95% by 2030, reduce domestic pollution by 80% in 2020 and 90% in 2030 and treat and reuse 100% of collected wastewater by 2030. Since its implementation, several projects have been completed or are nearing completion. Successes achieved are an increased connection rate from 70% in 2005 to 76%, a wastewater treatment rate of 52.6% (compared to 8% in 2005) and the current construction of 79 wastewater treatment plants.

In addition to this, the Department of the Environment, in collaboration with the Minister of the Interior, the Minister of the Economy, Finance and Administrative Reform and the Department of Water, has developed the National Liquid Sanitation and Wastewater Treatment Programs in urban and rural areas and the reuse program for treated wastewater. This shared program was approved in 2018 and launched in 2019. It aims to improve the connection rate to the liquid wastewater network and the depollution rate. The expected results of this program are:

- Realisation of 154 sanitation projects as part of the continuity of the PNA to achieve a connection rate of 90% and a depollution rate of 80% including outlets by 2040;

³⁰ Le Matin (2019) [Assurer gestion durable l'eau Maroc construit décennies mode gouvernance sameliore senrichit progressivemen](#)

³¹ Medias24.com (2020) [Programme d'eau potable et d'irrigation 2020-2027](#)

³² Transcription of EHTP webinar: THE WATER SECTOR: What are the stakes for Morocco's economic, social & environmental development; Mohammed Fikrat, representative of the CSNMD: Special Commission on the New Development Model.

³³ Ibid

³⁴ Afrik21.africa (2020) [Morocco: Wastewater from new Safi sewage treatment plant to be reused](#)

- Completion of 1,207 sanitation projects in towns to achieve a connection rate of 50% by 2030 and 80% in 2040 and a depollution rate of 40% by 2030 and 60% in 2040;
- Reuse of 474 million m³ of wastewater treated annually by 2030 and 573 million m³ by 2040.

Wastewater Reuse – the potential for Grey Water systems

Using untreated wastewater to irrigate agricultural fields is very common in Morocco. This practice represents a problem as it is dangerous for both crops and consumers. Being untreated, the waters can contain all types of chemicals, pests and diseases that can be transmitted to humans or damage crops.

Despite the few arrests, the problem is far from being solved. The use of untreated wastewater on farms is a scourge that is difficult to stop. Indeed, some farmers would even go so far as to pump wastewater directly into the canals dedicated to irrigation.

Only 12% of treated wastewater is currently reused in Morocco. There is great potential to enlarge this share by implementing circular economy principles through Grey Water projects into the water and wastewater sector.³⁵ The treated wastewater reuse is one of the alternatives that could be reliable and highly beneficial for irrigation and at the same time for agriculture. In fact, the treated wastewater can be an alternative to the use of clean water for agriculture, leaving fresh water for other purposes including drinking water supply³⁶. Indeed, environmental and socio-economic advantages of this reuse can only be achieved if water goes through a wastewater treatment plant (WWTP) that will eliminate the components liable to harm the environment and public health³⁷.

The Water Sector Development Strategy has set as objectives to reach 22% in 2020 if wastewater discharged into the sea is collected and reach about 100% by 2030. In addition, Morocco has set the ambitious objective of reusing 325 million m³ by 2030, with 59 million in the Sebou basin, of which 34 million m³ will go for irrigation, 15 million m³ will be used for watering green spaces and golf courses, and 10 million m³ for recharging the water table.³⁸

It should be noted that despite the interest shown by the Department of Agriculture in the reuse of treated water for agricultural purposes, efforts have not been followed up for a rapid transition from experimentation to barn-scale application. This gap can be attributed to several factors, including the difficulty in setting up an institutional and legal arsenal accepted by all stakeholders as well as rules for sharing wastewater treatment costs between municipalities (producers) and users (farmers).

In this context, the new Water Law 36-15 has strengthened the legal framework for wastewater recovery. The managers or owners of approved wastewater treatment plants and autonomous sanitation facilities that reuse wastewater can benefit from financial assistance from the Water Basin Agency under the conditions set by regulation. Examples of water reuse projects in Morocco can be found in Table B-6, Annex B).

³⁵ AgriMaroc (2020) [115 MILLIARDS DE DIRHAMS POUR L'EAU ET L'IRRIGATION](#)

³⁶ World Health Organization, (2006) [Guidelines for the Safe use of Wastewater, Excreta and Greywater](#)

³⁷ El Moussaoui et al. (2017) [Reuse study of sustainable wastewater in agroforestry domain of Marrakesh city](#)

³⁸ Transcription of EHTP webinar: THE WATER SECTOR: What are the stakes for Morocco's economic, social & environmental development? Expert ONEE.

2.3.3 Waste management, with the focus on household waste

According to the National Waste Recycling and Recovery Strategy (SNRVD)³⁹, Morocco generated a total of 26.8 Mtons of waste in 2015 while numbers for the waste generation in 2030 are estimated to increase by 45%, reaching 39 Mtons. The distribution between sectors of production in the reference year 2015, was as follows:

- Household and similar waste (DMA) in urban areas: 5.9 Mtons;
- Household and similar waste (DMA) in rural areas: 1.5 Mtons;
- Industrial waste (ID) is 5.4 Mtons;
- Demolition and Construction waste: 14 Mtons.

Household Waste

The average annual production of household waste in 2019 was around 7 Mtons with 78% – about 5.9 Mtons from urban origin: the equivalent of 0,76 kilo per individual per day. In rural areas, about 1.6 Mtons of waste is produced per year, the equivalent of almost 0,3 kg per individual per day. Household waste is predominantly composed of organic matter (almost 70% of the total weight) with high moisture content (67%) and low calorific value (between 850 and 950 kcal/kg). Compared to all waste collected on a national scale, the recycling rate did not exceed 10% in 2015. Even though an ambitious national program was put in place as soon as in 2008 to improve collection and recycling rate of household waste.⁴⁰

Comparing the generation and recycling rates of the urban household and industrial waste, it stands out that both sectors generate approximately the same amount of waste (5.9 Mtons generated by urban households and 5.4 Mtons by industry in 2015). However, the recycling rate for the household sector is smaller than of the industrial (6% for the urban households and 12% for industry). Especially in the material streams of plastic and paper, there is still a lot of potential to increase the recycling rates. Reasons for this relatively low recycling rate could be the lack of proper waste management in cities (see Annex B for absolute and more detailed data).

To overcome the challenges and obstacles related to the management of household and similar waste and professionalise this sector, several measures and initiatives have been adopted:

- Adoption of the Law 28-00 related to waste management and their elimination in 2006. The purpose of this legislative text was the elimination of the negative impact of waste, health preservation, respect for life in all its forms, the integrity of all living environments (water, air, soil, etc.) and all ecosystems and natural and environmental sites. According to this law, these impacts are prelisted and classified and the related commitments to waste management are also defined⁴¹.
- Execution of a National Program of Household and similar waste (PNDM)⁴² in 2008 with an estimated budget of DH 40 billion (€ 3.7 billion), distributed as follows:
 - Waste collection and cleanliness: 72%
 - Execution and management of controlled: 14.6%
 - Rehabilitation and closure of uncontrolled landfills: 6.2%
 - Studies, monitoring and control: 3.5%
 - Development of sorting operations, recycling and recovery of waste: 1.8%
 - Awareness and training: 1.8%

³⁹ Secrétariat d'Etat auprès du Ministre de l'Énergie, des Mines et du Développement Durable, chargé du Développement Durable & GIZ (2019) [STRATEGIE NATIONALE DE REDUCTION ET DE VALORISATION DES DECHETS](#)

⁴⁰ Association Des Enseignants Des Sciences De La Vie Et De La Terre (2019) [Gestion Des Déchets Ménagers Au Maroc](#)

⁴¹ Agence Urbaine de Tanger (2006) [Loi n° 28-00 relative à la gestion des déchets et à leur élimination](#)

⁴² Secrétariat d'Etat chargé du Développement Durable et le Ministère de l'Intérieur (n.d.) [Programme National des Déchets Ménagers](#)

The PNDM essentially aims to:

- Ensure the collection and cleaning of household waste to reach a collection rate of 85% in 2016 and 90% in 2020;
- Create landfill and recovery centres for the benefit of all urban centres (100%) in 2020;
- Rehabilitate or close all existing landfills in 2020;
- Modernise the waste sector by professionalising the sector;
- Develop the “sorting-recycling-recovery” sector, with pilot sorting actions, to reach a rate of 20% of recycling in 2020;
- Generalise the master plans for the management of household and similar waste for all the prefectures and provinces of the Kingdom;
- Train and raise awareness of all stakeholders on the issue of waste;
- The promulgation of Law 77-15 stipulating the ban on manufacturing, trade and sale of plastic bags.

The national strategy for the reduction and recovery of waste (2019)

In addition to the PNDM underway, Morocco launched the national strategy in the field of waste reduction and recovery, developed with the support of the German Technical Cooperation (GIZ). The strategy defines the objectives and strategic axes for the reduction and recovery of waste. It constitutes a national reference and a decision-making tool for sustainable waste management and the promotion of the circular economy at territorial level. The implementation of this strategy should also help reduce the cost of environmental degradation linked to waste management which has been estimated at DH 3.7 billion (€ 0.3 billion), or 0.4% of GDP. By 2030, Morocco plans a total deposit of waste of 39 million tons. This represents a significant increase of 45% compared to 2015 when the deposit of waste totalled 26.8 million tons.⁴³

2.3.4 Construction and demolition

In Morocco, construction and demolition (C&D) waste management is one of the 9 priority sectors with great potential for increasing its sustainability⁴⁴. Especially in the construction sector where different material flows come together, it is essential that all stakeholders along the value chain take responsibility for the integration of necessary changes towards a more sustainable system⁴⁵.

According to the department of Environment during a round table co-organised by Lafarge Holcim Maroc and the MGBC (Moroccan Green Building Council) on the theme of sustainable construction in December 2018, the amount of waste generated from construction and demolition activities was around 41.9 million tons per year, with a rising trend. Most of the time, construction and demolition waste end up in landfills mixed with domestic waste or used to fill an old extraction field of natural aggregates. The department identifies three types of waste: inert, non-hazardous and hazardous. Inert waste represents 97.3% of the volume produced, non-hazardous waste 2.4% and hazardous waste 0.8%.

Certainly, from one building site to another, C&D waste can be totally different in terms of composition and quantity. Inert waste is often mixed with each other or with other categories of waste which makes it more difficult to identify the different inert materials. A proper waste management and sorting have to start on the construction site and demands a reorganisation of the site as well as staff training. At present, in Morocco,

⁴³ Médias24.com (2019) [Au Maroc, 39 millions de tons de déchets à valoriser d'ici 2030](#)

⁴⁴ The other sectors are plastic, paper & cardboard, ferrous metal & aluminium, glass, used tires, used lubricating oil, used batteries and waste from electrical & electronic equipment.

⁴⁵ L'Economiste (2018) [Déchets de construction: Les maillons de l'économie circulaire](#)

sorting is rarely carried out on site either due to construction codes which do not allow the recovery (for traceability and safety issues) or the absence of a recovery process. Table B-8 in Annex B presents different actions to be implemented before and during a construction site in order to set up a waste management system for a construction/renovation project.

Legal and Institutional Framework

At the legal level, two draft laws are being prepared. They are at two different levels of validation. One is the decree on the management of non-hazardous waste, which is in its final stage of validation. This will define the necessary requirements for all types of non-hazardous waste, including C&D waste, addressing collection, selective sorting and ecological treatment. It will also govern the terms and conditions for the authorisation of facilities for waste recovery⁴⁶. The second decree, which is under development, will deal with the introduction of a minimum threshold for sorting in-situ.

The strategic orientations of Framework Law 99-12, the National Charter for the Environment and Sustainable Development, which regulates the management of construction waste, have incorporated important management principles. This law calls for updating the legislative mechanism relating to waste management, including C&D waste, through the introduction of a system of sorting at source, the promotion of recovery techniques and the introduction of the principle of the extended responsibility of waste producers.

Law 28-00, for its part, went into detail by requiring environmental and rational management of (C&D) waste. According to Law 28-00, C&D waste is classified as any waste that does not produce physical or chemical reaction and does not consist of, or is contaminated with, dangerous substances or other pollution-generating elements. In case of the lack of appropriate techniques for treatment and disposal of inert waste, it can be used for filling quarries. It can also be used to enhance, treat or dispose of other waste categories, with the exception of hazardous waste.⁴⁷

Strategies and Planning

C&D waste is generally excluded from the household waste management services agreement between a municipality and delegated solid waste service providers. According to the contract agreement template between communes and landfill operators, inert waste (demolition materials, excavation, etc.) received by the landfill must be placed separately in a place other than the bins to be landfilled. The operator will later, in most cases, use this type of debris for the development of tertiary access roads if they are of an appropriate nature.⁴⁸

Financing and Private Sector Involvement

Rabat is the only municipality in the PNDM (National Programme for the Management of Household and Assimilated Wastes) report that has established a separate construction, demolition and green waste contract with a waste management company, which delegates the collection and disposal of construction and demolition waste, along with green waste. According to the statistics, approximately 90% of the construction, demolition and organic waste are collected, which equals to 119,500 Mtons.⁴⁹ The financing is entirely provided by the municipality. The 7-year service contract between the municipality of Rabat and the company

⁴⁶ Sweepnet (2014) [Report on Solid Waste Management in Morocco](#)

⁴⁷ Secrétariat d'Etat auprès du Ministère de l'Énergie, des Mines et du Développement Durable, chargé du Développement Durable (2019) [Stratégie Nationale de Réduction et de Valorisation des déchets](#)

⁴⁸ Climate Chance (2020) [DÉCHETS La société marocaine en ordre dispersé contre la prolifération des déchets](#)

⁴⁹ Sweepnet (2014) [Rapport sur la gestion des déchets solides au MAROC](#)

Sita El Beda amounts to 142.8 million DH (€13.2 million), which is equal to 20 million DH (€ 1.8 million) per year, at a cost of 171 DH (€ 16) per ton.

Collection, Treatment, and Disposal

In order to set up a proper C&D waste management system, it is necessary to quantify the waste produced by the construction sector. However, in Morocco, there is no exact quantification of C&D waste generated by type of construction site. Indeed, the C&D waste is not weighed by category at the exit of the building site, instead the quantification is estimated based on the number of waste disposal trips. Other than through this approach it is not recorded anywhere. The National Strategy for Waste Valorisation gives an overview of the overall proportion: in 2015, from the total waste deposit in Morocco (excluding agricultural waste), estimated at 26.8 Mton in 2015, C&D waste represents 14 Mtons, which equals a relevant share of 52%.⁵⁰

Case studies, Best practices

Best practices in Morocco are based on the reduce-reuse-recycle-renew approach, which is a key element of green architecture or green buildings. Considerable construction and demolition materials can be reused or recycled, which reduces waste and pollution, conserves natural resources, reduces greenhouse gases due to manufacturing and transportation-related emissions, and provides cost savings. Another example is the construction with modularity. This could be applied in low-cost housing projects, using prefabricated and modular container homes. A last good practice to mention is the deconstruction of the whole or parts of a structure, rather than demolishing a building, with reuse as primary aim. Deconstruction enables the building components to be carefully dismantled for reuse or recycling instead of being demolished and landfilled. This approach is often more cost effective than disposal.⁵¹

Table 2-1 Local and environmental-friendly construction using soil in Ecodome Maroc

Ecodome Maroc
<i>Ecodome Maroc</i> is one of the best example of local and environmental-friendly construction using soil, natural materials and non-hazardous C&D materials that can be reused or recycled such as Acoustical ceiling tiles; Asphalt; Asphalt shingles; Bricks; Cardboard; Carpet and pad; Concrete; Dirt; Drywall; Fluorescent lights and ballasts; Insulation; Land clearing debris; Metals; Office waste (paper, cans, glass, plastic bottles and cardboard); Paint; Plastic film from packaging; Porcelain; Window glass; Wood.

Upcoming initiatives

Within the framework of the National Hazardous Waste Plan, the installation (STASO) of a solidification/stabilisation (S/S) plant is planned. By means of soil remediation, in which contaminants are rendered immobile through reactions with additives or processes⁵², this facility will allow the treatment of 6,473 tons per year, equivalent to 21.6 tons per year of different types of hazardous industrial solid waste, including contaminated construction and demolition waste.⁵³

2.3.5 Opportunities in other sectors: Transport

When comparing to the rest of the world, the level of car ownership in Morocco is still very low with around one out of ten people owning a car. In Africa, however, Morocco ranks 6th when comparing countries for

⁵⁰ Ministère De L'Énergie, Des Mines, De L'Eau & De L'Environnement (2019) [Programme National des Déchets Ménagers](#)

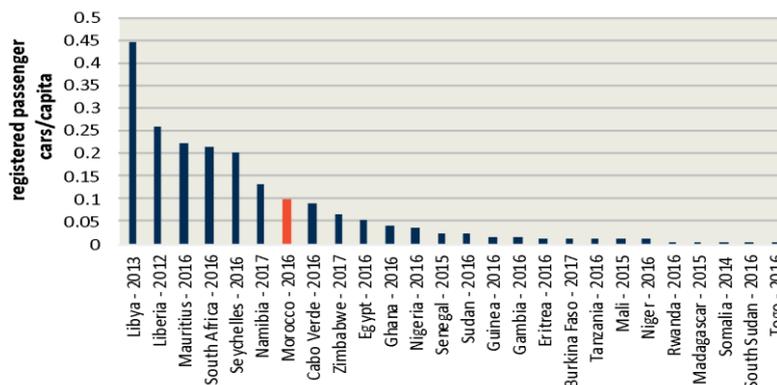
⁵¹ Sweepnet (2014) [Rapport sur la gestion des déchets solides au MAROC](#)

⁵² Dasary et al. (2005) [Stabilisation and solidification technologies for the remediation of contaminated soils and sediments: An overview](#)

⁵³ GIZ- ministère de l'intérieur (2017) [essais de caractérisation des déchets ménagers et assimilés réalisés au Maroc](#)

highest car ownership (Figure 2-8). This is mirrored in Morocco's trade figures – cars and vehicles compose the third strongest import product category. In 2018, Morocco spent \$ 5.15 billion (€ 4.3 billion) on car and vehicle imports. Since 2010, it follows a strongly increasing trend⁵⁴.

Figure 2-8 Car ownership per capita in Africa, highlighting Morocco



Source: WHO - Global Health Observatory (GHO) data - Number of registered vehicles

After four consecutive years of growth, the Moroccan new vehicle market came to a serious halt in 2019. According to statistics released by the Association of Vehicle Importers in Morocco (Aivam), sales of new vehicles in the country reached 165,918 units during the past year and went down by 6.15% compared to 2018.

Ridesharing, popularised through Facebook groups, sites or application, is taking a serious turn and is becoming widely adopted. Main users are active people who no longer want to be subjected to the “diktat” of official transporters. Many Moroccans, whether students or professionals, favor ridesharing over other modes of public transport. They group together as a community on social networks and get in touch with the aim of selecting a non-professional driver and passengers who wish to make the same journey and dividing the costs.

Pip Pip Yalah is the largest ridesharing app in Morocco with over 300,000 users. Founded in 2013, the company started as a Facebook group that connected drivers and passengers with more than 300 routes per day with a filling rate of 400 to 500 passengers a day. According to Hicham Zouaoui, CEO and Founder, the ridesharing community in Morocco is less than one million members. However, the journey is only starting and more effort should be done to legalise ridesharing in Morocco.

The new start-up Carmine is the first company to launch car sharing in Morocco. “Carmine’s mission is to meet a need of Casablanca’s inhabitants or visitors, who do not have the financial capacity to afford a first or second type of new vehicle”, explains Mohammed Mrani Alaoui, Carmine’s Founder. For the moment the company has a fleet of 15 vehicles that is intended to gradually expand to reach 150 cars in 3 years.

2.4 Policy framework supporting circular economy activities

2.4.1 Overview of the policy framework in the context of circular economy

In order to build a green economy, Morocco has shown its commitment at the highest level of the state in favor of a green growth, both in terms of reflection and action. Its commitment is recognised on the international level as Morocco leads rankings in climate change and renewable energy, i.e. the 2017 Climate Change Performance Index where ranked Morocco among the top ten most climatically conscious countries,

⁵⁴ Trading Economics (2018) [Morocco Imports of Vehicles other than railway and tramway](#)

and number one in the developing world while it also leads the Arab region (75 points), followed by the UAE (73 points), Tunisia (70 points), and Algeria (64 points) in terms of development of renewable energies, according to the AFEX-2019 Index (Arab Future Energy Index).

Article 31 of the Constitution stipulates that the state, public establishments and local authorities must work towards mobilising all available means to facilitate equal access for citizens to the enabling conditions and rights to enjoy a healthy environment.

The National Sustainable Development Strategy sets targets for 2017-2030 and identifies operational measures to which the stakeholders are committed. The SNDD will ensure their monitoring and implementation. To give substance to this vision, 7 major challenges have been identified. Each issue is then broken down into strategic axes which are in fact major fields of action, with objectives to be achieved and measures and actions to deploy. The challenge is now to implement this strategy and, in particular, to identify projects in line with the objectives set. The objectives and measures, which are at a higher level of detail, are nevertheless available in the annex of the SNDD. CE-relevant plans are water, energy, forest, agriculture, cities, transport and waste. Their implementation is supported by an investment of € 25 billion and coupled to climate change objectives, i.e. CO₂ reduction by 2030 (Table B-10, Annex B).

The National Charter for the Environment and Sustainable Development (CNDD), adopted in December 2012 by the government council, had already anchored the country in the spirit of preserving its environment and sustainable development, which has become a major concern for all Moroccans.

The legal aspect has known real progress since the 1990s. Thanks to a strong political will, several advances have been made in this area, notably on the regulatory level, with the promulgation of the texts of adopted laws which cover almost all aspects relating to environmental law. These are⁵⁵:

- Framework Law No. 99-12 on the National Charter for the Environment and Sustainable Development;
- Law 36-15 relating to water;
- Law 12-03 on impact studies;
- Law 13-03 on combating air pollution;
- Law 28-00 on waste management and disposal;
- Law n° 15-58 relating to renewable energies amending law 13-09.

In addition, major reforms and large-scale structural plans and programs have been carried out in recent years on institutional, regulatory and strategic aspects⁵⁶:

- The National Water Strategy⁵⁷ (2009);
- The National Action Plan to Combat Global Warming⁵⁸ (2009);
- The Green Morocco Plan for Agriculture⁵⁹ (2008) and now the Green Generation Plan⁶⁰ (2020);

⁵⁵ Levert.ma (2019) [L'économie verte au Maroc : « enjeux et opportunités »](#)

⁵⁶ Nations Unies, Commission Economique pour l'Afrique, Bureau pour l'Afrique du Nord (n.a.) [L'economie verte au Maroc](#)

⁵⁷ Ministère De L'Energie, Des Mines, De L'Eau & De L'Environnement (2019) [PROGRAMME NATIONAL D'ASSAINISSEMENT LIQUIDE \(PNA\)](#)

⁵⁸ Secrétariat d'Etat auprès du Ministère de l'Energie, des Mines, de l'Eau et de l'Environnement, chargé de l'Eau et de l'Environnement (2009) [Plan National de Lutte contre le Changement Climatique](#)

⁵⁹ Ministère de l'Agriculture et de la Pêche Maritime (2009) [Plan Maroc Vert](#)

⁶⁰ Ministère de l'Agriculture et de la Pêche Maritime (2020) [La stratégie « Génération Green 2020-2030 »](#)

- The Halieutis Strategy for Fishing⁶¹ (2020);
- Solar Plan⁶² (2020);
- Integrated wind program (2020);
- Energy Efficiency - building, transport industry⁶³ (2030);
- National irrigation water saving Program (2030);
- National Program for Household and similar waste⁶⁴;
- National Liquid Sanitation Plan⁶⁵.

Specialised national agencies and institutes, i.e. the National Agency for the Development of Renewable Energy and energy Efficiency (ADEREE), Moroccan Agency for Solar Energy (MASEN), National Agency for the development of aquaculture (ANDA), Research Institute for Solar Energy and Renewable Energy (IRESEN), were developed and green city projects have been launched.

Within Framework Law No. 99-12 on the national charter for the environment and sustainable development, in particular Article 30, Morocco has introduced an ecological tax of 1% ad valorem on plastics and articles thereof (raw materials, semi-finished products, finished products and plastic waste). The objective is to develop the recycling and recovery of plastic waste. Also, under the Foreign Trade Law and the Basel Convention, Morocco has established export licenses for wastepaper and cardboard as well as waste PET bottles to ensure the continuous supply of the recycling and recovery waste into these waste industries. This will help to develop investment in industrial and energy recovery projects for waste. These measures are very likely to boost the transition to the circular economy. Also, it should be noted that under the current partnership with the EU, environmental goods and services are not subject to any specific regulation, except those governed by multilateral agreements.

The Ministry of Industry, Commerce, Green Economy and Digital launched, in partnership with the Coalition for the Recovery of Waste (COVAD), the establishment of the green ecosystem to support and improve the competitiveness of industrial ecosystems through the promotion of the circular economy. This green ecosystem targets the development of industrial and energy recovery projects for waste, the structuring of the waste value chain and the integration of the informal sector. Its evaluation study is currently under development. The first phase (diagnosis and benchmark) has been completed and the second phase (development strategy) is being finalised. As part of this phase, business plans for priority sectors of industrial and energy recovery from waste were designed.

2.4.2 Nationally-driven financial programmes and initiatives supporting circular economy-related sectors

Morocco does not yet have a nationally-driven financial programme tailored to circular economy. However, the country does have various ones in areas related to the circular economy.

Morocco submitted on the 19th September 2016 an ambitious National Determined Contribution with a target to reduce GHG emissions by 42% by 2030, compared to a normal business scenario (BAU or Business as Usual),

⁶¹Ministère de l'Agriculture et de la Pêche Maritime (2010) [Stratégie de développement et de compétitivité du secteur halieutique marocain à l'horizon 2020](#)

⁶²Moroccan Agency for Solar Energy (2015) [Plan Solaire Marocain](#)

⁶³ ADEREE (2014) [Stratégie Nationale d'Efficacité Energétique à horizon 2030](#)

⁶⁴ Secrétariat d'Etat chargé du Développement Durable et le Ministère de l'Intérieur (n.a.) [Programme National des Déchets Ménagers](#)

⁶⁵ Secrétariat d'Etat auprès du Ministère de l'Energie, des Mines, de l'Eau et de l'Environnement, chargé de l'Eau et de l'Environnement (2005) [Programme National d'Assainissement Liquide](#)

of which 25% is subject to international support. For the implementation of the National Determined Contribution, Morocco estimated its needs at \$ 85 billion (€ 72 billion) over 10 years (2020-2030), including \$ 24 billion (€ 20 billion) conditioned by an international support through the mechanisms of climate finance. The actions require a total budget of \$ 50 billion (€ 42 billion), while adaptation actions require \$ 35 billion (€ 30 billion)⁶⁶.

Morocco was able to attract significant amounts of climate finance thanks to its ambitious climate policies and its commitment to scale international. Indeed, this commitment allowed Morocco to establish the necessary credibility to get this funding. Hence, for public funding, Morocco is ranked 3rd in the world, overall, it is \$ 784 million invested⁶⁷.

To support its environmental policy and related sector programs, the country has been able to use funding opportunities in the context of international and bilateral cooperation, including the mobilisation of carbon finance. Below, a range of specific funds and economic instruments are listed:

- The industrial depollution fund (FODEP)⁶⁸ contributes to the reduction of pollution linked to industrial production and compliance with environmental standards by supporting the upgrading of industrial units installed in Morocco, the reduction of liquid, solid and gaseous emissions. It thus aims to rationalise the use of natural resources;
- The National Environment Fund (FNE)⁶⁹ is an incentive instrument that allows the financing of actions to protect the environment and sustainable development in sectors other than those of industry;
- The Clean Development Mechanism⁷⁰ (CDM) aims to reduce greenhouse gas (GHG) emissions by encouraging investment in clean technologies. Today, Morocco has many projects eligible for this mechanism in sectors such as energy, industry, transport, sanitation, agriculture and reforestation;
- Morocco Capital Carbon Fund⁷¹ obtains DH 300 million (€ 28 million) and is the first French-speaking African fund dedicated to Carbon Finance in Morocco. The objective of the FCCM is to support Moroccan promoters in carrying out their CDM projects by acquiring carbon credits;
- Energy Development Fund: The \$ 1 billion (€ 850 million) fund is intended to support the new national policy for the development of electricity production from renewable energy and energy efficiency;
- National Fund for Liquid Sanitation and Wastewater Treatment⁷² (FALEEU), was created to finance the National Liquid Sanitation Program.

2.5 Enabling environment on trade and investment in Morocco

This section is a snapshot of the trade and investment situation in Morocco. A more detailed analysis can be found in Annex C.

Morocco has a relatively high level of trade, comparable with the MENA region and the EU, and laying above the average of the Sub-Saharan region. The highest share of total trade is found in 2018 (at almost 90% of

⁶⁶ Secrétariat d'Etat auprès du Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, chargé de l'Eau et de l'Environnement (2019) [Guide d'Accès à la Finance Climat](#)

⁶⁷ Secrétariat d'Etat auprès du Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, chargé de l'Eau et de l'Environnement (2019) [Guide d'Accès à la Finance Climat](#)

⁶⁸ Ibid

⁶⁹ Moroccan Government (2015) [Missions](#)

⁷⁰ Moroccan Government (2015) [National Climate Change Strategie](#)

⁷¹ Fella Trade (n.a.) [Fonds de développement Durable](#)

⁷² Secrétariat d'Etat auprès du Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, chargé de l'Eau et de l'Environnement (2005) [Programme National d'Assainissement Liquide](#)

GDP) while the lowest share was in 2010 (75%). The most important import sectors are mineral fuels and oils, machinery, vehicles, electrical and electronic equipment with Spain, France, China and the USA as strongest import partners. The exports are dominated by electrical and electronic equipment, vehicles, fertiliser and textiles with Spain, France, USA and Italy as the most important export partners⁷³. The export to the EU as well as the imports from the EU have remained relatively stable over the period of 2015-2018 with 65% and 55% respectively.

Morocco's economic growth has been moderate but volatile during the last ten years, with an average course comparable to other African and world regions. This is mainly due to its dependency on raw material prices of global markets, especially affecting the GDP contribution of the industry sector, and climatic conditions influencing the economic output of the agricultural sector⁷⁴. Thanks to economic reforms and modernisation programs attracting foreign investors, Morocco's FDI is on an upward trend and reached 3% in 2018, laying above to the world average.

Multiple investment opportunities for the EU and the Moroccan government resulting from the before-mentioned aspects, are to invest into Moroccan industries and businesses, for the purposes of strengthening the economic and labour force as well as transitioning towards a more local and circular economy. This should also include to stimulate the trade in environmental goods and services through specific regulation and trade agreements. The potential for circular economy activities exist across many sectors in Morocco. This represents a trade and investment opportunity for European businesses. The EU may help solving the waste problems in Morocco, e.g. through investments into recycling or remanufacture facilities. However, due to the covid-19 crisis, countries slowed down international economic and investment activities and rather focus on the recovery of local markets. For instance, in the short-term, European investors might prefer investing into clean technologies in the EU, supported by the recovery fund.

2.6 Existing awareness and capacities on CE in Morocco

2.6.1 National awareness on CE

Morocco has experienced a rapid industrialization and urbanization in the recent years. Along with the high relevance of agriculture in the economy this is increasingly confronting the country with environmental and sustainability challenges, including water stress and environmental pollution. As Morocco's Government is increasingly becoming aware of these challenges a series of laws and programs have been adopted to facilitate Sustainable Consumption and Production (SCP) and Green economy related issues within the country. In this context, the Kingdom also developed a National Sustainable Development Strategy (NSDS) 2017-2030. The strategy focuses on 7 Challenges with 137 detailed underlying development objectives to operationalize the sustainable development strategy, some of which directly aim to facilitate CE in Morocco. It further aims to strengthen eco citizenship through various awareness building and communication initiatives.⁷⁵ Facilitating a circular economy also plays a key role in the national household waste programme (PNDM). The program aims to reduce waste, upgrade (recycling, composting and energy production) 20% of waste in 2020 (against 10% in 2013) and create 150,000 jobs in five years. The priority sectors concerned are: plastic waste, paper & cardboard waste, used oils, batteries and tires⁷⁶. Other relevant on-going action plans include the National Program on sewerage and sewage treatment, which aims to reduce environmental degradation

⁷³ WITS (2018) [Morocco import/export by country](#)

⁷⁴ AfDB - Government of Morocco - MCC (n.a.) [Morocco's Growth Diagnostic](#)

⁷⁵ Government of the Kingdom of Morocco (2017) [National Sustainable Development Strategy](#)

⁷⁶ UNIDO (n.d.) [Switch Med programm](#)

caused by waste as well as the Green Morocco Plan 2010-2020 to address food insecurity through the adaptation of agriculture to climate change and sustainable growth of small farmers.^{77, 78}

2.6.2 *Businesses/industries awareness*

As the national awareness for CE and CE related approaches in Morocco grows, business and industries are also increasingly getting aware of the economic potentials that innovative green and circular business models can offer. As a result, Moroccan companies' commitment to new resource-efficient and environmentally friendly approaches. Although still relatively weak, Morocco is one of the most advanced in Africa⁷⁹. In an effort to assist Moroccan businesses to adapt green and circular business models, the Confederation Générale des Entreprises Marocaines (CGEM) has set up a Green Economy commission (formerly Sustainable Development Commission), whose mission is to encourage and support companies in their environmental approach and in their commitment to the green economy. The CGEM is further collaborating with the Moroccan Centre for Clean Production (CMPP), which provides manufacturers with technical assistance and fundraising support with regard to the adoption of cleaner production, technology transfer that preserves the environment and resource efficiency. CMPP also aims to raise industry awareness and disseminate information on cleaner production via workshops, Green Growth Academy, guidelines, case studies, etc.^{80,81} Following an evaluation conducted by a firm of independent experts, CGEM also awards companies with a CSR label (ISO 26000 standard), which so far was granted to over 55 CGEM member companies. Despite some progress, the number of ISO 14001 certified firms (environmental management) remains limited (It has grown from around 20 companies in 2007 to about 40 in 2013) and concerns rather big businesses.⁸² Supplementing the national efforts, the United Nations Industrial Development Organization (UNIDO) has been working in Morocco to help businesses become more resource efficient and use cleaner production methods, as part of the MED TEST II project. Thanks to the MED TEST II project, over 22 companies in Morocco's chemical, food, mechanical and textile sectors have already successfully implemented measures to reduce resource use and cut emissions.⁸³ A selection of CE-related industry initiatives supported by SwitchMED in Morocco is presented in Table B-1, Annex B.

Within the framework of the Morocco-European Union cooperation program for “competitiveness and green growth” (PACC) the Ministry of Industry, Trade, Green and Digital Economy – in partnership with the German International Cooperation Agency (GIZ) and the support of the European Union – has recently also launched a call for green projects (Ecostart). The initiative specifically aims to support Moroccan entrepreneurs active in the green economy. Intended for projects in the early stage, Ecostart will support 50 entrepreneurs over a period of 3 months, ultimately rewarding 10 winners with a financial prize to support their businesses.⁸⁴

2.6.3 *Consumer awareness of CE*

Although the concept of CE, green economy and responsible buying is increasingly taking hold in Morocco, a consumer survey from 2015 shows that the majority of consumers are not prioritising ‘ecological’ or ‘green’ purchasing criteria in their buying decisions. This is partly due to the lack of trust toward green companies and products, which has been observed in most of the survey participants. As financial barriers are still an issue, the price remains the ultimate decision factor for Moroccans, even with green consumers.⁸⁵

⁷⁷ United Nations Economic Commission for Africa (n.d) [The green economy in Morocco](#)

⁷⁸ UNIDO (2018) [SwitchMed Magazine Morocco](#)

⁷⁹ Green Growth Knowledge Platform (n.d.) [The Green Economy in Morocco](#)

⁸⁰ United Nations Economic Commission for Africa (n.d) [The green economy in Morocco](#)

⁸¹ Confederation Generale des entreprises du Maroc (n.d.) [The Moroccan Cleaner Production Center](#)

⁸² United Nations Economic Commission for Africa (n.d) [The green economy in Morocco](#)

⁸³ UNIDO (2019) [UNIDO recognized for support for resource-efficient and cleaner production in Morocco](#)

⁸⁴ Ecostart (n.d.) [About](#)

⁸⁵ Tarfaoui, Dalat; Zkim, Salah (2015) [The Environmentally conscious Consumption in Morocco: Myth or Reality](#)

2.6.4 Overview of awareness creation initiatives

Over the recent years a number of awareness creation initiatives for CE related measures were launched in Morocco. In addition to state-organised donor- and state-funded initiatives, social entrepreneurs in Morocco are also increasingly involved in awareness-raising efforts for CE. Some of the most relevant awareness initiatives are listed in the following table:

Table 2-2 CE-related awareness creation initiatives in Morocco

<p>Support to the National Municipal Waste Program (PNDM)</p> <p>As part of the support measures for the National Municipal Waste Program (PNDM), an outreach and communication plan has been established. It is comprised of an audio-visual campaign (TV, radio and video spots); developing communication tools; a website that will be affiliated with the Department of Environment as well as regional training workshops.⁸⁶</p>
<p>Citizen Report cards on solid waste services</p> <p>The World Bank's third municipal solid waste sector Development Policy Loan (DPL) granted in 2013 provides for a new public participation tool in Morocco: citizen report cards that will enable the public to provide feedback on their city's solid waste services. The DPL also aims to increase transparency via public information access to policy information and disclosure of contracts with private companies.⁸⁷</p>

2.6.5 Education and skills gaps

In Morocco, the design and implementation of all nationwide education policies for primary and secondary education and partially for preschool education lies within the responsibilities of the Moroccan Ministry of National Education and Vocational Training. Overall, the school systems foresee nine years of education are compulsory, excluding the preschool, which targets children aged between 4-6 years old. Primary education consists of six years of schooling and is compulsory for children aged between 6-12 years old. Secondary education is composed of three years of lower-middle school and three years of high school including one year of common core and two years of curriculum in the humanities or sciences.⁸⁸ The higher education system comprises public higher education, higher education in the context of a partnership, and private higher education.⁸⁹ Despite the increasing national focus and corresponding spending (5.4% of its GNP⁹⁰) on proper education a recent review by Superior Council for Education, Training, and Scientific Research (2015) identified mayor shortcomings concerning student performance. Among the main challenges to meet by the education system are the continued fight against illiteracy, especially among the younger population.

A recent report from the Higher Council for Education, Training, and Scientific Research (CSEFRS) furthermore states that in 2018 431,876 students dropped out of public schools “without obtaining school certificates.” This number represents 7,8% of all students who had studied at primary and secondary schools. The main reasons for school drop outs and exclusion from education, usually include poverty, and quality of access to education establishments in rural areas.⁹¹ Moreover, public schools are often lacking proper technological equipment, such as, laptops, tablets, data-show, and the printing machines. Thus, preventing students from becoming acquainted with modern equipment, making it harder for teachers to achieve their set learning

⁸⁶ GIZ (2014) [Report on the Solid Waste Management in Morocco](#)

⁸⁷ Ibid

⁸⁸ Worldbank (2016) [Saber country report Morocco](#)

⁸⁹ European Comission (2017) [Overview of the higher education system - Morocco](#)

⁹⁰ Morocco on the Move (2015) [Reforming Education: How Morocco Plans on Empowering the Next Generation - Anastasia Pestova](#)

⁹¹ Morocco World News (2020) [More Than 400,000 Moroccan Students Dropped Out of School in 2018](#)

objectives.⁹² Related to the latter issue, the lack of digital equipment, digital skills are also crucial to increasingly teach and transfer, both to the youth as well as to the experienced labour. Digital skills are key enablers for circular business models which operate through digital application to largen the reach and accessibility and apply digital technologies to optimise feedback flows between the stakeholders. With several political initiatives, Morocco is tackling this topic. For instance, under the Maroc Plan Numérique 2020, developed by the Ministry of Industry, Commerce, Investment and the Digital Economy (MCIEN) and realised by the Digital Development Agency, digital skills are part of its three pillars.⁹³ Another example is the “Youth Employment Mediterranean” (YEM), a three-year EU-funded project, launched in 2018, that aims to inter alia improving the technical digital skills of the Mediterranean region. And lastly worth mentioning is the Financial Inclusion Digital Economy Development Policy Financing Project (FIDE DPF), a government program developed to foster financial inclusion to digital transformation for individuals, enterprises and entrepreneurs.⁹⁴

To address the remaining issues and raise the overall quality of education the Council for Education proposed the 2015-2030 strategic vision.⁹⁵ The strategic plan aims to address the gaps in education by basing education policy on three pillars:

- Ensuring fairness and equality of education;
- reforming business education and training;
- securing youth employment and human capacity development.

With a view to transitioning towards a green and circular economy, Morocco’s National Charter for Environment and Sustainable Development has further elevated the nationwide importance of Environmental and Sustainable Development Education. At the time, the majority of Moroccan environmental education programs are based on partnerships between regional districts and environmental NGOs to implement school-level EE programs. As Morocco has no dedicated environmental education fund, the Ministry of National Education and Vocational Training allocates a budgetary allowance, which is increasingly being used by the regional education districts and partner NGO networks. Complementing these efforts, the Mohammed VI Foundation for Environmental Protection is currently working to mainstream EE across the spectrum of government agency.⁹⁶ However, the current deficiencies of the Moroccan education systems often result in a failure to produce graduates sufficiently qualified to work in branches of the modern economy and green jobs (e.g. renewable energy, management and re-use of waste), all of which offer a good opportunity to facilitate Morocco’s transition towards a CE.⁹⁷ It is therefore essential that future education efforts pay particular attention to the development of skills needed in emerging sectors of the economy.

2.6.6 Vocational training capacities

High youth unemployment remains a major challenge for the countries of the Arab world, including Morocco. The promotion of a green and circular economy in Morocco may have the potential to address this problem by creating a number of new jobs and employment opportunities, especially for the younger generation. For example, a study by the Economic, Social and Environmental Council⁹⁸ shows that the planned investments in four key sectors of the green economy (renewable energy, energy efficiency, waste management and sanitation) amounting to €20 billion are expected to create over 90,000 new jobs by 2020.⁹⁹ Furthermore, a

⁹² Morocco on the Move (2015) [Morocco Education System: Problems and Solutions](#)

⁹³ OECD (n.d.) [OECD Digital Government Studies](#)

⁹⁴ Worldbank (2019) [KINGDOM OF MOROCCO FINANCIAL INCLUSION AND DIGITAL ECONOMY DPF](#)

⁹⁵ Worldbank (2016) [Saber country report - Morocco](#)

⁹⁶ GEEP (n.d.) [Morocco](#)

⁹⁷ New York Times (2013) [Gaps in Graduates’ Skills confound Morocco](#)

⁹⁸ CESE (2013) [New Model development for the Southern Provinces](#)

⁹⁹ United Nations Economic Commission for Africa (n.d) [The green economy in Morocco](#)

mapping of employment opportunities and green entrepreneurship conducted within the framework of Morocco's Youth Employment Strategy 'YES Green' also confirms a significant potential for integrating the youth, whose unemployment rate reached 19.3% in 2013 for the 15-24 year-old cohort.¹⁰⁰ However, the linkage between the need for youth employment generation and green job opportunities among the currently implemented policies and strategies is rather weak. The Ministry of Environment is currently developing a strategy¹⁰¹ supplementing this strategy the Moroccan Government has launched a range of initiatives aiming to further promote employment and to create training capacities. In 2015 the National Agency for the Promotion of Employment and Skills (ANAPEC) launched its 2020 Vision to expand the agency's coverage to also include unqualified job seekers. ANAPEC further launched three active labor programs: Idmaj (wage subsidies for unemployed graduates); Te'hil (youth training); and Moukawalati (entrepreneurship promotion through training and financial assistance). In parallel, relevant ministries have embarked on three strategies on:

- youth integration, which plans to improve the training system and integrate youth into the labour market through internship or skill matching;
- employment, which aims to increase employment and productivity;
- microenterprise promotion, which intends to support microenterprise financing¹⁰².

SwitchMed is aiming to facilitate a green entrepreneurship ecosystem in Morocco as well. In parallel to the entrepreneurial support, the initiative has developed an innovative training methodology, supporting the creation of green business and adapted to the Southern Mediterranean context. The methodology, comprised of a handbook and workbook on green business model development and green business plan development & incubation, guides green entrepreneurs through the entire process of growing their green business idea into a full-fledged enterprise. In total, the initiative trained 123 local trainers on-site. Of this group, 84 were selected for the implementation of the training programme for which +2,300 green entrepreneurs were selected and trained. In the aftermath of the trainings, 166 entrepreneurs additionally received a 10 hour individual coaching to improve their green business models.¹⁰³

¹⁰⁰ Ibid

¹⁰¹ Government of the Kingdom of Morocco; United Nations Development Programme (2012) [Morocco's Youth Employment Strategy Green - YES Green](#).

¹⁰² Ibid

¹⁰³ UNIDO (2018) [SwitchMed Magazine Morocco](#)

3 Impacts and benefits of the CE in Morocco

The section below is a review of a number of case studies that have been selected for their relevance related to CE. They have been realised based on direct interviews and by means of a questionnaire sent to stakeholders (see list in Annex A). A description of these organisations is provided in the table below.

Table 3-1 Local initiatives selected for their relevance related to CE

Local Initiatives	Description
Coopérative Attawafok	A sorting center and platform for circulation and storage of the landfill waste from Oum AZZA. Attawafok Cooperative was created in 2011 for the employment of former informal sorters of Akreuch.
Gharb Paper Cardboard - GPC	Created in 1992 in Kénitra, the GPC company has been dedicated to the manufacture of all types of corrugated cardboard packaging. It is the result of Ynna Holding's diversification policy. There are currently 3 production units established respectively in the regions of Gharb, Souss Massa Draa and Casablanca.
GIZ - CESAR	The CESAR project was launched by the German Federal Ministry of Economic Cooperation and Development (BMZ) in cooperation with the ministry of Interior of Morocco for the stability and development of the MENA region. This project aims to create job opportunities in water and sanitation in Morocco and will help to create the conditions for a good start of the PNAM (National Program for Rural Sanitation) and ensuring thereafter its support. This programme will adjust the legal and institutional framework and set a clear water code integrating regulatory aspects of wastewater reuse which is one of the most important part of CE.
Cluster Solaire	Created in 2014, the key players in the renewable energy (RE) & Green Business ecosystem, notably Masen and the professional federations, set up the Cluster Solaire/ Green Business Booster with the mission of supporting the development of a competitive local industry. This initiative addresses renewable energies, including biogas and waste to energy, which are seen as circular energy sources.
COVAD	The Coalition for the Recovery of Waste (COVAD) was created in April 2016, bringing together actors from the private sector, civil society and government bodies. COVAD's mission is to contribute to the creation of a favorable environment, to the structuring of industries and to the promotion of the circular economy in waste management on a national and international scale. This establishment was created thanks to its founding members, which are institutions and organizations such as the CGEM, the Ministries of the Environment, the Interior and Industry.
SwitchMed	SwitchMed is an EU initiative that supports and connects stakeholders to scale up eco and social innovations. The SwitchMed initiative aims at achieving a circular economy in the southern Mediterranean by changing the way goods and services are produced and consumed. In order to achieve this, the initiative provides tools and services directly to the private sector, supports an enabling policy environment, and facilitates exchange of information among partners and key stakeholders.
AMAZ	AMAZ is a brand of ethical and slow fashion sneakers 100% Moroccan, vegan, eco-conscious, launched in April 2017. The first Moroccan sneakers made from recycled and woven waste (plastic packaging waste, video cassette tape and fabric scraps) in collaboration with the Moroccan social enterprise Ressourc'in (KOUN brand). AMAZ is also a solidarity project: through the Amaz for Education programme and in partnership with the Education for All association, for each pair of AMAZs sold, one day in boarding school for a young girl attending secondary school in the High Atlas region is financed.

Local Initiatives	Description
BIOCHAR	Biochar Main activity is the commercialization of agricultural organic biomass valorization units (greenhouse waste, oasis date palm waste) into ecological charcoal and biochar as a soil conditioner.
GREEN WATECH	Green Watech is an innovative start-up created in 2018 specialised in low cost and efficient solutions for wastewater treatment.
ECOFERTIL	ECOFERTIL is the first Moroccan company operating in the field of composting of organic waste and the production of natural fertilisers for farming and green landscapes.
ECO-DOME	Ecodome Morocco is an alternative to unhealthy housing: an ancestral technique combined with modern civil engineering techniques.
FONDATION DU CREDIT AGRICOLE DU MAROC POUR LE DEVELOPPEMENT DURABLE	Since its creation in 2011, the Crédit Agricole du Maroc Foundation for Sustainable Development has been promoting the development of agriculture resilient to climate change, improving farmers' incomes, attractive to young people and ensuring healthy diet for all.

3.1 Existing impacts and benefits

Over the last years, there has been a growing number of project developments, programs and businesses engaged in circular economy activities. It is clear for those actors and practitioners that the circular economy is interesting in terms of economic opportunities as well as from an environmental and social point of view. For most of them, their approaches need to be strengthened and consolidated with the establishment of innovative partnerships with the private sector, local communities and the civil society among other things.

These partnerships should mobilise the necessary investments and the technological solutions, promote local skills and strengthen everyone's commitment and solidarity¹⁰⁴. Innovating SMEs (Ecodome, GreenWatech, Ecofertil, Amaz, Biochar) will be the real engines towards a green economy, however, their capacities will need to be improved and they will need to benefit from new green funding tools and appropriate accompanying measures. Particular attention should be given to the integration of the informal sector (Coopérative Attawafok), given its importance.

The level of commitment of Moroccan companies in favor of Corporate Social Responsibility (Gharb Paper Cardboard - GPC, CIMAR) although still weak, is nevertheless one of the most advanced in Africa, from the Maghreb and the Arab world.

The following tables summarise some positive economic, social and environmental impacts resulting from the adoption and implementation of national policies and initiatives as further outlined in Chapter 4. These are based on the output of the interviews (some initiatives are still in the initial phase of developing their KPI's).

The initiatives listed usually focus on fast action on the ground, but mostly neglect the application of impact measurements, like specific indicators and KPIs, same as of subsequent monitoring. Common quantitative measurements used are on a macro-level, i.e. the number of jobs created, but not giving additional insight into interrelated impacts such as the extent of improved life quality or CO₂ volumes

¹⁰⁴ (COVAD, Switched, GIZ)

saved.

3.1.1 Economic impacts and benefits

It is worth noting that a number of initiatives like COVAD or CLUSTER SOLAIRE/GBB have just started the process of assessing and measuring their impact. At the time of the interviews, they were not in possession of exact figures or indicators that could provide indications of their concrete impact on the field. In the following tables the economic impacts and benefits are listed.

Table 3-2 Economic impacts and benefits of local initiatives

Local Initiatives	Economic Impacts & benefits
Coopérative Attawafok	<ul style="list-style-type: none"> • Job opportunities for informal waste pickers in the sorting center of the coop: 15 jobs created since 2019 with the acquisition of baler (equipment to condition the waste) • Partnership with European companies (Pizzorno) for capacity building, International NGOs (Care International), National Initiative for Human Development (INDH): grants, World Bank through indirect financial support, Local authorities (Commune de Kenitra): Funding of DH 1.5 million (€ 140,000) in 2 years, European Embassies: Switzerland, Germany, Sweden, Hungary and Czech Republic for increasing their employees' awareness on waste recycling and grouping their waste pick up. • Knowledge sharing through visits to European sorting centers • Elimination of intermediates in the sorting chain • The profits are reinjected into the cooperative for: <ul style="list-style-type: none"> ○ Investment in new equipment to cover the entire value chain ○ Creation of 15 new job opportunities
GPC	<ul style="list-style-type: none"> • Creation of a subsidiary company SMCR (Société Marocaine de Collecte et de Recyclage)- which employs 30 people in Casablanca for the reception of cardboard waste from the city with 10 trucks which collects cardboards directly from partner companies • Investment in waste recovery equipment, i.e. baler • A total of € 4-5 million of green investments which do not generate Return on Investment • DH 20 million (€ 1.83 million) investment in wastewater treatment plant • DH 350 million (€ 32.3 million) invested in solid waste management which generates cash depending on the international market of paper, but it remains a security of supply for Morocco. • Improving the value of the cardboard collected by eliminating several intermediaries • Market opportunities thanks to the CSR requirements of certain customers
GIZ - CESAR	<ul style="list-style-type: none"> • 400 participants in project actions have created micro or small businesses or have started an independent professional activity as craftsmen in the fields of water and sanitation management • 18 events organised (e.g. job forum, internships) to put jobseekers in contact with employers • 60 companies offer new or improved services or products in the area of water and sanitation management. • 30 projects in the fields of water and sanitation management are requested by the municipalities or associations
Cluster Solaire	<ul style="list-style-type: none"> • The establishment of platforms for exchange, sharing and networking between key actors in the sector • The launch of working groups for the establishment of a clear roadmap

Local Initiatives	Economic Impacts & benefits
COVAD	<ul style="list-style-type: none"> Contribute to the emergence of the recycling and recovery sector in Morocco Support of the establishment of a legal and economic framework favourable to the emergence of recovery sectors Access to financing for recovery sectors
SwitchMed	<ul style="list-style-type: none"> 4 Pilot projects from policymakers 22 companies from the food sector joined MED TEST II and saved € 10.4 million annually through 457 RECP measures 8 Incubated green entrepreneurs 2 Civil Society Organisations¹⁰⁵
AMAZ	<ul style="list-style-type: none"> Sales of 2,300 pairs in 15 countries
BIOCHAR	<ul style="list-style-type: none"> Training of 19 cooperatives in the eastern regions of Morocco in the recovery of rosemary waste
GREEN WATECH	<ul style="list-style-type: none"> Sharing economy with high efficiency, easy maintenance, low cost Minimising the use of freshwater in irrigation Saving the water as a natural resource Development of agriculture sector by reusing treated wastewater in irrigation
ECOFERTIL	<ul style="list-style-type: none"> Better crop yields Less usage of chemical fertilisers (cost) Creation of 6 direct and 60 indirect jobs Reduced cost of socio-economic impact due to untreated waste Reduced transportation costs
ECODOME	<ul style="list-style-type: none"> 17 direct jobs in rural areas 22 indirect jobs: to revive ancestral trades and techniques that have begun to disappear Ecodome construction is quick to build: 40% of reduction in construction time compared to conventional structures. 3 partnerships 25 constructions More than 3,000 people impacted through the operation of our constructions, like through better housing
CREDIT AGRICOLE	<ul style="list-style-type: none"> Structuring of the informal recycling sector of the 30,000 tons of used agricultural plastics emitted each year in the Sous Massa region by the creation of 8 cooperatives and the creation of a group bringing together 10 recycling companies.

3.1.2 Social impacts and benefits

In this section, illustrated in the table below, the social impacts and benefits of the local initiatives are summarised.

¹⁰⁵ SwitchMed (2018) [SwitchMed Magazine Morocco](#)

Table 3-3 Social impacts and benefits of local initiatives

Local Initiatives	Social Impacts & benefits
Coopérative Attawafok	<ul style="list-style-type: none"> • Informal waste pickers have become real sorting professionals and got the respect and consideration they deserve for contributing to environmental protection and reducing its degradation. • They also got an economic stability and dignity • Reduction of risks of accidents (no serious accident in 9 years of operations) • Access to Social Security and Medical Insurance • Developing a collaborating and caring spirit for each other • Shared profits and reinvestment into the cooperative for buying new equipment to cover the entire value chain and enhancing the products value. • Social reintegration: 50% of employees have a criminal record • Prohibiting work for children aged less than 18 years old • Recruitment of 27 women of equal pay since the start of the coop • Possibility for retired persons who have not completed their social security points to be replaced by their relatives.
GPC	<ul style="list-style-type: none"> • GPC is a 100% shareholder in SMCR • Training plan for employees • Gender approach: 10% - Administrative GPC: 30% women - Management Committee: 70% of women • Work with small companies by ensuring them pre-payment on raw material • Leveraging the know-how of GPC to improve the material • GPC helped organise waste pickers to initiate the collection of cardboard in several cities and at the level of public and private administrations, banks and ministries. • Communication campaigns • Set up strict specifications with suppliers regarding their CSR obligations to push them upwards even if it is not always easy to meet all the requirements of the integrated management system.
GIZ - CESAR	<ul style="list-style-type: none"> • 4,500 people, including 450 women and 2,000 youths, are newly employed in the fields of water and sanitation management • 1,200 employees who participated in the qualification measures in the fields of water and sanitation management comply with at least one criterion that indicates an improvement in their situation (for example, improvement of working conditions, formal employment, longer duration of employment, higher job and/or higher income, higher job security through e.g. skills). • 6,000 people, including 1,200 women and 3,600 youths (under 35) have successfully obtained a professional qualification through initial or continuous training.
Cluster Solaire	<ul style="list-style-type: none"> • Developing the skills and strengthening the capacities of different actors • Technical training on renewable energy technologies • Practical training on certifications, software or other fundamentals of the sector • Technical assistance activities for members, on request • Information workshops on new data and legislation in the sector • Thematic working groups • Legal training on key topics
COVAD	<ul style="list-style-type: none"> • Participation in numerous events, conferences and round tables

Local Initiatives	Social Impacts & benefits
	<ul style="list-style-type: none"> Communication and lobbying campaign: lobbying program to support decision-making on the waste management strategy for the city of Casablanca and Organisation of several meetings between the COVAD and the various target decision-makers.
SwitchMed	<ul style="list-style-type: none"> 25 women trained in the production of reusable bags 1,000 reusable bags produced and distributed 90 professionals: from academia, business associations, government institutions and industries received training on the TEST tools during the demonstration phase of MED TEST II in Morocco
AMAZ	<ul style="list-style-type: none"> Financing of one year's boarding school for 7 girls attending secondary school in the High Atlas 8 craftsmen working in good condition
BIOCHAR	<ul style="list-style-type: none"> More than 30 African farmers trained in the field of green charcoal¹⁰⁶. Equipment of 3 cooperatives with 3 units for the recovery of waste from the oases in East Morocco.
GREEN WATECH	<ul style="list-style-type: none"> Improving the life quality of 7,000 people in rural population Ensures access to good sanitation service Creating job opportunities (4 direct job opportunities, 45 indirect jobs, 19 of them for women) Reducing vulnerability and forced migrations of rural inhabitants Awareness-raising on the preservation of the environment Promote education of children (mainly girls) in rural schools by providing a safe sanitation service
ECOFERTIL	<ul style="list-style-type: none"> Reduced cost of socio-economic impact, including health, due to untreated waste Raising awareness on the benefits of composting and sustainable farming through conferences and workshops
ECO-DOME	<ul style="list-style-type: none"> Ecodome concept allows people with limited income to build a dignified home, affordable compared to a solid construction and healthier in terms of comfort. Use of natural and local materials Recruiting local labour, mobilising trained people
CREDIT AGRICOLE	<ul style="list-style-type: none"> Capacity building of local farmers in terms of sustainable agriculture and publication of a guide on the recovery of used agricultural plastics Improved livelihoods opportunities for farmers who are now able to earn a decent living wage to fund their children education and meet their household responsibilities

3.1.3 Environmental impacts and benefits

Finally, the table below holds the environmental impacts and benefits of the local initiatives.

Table 3-4 Environmental impacts and benefits of local initiatives

Local Initiatives	Environmental Impacts & benefits
Coopérative Attawafok	<ul style="list-style-type: none"> The waste pickers contribute to the rationalisation of the collection of waste from Rabat and the surroundings and work to their recycling.

¹⁰⁶ Green charcoal means using agricultural waste or household waste, which are usually not used at all, to produce clean and energy efficient coal. Green charcoal emits less CO₂ than wood charcoal when being burned. This diverts deforestation. Estimated in 2002, 30,000 ha of forest equivalent to 6 Mtons of wood are deforested and processed to wood charcoal annually. Most of it is used to heat the water in the Hammams, which represents a huge potential to replace wood by green charcoal. L'Economiste (2020) [Les hammams, gros consommateurs de bois-energie](#)

Local Initiatives	Environmental Impacts & benefits
	<ul style="list-style-type: none"> 500-600 tons of waste are collected per day and sorted, representing one third of all the waste sent to the landfill of the 13 municipalities in the Rabat-Salé region, with a rate of 16 hours per day.
GPC	<ul style="list-style-type: none"> Certified ISO 14 001 (environment management) and ISO 50 001 (energy management) Risk of water and soil pollution has been reduced through better solid waste management Heavy investments in water treatment plants Reduction of wastewater discharge from 12 m³ to 4 m³ with improvement of the quality (no heavy metals in the discharges) Several actions to reduce the discharge of gaseous effluents - signing of a natural gas contract to reduce the use of Fuel in boilers → gain in carbon points by eliminating 2 trips of fuel per day Actions regarding the gaseous discharges of vehicles through the installation of a bubbling system to capture the fumes Switch to electric vehicles vs. diesel to have clean energy 1 MW solar station project in Mohammedia and Agadir 60,000 tons per year of recycled paper in 2 years will increase to 90,000 tons per year Today, nationwide, 140,000 tons of cardboard are collected, which represents 45% by GPC
GIZ - CESAR	<ul style="list-style-type: none"> Realising of 7 demonstration centers, including at least 3 education and training centers, representing sustainable water and wastewater management technologies, showing their positive effects on environmental protection, climate change and the development of value chains. 60 companies offer new or improved services or products in the area of water and sanitation management. 30 projects in the fields of water and sanitation management are requested by the municipalities or civil society.
Cluster Solaire	<ul style="list-style-type: none"> Access to information around renewable energy development projects in Morocco and internationally in order to identify opportunities Implementation of pilot projects around waste to energy and waste management Creating a Cleantech startup
COVAD	<ul style="list-style-type: none"> Elaboration of recommendations on the implementation of the Extended Producer Responsibility
SwitchMed	<ul style="list-style-type: none"> Annual environmental impact savings identified in 22 Moroccan food industries 131.519 m³ per year of annual water savings, equivalent to 393 Moroccan household's annual water consumption 97.6 GWh per year of annual energy consumption savings 39,488 tons of annual CO₂ savings 3,162 tons per year of solid waste avoided
AMAZ	<ul style="list-style-type: none"> 2,000 upcycled plastic bags, 500 upcycled video cassettes, 100 m of upcycled fabric scraps Vegan (prevention of pollution from livestock farming) No plastic or cardboard packaging
BIOCHAR	<ul style="list-style-type: none"> Contribute to reduce by 40% the CO₂ emissions due to agricultural waste in the province of Souss-Massa. Transforming agriculture waste to 1 ton of Biochar per week with Bio-packaging

Local Initiatives	Environmental Impacts & benefits
GREEN WATECH	<ul style="list-style-type: none"> Reducing the effects of wastewater reject and water diseases Protecting water resources (groundwater and surface water) Minimising the use of 80% of potable water through reusing treated wastewater in irrigation Limiting the use of chemical fertilisers by 30%-40% Increase awareness on the importance of wastewater treatment and reuse to fight climate Saving 100% of energy, working with gravity
ECOFERTIL	<ul style="list-style-type: none"> Reduction of biowaste volumes sent to the landfill Decrease of air pollution and CO₂ emissions Reduction of soil and groundwater pollution Decline of irrational handling of both chemical fertilisers and pesticides by new reasoned cultural practices Destruction of residues of certain phytosanitary products
ECO-DOME	<ul style="list-style-type: none"> Ecodome construction process reduces CO₂ emissions by up to 64% when compared to available techniques on the market. 80% of buildings are made of earth and do not consume fossil fuels. 80% reduction of waste whether it is reinforced concrete, e.g. carpentry 1.5 kWh/m² reduction in consumption compared to ordinary construction
CREDIT AGRICOLE	<ul style="list-style-type: none"> Promotion of a sustainable agriculture through the identification of 7 short circuits and the creation of local farmers markets in 4 cities Set up of a pilot participatory system with 16 labelled agro-ecological farms Encourage solar pumping on the farm through training in 3 regions of 60 solar pump installers in international quality standards with the publication of a guide Proposal of a grid of 33 sustainability indicators to assess the sustainability of Moroccan farms Structuring of the informal recycling sector of the 30,000 tons of used agricultural plastics emitted each year in the Sous Massa region by the creation of 8 cooperatives and the creation of a group bringing together 10 recycling companies

3.2 Future impacts and benefits

As the Moroccan 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 Morocco.

3.2.1 Modelling approach and framework

The modelling of the macro-economic impacts of the circular economy transition in Morocco was carried out using Cambridge Econometrics' FRAMES model. This is an advanced input-output model, designed to enable the assessment of socioeconomic and environmental effects of energy, environment, and economy policies (for details see Annex D).

A conventional difference-to-baseline approach is followed. The circular economy (CE) scenario is compared against a baseline¹⁰⁷ in which no explicit assumptions are made about circular economy 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.

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

¹⁰⁷ The baseline is E3ME's standard projection to 2030 for the Moroccan economy, based on official published economic and energy forecasts. See Annex B for more details.

could take in Morocco by 2030 and used these as inputs into the model. These model inputs are summarised in table 3-5.

Table 3-5 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)
		Exports of materials recovered from e-waste recycling
	Increased use of recycled materials in electronics production, replacing virgin metals and plastics	Shift in plastics' intermediate demand: reduced purchases from metals and plastics sectors, replaced by purchases from recycling sector
Agriculture	Prevention of food loss in agricultural supply chain through improved storage and logistics	Substitution of agricultural imports by domestic agricultural production
		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 FRAMES model restricted the type of assumptions and inputs that could be used. For instance, in such a demand-driven framework, it is difficult to model an increase in recycling when this is not fully coupled with 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 Morocco would have a positive impact on the Moroccan economy. By 2030, Morocco's GDP is projected to be around 0.7% higher in 2030 in the circular economy scenario compared to the baseline scenario. In other words, this suggests that the Moroccan economy would be slightly larger as a result of increased circular economy activity than it would be in a 'business-as-usual' situation. Table 3-6 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 3-6 Macro-economic impacts of the CE scenario

Variable	Absolute difference from baseline scenario by 2030 (€2019)	Relative difference from baseline scenario by 2030 (%)
GDP	+ €1.3bn	+ 0.7%
Consumer	+ €400m	+ 0.4%
Investment	+ €489m	+ 0.7%
Exports	+ €96m	+ 0.1%
Imports	- €354m	- 0.4%
Price level	-	- 0.3%

These results suggest that the positive economic impacts would be spread relatively evenly across the components of GDP: consumption, investment and the trade balance all see an improvement as a result of circular economy activity.

Some of these impacts can be attributed to the direct effect of the input assumptions in the circular economy scenario. The investment impact is partly driven by scenario assumptions of increased investment in the agricultural and recycling sectors, which account for around € 140m of the total € 489m investment impact. We have also assumed a fall in imports of agricultural products of € 450m (substituted by domestic production, due to better prevention of food losses in the supply chain), which has directly affected the trade balance to a significant degree.

However, much of the impact would equally result from the downstream effects of these and other circular economy activities. Notably, the investment and import substitution shocks to agriculture would lead to increased demand for other sectors through higher investment spending (benefiting sectors such as construction and machinery), and higher intermediate demand for inputs from its suppliers (such as financial and business services). The increasing competitiveness of the agricultural sector also allows it to export some of its produce, which along with the scenario assumption of increased exports of recycled materials from e-waste, contributes positively to the trade balance.

Equally, the model suggests that circular economy activity would lead to greater consumption, as rising employment in key sectors (see next section) would lead to higher disposable incomes, and so to greater consumer spending in sectors such as retail, education and health, and agriculture.

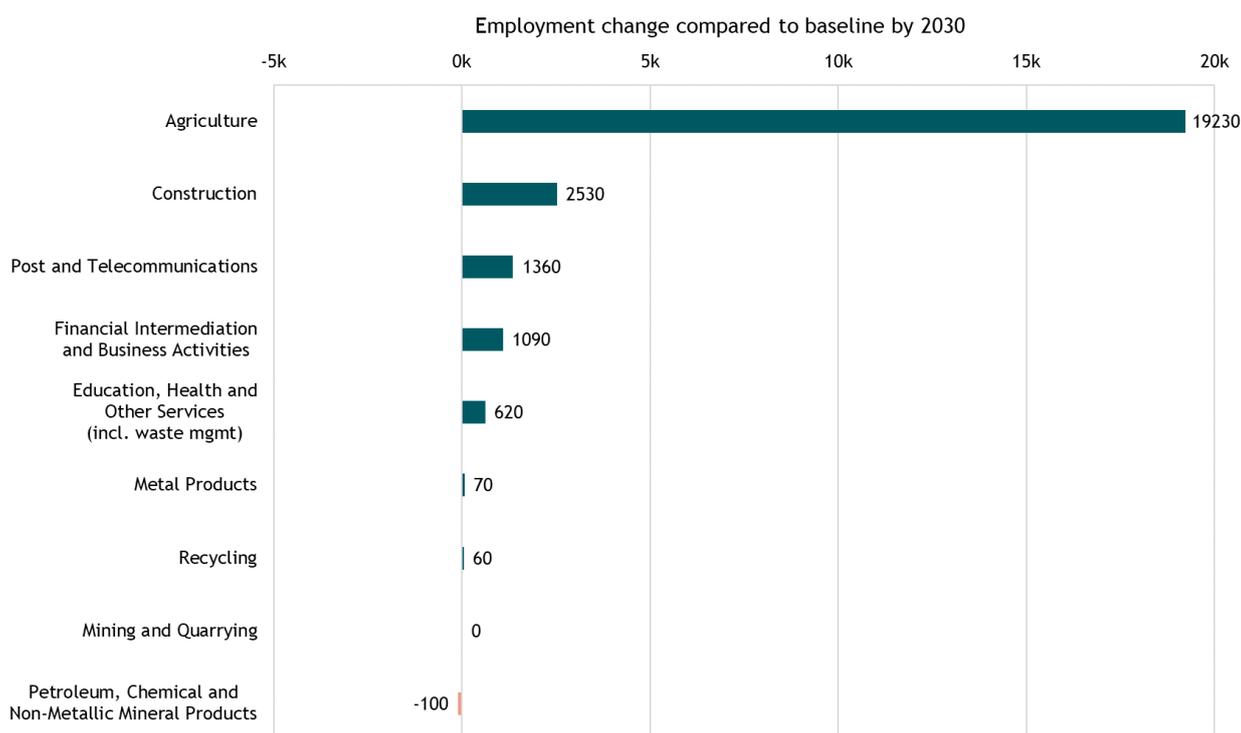
Some share of this higher business and consumer demand would be spent on imports, providing a counterweight to the assumed fall in imports of agricultural products due to better prevention of food losses. This explains why the forecast reduction in total imports (-€ 354m) is slightly smaller than the assumed fall in agricultural imports (-€ 449m).

The increase in the circularity of production in Morocco's relatively large industrial sector would lead directly to a large boost to the recycling sector, as recycled materials replace virgin materials as inputs to production. The multiplier effects resulting from higher business and consumer spending described above ensure that the overall gains to the recycling sector far outweigh any losses to sectors producing those virgin materials (including mining, plastics, metals, non-metallic materials and chemicals).

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 Morocco would also have positive employment effects. Overall, a net increase in employment relative to the baseline scenario of around 0.2% is projected, or approximately 25,700 additional jobs compared to the baseline (Figure 1).

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

In line with the economic impacts, the largest employment impacts in the CE scenario would be seen in the agricultural sector, which accounts for around three quarters of the additional employment seen in the CE scenario relative to the baseline. This employment impact in agriculture would be a direct consequence of greater circular economy activity in this sector, as attempts to improve prevention of food losses would generate investment and improve productivity.

These impacts on agricultural employment should be interpreted with caution, however, due to a limitation in the modelling methodology. The 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.

Circular economy activity would also have a direct, positive impact on employment in the waste management sector, as output and employment would need to increase in order to meet higher collection rates than in the 'business-as-usual' scenario. Employment in the recycling sector would also see a marked expansion relative as a direct consequence of greater circularity in industrial production, although this would not make much of an impact on aggregate employment in absolute terms. The employment gains seen in the recycling sector relative to the baseline would, however, come at the expense of falls in employment in sectors producing virgin materials, principally the petrochemicals sector. Our results suggest that the net impact of these effects on employment would be slightly negative, although small in the context of employment impacts elsewhere.

Employment in other sectors would indirectly benefit from circular economy activity. Increasing investment expenditure in agriculture would lead to higher demand for construction, and higher

consumer spending levels would lead to higher demand for telecommunication and financial and business services, generating positive employment impacts in these sectors.

However, in order to yield these positive labour impact, strong capacity building and upskilling, including trainings and education, are needed to be implemented. This is especially required in the agricultural sector in relation to organic fertiliser, irrigation systems and prevention of water pollution; in the construction sector in topics like local, eco-friendly and recycled building materials; and generally, there is a need for the education system to offer more environmental degrees as well as more related technical and vocational programmes in order to qualify graduates for green jobs.

As explained throughout this report, CE strategies can have important impacts on informal workers. 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 Morocco would produce higher carbon emissions than in the baseline, with CO₂ emissions forecast to be 0.7% higher than baseline levels by 2030¹⁰⁸.

Agriculture, transport and power generation would be responsible for the greatest contribution to the projected increase in emissions. Agriculture, among the largest sectors in the Moroccan economy, would see a direct increase in output as a result of circular economy activities. Meanwhile transport and power generation are both among the most energy- and carbon-intensive sectors in the economy, and would see greater demand for their services by households and businesses as a result of higher output in a more circular economy. Any circular economy scenario would be unlikely to achieve both a positive economic impact and carbon neutrality without an increase in take-up of renewable energy sources in these two sectors. As it is, our results suggest that overall carbon emissions in the CE scenario would grow relative to the baseline at the same rate as GDP, suggesting that circular economy activity would have no impact on the carbon-intensity of the Moroccan economy.

Just as demand for recycled materials would replace demand for virgin materials in the CE scenario, greater emissions from the recycling sector replace falling emissions from the petrochemical sector. This suggests that increasing the circularity of production would do little to reduce the carbon-intensity of production.

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

¹⁰⁸ These results include only emissions of CO₂ from energy use (such as burning of fossil fuels in transport). They therefore do not take account of emissions of other greenhouse gases (such as methane), nor of emissions of CO₂ from other sources (including emissions from industrial processes, from changes in land use and from landfill). 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.

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. As was the case with employment in this sector, however, it is likely 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.

Secondly, it should be noted that the results presented here only project the emissions impacts in Morocco, 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 Morocco, 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 natural capital.

4 Cooperation between the EU and Morocco

The following sections are meant to map the ongoing relations between Morocco and the EU on different levels, and to identify opportunities to further mainstream CE activities within these.

4.1 Policy dialogues

As geographical neighbours the EU and Morocco have established a particularly close relationship, with the EU supporting several of Morocco's economic and political reforms. The relationship emphasizes close cooperation on democratic reform, economic modernisation, and migration issues. Until 2017, the agenda of EU-Morocco relations was spelled out in an Action Plan under the European Neighbourhood Policy, launched by the EU in 2003 and based on mutual responsibility and shared commitment to the universal values of human rights, democracy and the rule of law.

The current legal basis for the partnership between the two parties is the Association Agreement between the EU and Morocco. The Agreement also provides the framework for a comprehensive political dialogue between the two parties, with the EU-Morocco Association Council being the institution designated for political dialogue and setting the priorities for cooperation. The council meetings, which took place 14 times since its first meeting in October 2000, provide a platform for both partners to review their current cooperation objectives and to look for further opportunities to broaden the partnership. In this context the establishment and consolidation of sustainable development has been a key pillar of the ongoing negotiations. During the most recent Association Council meeting, on 27 June 2019¹⁰⁹, the two partners declared their wish to continue the bilateral cooperation and give a new impetus to their strategic, multi-dimensional and privileged relationship by formulating a joint declaration. Within the declaration the EU and Morocco, among other things, agreed on enhancing the exchange of good practices regarding social dialogues, strengthening value chains through better industrial integration, the promotion of entrepreneurship and innovation as well as the joint support for the green economy in Morocco. To this regard, the declaration particularly highlights the opportunities provided by the blue and circular economy. The structural areas mentioned in the joint declaration will form an integral part of the renewed partnership and be the subject of closer concertation within the relevant multilateral fora, with the aim of reaching joint positions reflecting the vision of the Sustainable Development Goals.¹¹⁰

Further relevant platforms for CE-related policy dialogue between the EU and Morocco were created in the course of the EU-funded SwitchMED activities (also see 4.1.2). SwitchMed has, among other things, established the SwitchMED Connect event, a gathering of Mediterranean stakeholders to build synergies, exchange knowledge and scale-up eco and social innovations. During the event leading start-ups and entrepreneurs, industry agents, initiatives, change agents, policy and financial institutions working on applications related to productive, circular and sharing economies in the Mediterranean come together on a regular basis.¹¹¹ While the most recent SwitchMed Connect took place in 2018 in Barcelona and, among other things, focused on accelerating the Circular Economy and corresponding enabling policies, the Connect event for 2020 was initially planned to take place in Rimini, Italy, back to back with the

¹⁰⁹ European Commission (n.d.) [European Neighbourhood Policy And Enlargement Negotiations - Morocco](#)

¹¹⁰ European Council (2019) [Joint declaration by the European Union and Morocco for the fourteenth meeting of the Association Council](#)

¹¹¹ SwitchMed (n.d.) [SwitchMed Connect](#)

ECOMONDO – The Green Technology Expo. However, considering the ongoing developments around the COVID-19 pandemic, the event will be transformed into a virtual forum of exchange. As part of the first SwitchMed phase Morocco also participated in several national workshops, roundtables and nationally-tailored training sessions, which aimed to reinforce the capacity on SCP within the country.¹¹²

Sectoral policy dialogue is further taking place through the Morocco-European Union cooperation programme for “competitiveness and green growth” (PACC), which was signed in November 2016, and has been implemented to support entrepreneurship, particularly through the Industrial Acceleration Plan (PAI), foreign trade, environmental and energy strategies and the national financial inclusion strategy. Under the PACC several platforms for waste disposal, recovery and management have been established, addressing, among other things, the topic of introducing a polluter pays principle. With a financial contribution of € 30 million, PAAC is further actively supporting sectoral reforms towards a green transition in Morocco.

In the past Morocco was also involved in the multi-lateral dialogue platforms MedSpring (Mediterranean Science, Policy, Research & Innovation Gateway) as well as ERANETMED. Both platforms aimed to strengthen policy dialogue on Euro-Mediterranean research & Innovation cooperation (see 4.2 for further information).¹¹³ A particular focus on circularity was not given in both platforms.

The ongoing discussions between the EC and Morocco for the creation of an EU-Morocco green strategic partnership is an important element that could provide a renewed momentum to put green topics at the core of the relations EU-Morocco. As of today, however, the mapping exercise above does show that there are still significant gaps to this regard. Based on the existing structures a range of opportunities for future circular economy-related policy dialogues can be identified:

Table 4-1 Opportunities and Barriers for future CE-related¹¹⁴ policy dialogues between Morocco and the EU

Opportunities and Barriers for future CE-related policy dialogues between Morocco and the EU
<ul style="list-style-type: none"> • Although CE has, to some extent, been part of the bilateral cooperation dialogues between Morocco and the EU (advanced status, association agreements, budget support program, etc.), it is mostly addressed indirectly, sometimes only touching specific sectors such as waste management, water or energy. Anchoring of the CE within policy dialogues thus remains below the importance of the subject. However, the ongoing policy dialogue taking place within the EU-Morocco Association Council Meetings, presents a good opportunity for both parties to specifically address policy options that can facilitate Morocco’s transition towards a circular economy. The new overarching priority of the “European Green Deal” for the Van Der Leyen Commission and the commitment to mainstream it in all EU policies is especially enhancing the opportunity for scaling up EU’s engagement on green issues (including CE) in policy dialogues between the EU and Morocco. • The dialogue events in the framework of SwitchMed Connect provide a good opportunity to develop regular exchange formats on CE-related policy between Morocco and the EU. Future events could further strengthen the focus on CE-related enabling policies by taking into account the different needs of stakeholders in the participating countries, including Morocco.

¹¹² UNIDO (2018) [SwitchMed Magazine Morocco](#)

¹¹³ European Commission (2018) [International Cooperation - Morocco](#)

¹¹⁴ Opportunities and barriers which cover sectors or include elements that show the potential to promote circular economy approaches in Morocco

Opportunities and Barriers for future CE-related policy dialogues between Morocco and the EU

- The Barcelona Convention on the Protection of the Mediterranean and its coastline from pollution, constitutes a Regional Cooperation Agreement which allows the development of Mediterranean programs and projects around CE, positively impacting the advancement of the 'CE in Morocco. Most of the legally binding measures in the Plan have an implementation deadline of 2020. The evaluation of their progress which is underway by UNEP/MAP will provide a clear picture of targets achieved as well as those obligations for which further support is needed.¹¹⁵
- Current policy dialogues on CE between Morocco and the EU are often slowed down by a lack of knowledge of the actors involved as well as a lack of access to funding necessary to implement relevant policies identified in the dialogues.

4.2 Development cooperation programmes, including by the EU Member States

The majority of CE-related EU development cooperation projects in Morocco are channelled through the EU's Switch Mediterranean (SwitchMed) Programme. The program, which was launched in 2013, is funded and managed by the EU, with technical support of the United Nations Industrial Development Organisation (UNIDO), the UN Environment's Programme Economy Division, the UN Environment Mediterranean Action Plan and its Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC). The program is equipped with a budget of € 16,4 million (€ 15 million as EU contribution) and aims to support and connect local stakeholders that promote social and ecological innovations, SwitchMed primarily seeks to shape the framework for productive, circular and sharing economies in the Mediterranean.¹¹⁶ It consists of three key components: (1) a regional and national policy component, which directly supports countries in the Mediterranean region to develop and implement SCP policies; (2) a demonstration activity component, which targets both well-established companies and start-ups to support the adoption of SCP patterns at different stages of business development; and (3) a networking component, which connects stakeholders to foster regional exchange and cross-fertilisation.

The first phase of the project (SwitchMed I) aimed to promote Sustainable Consumption and Production Modes (MCPD) on the southern shore of the Mediterranean. The results of this program revealed an average gain of 40% on the cost of inputs (raw material, energy and water) for the benefit of a representative sample of companies from different industrial activities. On the basis of these encouraging results, a second Switch Med program (SwitchMed II) dedicated to the textile sector has been launched. The objective is to couple the promotion of the efficiency of energy, water and raw material resources with that of the Circular Economy through the development of industrial and energy recovery projects for textile waste. As such, MICEVN wishes to generalize this program to all of the industrial activities concerned in the context of cooperation with the EU. With the Covid-19 pandemic, the project was delayed but a resumption meeting is scheduled for July 1 and 2, 2020. In this regard, the support and expertise of EU is desirable to generalize this project to all industrial activities. The political and planning aspects which have made their success manifest themselves in Morocco's commitment to make sustainable development a lever of its sustainable economic development through the realization of plans and programs: Industrial Acceleration Plan, SNDD, NDC, energy strategy, water strategy, and others.

In Morocco Switchmed has so far supported the implementation and development of SCP policies, assisting in the structuring of a policy and regulatory framework for CE activities. In joint collaboration, the EU

¹¹⁵ IISD (2019) [Spring-boarding from Ocean Conservation to Sustainable Development: The Barcelona Convention](#)

¹¹⁶ EUneighbours (n.d.) [SwitchMed II](#)

affiliates and the Moroccan programme partners have achieved to provide a meaningful contribution to the National Strategy for Sustainable Development, by cooperatively developing the National Framework Plan for Sustainable Consumption and Production, as well as two sectoral plans (agriculture and construction)¹¹⁷. Furthermore, SwitchMed aided in the implementation of a law intended to phase out the usage of single-use plastic bags, by supporting Zero Zbel, an NGO conducting research efforts on the effects of the phase-out. Funding was also allocated to start-ups involved in the improvement of packaging waste collection and management, aligning with the objectives of the National Framework Plan on Sustainable Consumption and Production. Another pilot project targeted the substitution of toxic chemicals used for healthcare applications with safe alternatives, specifically in the procurement phase of medical devices. The pilot project was supplemented by a best-practice report, which outlined recommendations to improve current capacity and knowledge levels in the field in the health care sector.

From 2015 to 2018, SwitchMed funded a demonstration project ‘MED TEST II’. Building on the Resource Efficient Cleaner Production (RECP) methodology, the project aimed at Transfer of Environmentally Sound Technologies (TEST) by providing direct consultancy services to industries with regard to minimisation of environmental impacts¹¹⁸. The MED TEST II was intended to encourage business cases for a resource efficient and cleaner production in Morocco’s industrial sector. In Morocco MED TEST II was supported by the Ministry of Industry, Investment, Commerce and the Digital Economy and the Ministry of Energy, Mines and Sustainable Development and featured the involvement of two separate service providers, Fraquemar and MSI Conseil. The project aided 22 companies from the food, textile, chemical and mechanical sector in exploring RECP measures within their production processes. Ultimately, this led to cost savings through a more efficient use of energy, water and material resources. Circular approaches were also identified as possible resource efficient solutions for the companies. This included such measures as recasting of industrial water circuits to reduce wastewater, wastewater recycling¹¹⁹ or instalment of a biomass boiler.¹²⁰

Another project implemented as part of the SwitchMed project was the development Green Entrepreneurship project between 2014 and 2018. The project comprised a training programme, consisting of a five-day module delivered over three months, in order to equip local entrepreneurs with the necessary tools and proficiencies to develop their own business ideas. Circular economy principles formed a cornerstone of the training program, as participants were heavily encouraged to apply environmental sustainability to the various dimensions of their product or services. The entrepreneurship program was jointly implemented with three local partners in Morocco; the Fondation du Jeune Entrepreneur (Young Entrepreneur Foundation), the Réseau Marocain d’Economie Sociale et Solidaire (Moroccan Network of Social and Solidarity Economy) and the Ministry of Energy, Mines, Water & Sustainable Development. In Morocco, 376 green entrepreneurs were selected and underwent the training programme, 32 of those were selected for additional individual coaching in order to further expand their green business models, of which all of them submitted an application for the incubation phase. In the end, 8 were selected by an International High-Level Jury¹²¹ for the incubation programme. A selection of businesses integrating CE-thinking, which underwent the training provided by the SwitchMed Project and were subsequently granted financial support for their incubation phase are provided in Table B-1 in Annex B.

¹¹⁷ Switchmed (n.d.) [Morocco](#)

¹¹⁸ Switchmed (2016) [Green Paper on Scaling-Up of MED TEST II Activities](#)

¹¹⁹ SwitchMed (n.d.) [Sustainable and circular industries](#)

¹²⁰ Ibid

¹²¹ European Union (n.d.) [SwitchMed Green Entrepreneurship Programme](#)

Additionally, the SwitchMed project encompasses a platform for inspiring green entrepreneurs and changemakers in the Mediterranean region, the so-called Switcher platform. Currently, there are 50 initiatives from Morocco on the Switcher platform, setting a positive example of how businesses can thrive under the premise of sustainable production cycles. Furthermore, SwitchMed supports community-based social eco-innovation initiatives to maximize their impact and influence, in order to advance sustainable production and consumption measures within the partnering countries. Similarly, to their green entrepreneurship programme, this support framework consists of a 4-day training for civil society grassroots organisations. Amongst the organisations, one can find textile manufacturers using traditional and simultaneously sustainable processes, a company turning overripe apples into cider vinegar or a company supplying solar energy-based wastewater treatment systems. A further support mechanism, the Switchers Fund was set-up to provide financial instruments for green businesses in Morocco. SwitchMed also funded the Docteur Fatiha association, which is involved in the design and production of sustainable alternatives to single-use plastic bags.

Another important pillar of CE-related development cooperation between Morocco and the EU is the PACC, which was signed in 2016. With the PACC, the EU aims to support Morocco`s sectoral reforms by:

- supporting the structural transformation process of the Moroccan production system by removing competitiveness constraints of businesses;
- supporting the structuring of networks of Business Angels and the creation of start-ups through the fund “Fonds Innov Invest”;
- developing the Euro-Mediterranean University of Fez by granting scholarships to students from modest backgrounds;
- improving commercial exchange with exteriors by facilitating access to European market for Moroccan enterprises;
- supporting sustainable development, by facilitating the transition towards a green economy and supporting projects by micro and small Enterprises.

With the aim to help build up a supportive legal framework and address the lack of awareness of the general public on the circular economy (see 2.5.1), the EU furthermore funds a twinning approach as part of the PACC. The twinning is led by France (leader) and Austria with a view to the Monitoring, Environmental and Legal Affairs Directorate (CEDEAJ). The twinning aims to (i) complete the legal and regulatory framework for the application of the framework of Framework No 99-12 on the National Charter for the Environment, and (ii) support the development of the analytical prerequisites and the implementation of the 99-12 framework. This partnership will thus contribute to a legal and institutional strengthening at the end of an inclusive, documented process based on verifiable data.

Apart from SwithMed and PACC, Morocco is involved in various bilateral development cooperation programmes with EU Member States and other EU partners. Although CE is an important aspect of many of these cooperative development approaches, most do not specifically address the concept. Moreover, the majority of projects are still limited to the water, sanitation and agriculture sectors. The following table provides a non-exhaustive overview of the most relevant CE-related development cooperation projects and programmes conducted in Morocco:

Table 4-2 Relevant MS-funded development cooperation projects on CE in Morocco

'Green jobs' for young people in rural areas

This cooperation project carried out by the German development agency GIZ is intended to support young adults in finding employment opportunities that have a sustainability component. The project is particularly targeted at engaging a younger demographic situated in rural areas. In order to achieve a dissemination of knowledge and capabilities to rural areas, the project foresees the establishment of a decentral advice and training network for green employment. The project is carried out in collaboration with the Moroccan Department of Water and Forests and the Mohammed V Foundation of Solidarity from 2018 to 2022 and is endowed with a funding volume of € 5.5 million.¹²²

Network of demonstration activities for sustainable integrated wastewater treatment and reuse in the Mediterranean

In a joint effort of the GIZ the European Union and four Maghreb states, including Morocco, Egypt, Tunisia and Jordan, this project was carried out from 2012 to 2015. It was meant to equip decision makers with the capabilities required for implementing sustainable water policies. The project focussed on the re-use of wastewater, in order to hinder the depletion of naturally occurring water sources and promote sustainable integrated water policies in the region. Morocco was represented by the State Secretary for Water and Environment Morocco and the cooperation in Morocco emphasized the use of decentralised water treatment methods. The Agence du Bassin Hydraulique du Sous-Massa et Draa was also involved as collaborating organization in Morocco.¹²³

Integrated water resources management

The Integrated water resources management in Morocco project is another joint approach by the GIZ and Morocco to developing solutions for the challenges encountered within the Moroccan water sector. The project is unique in that it has duration of 12 years; it was started in 2008 and ends in 2020. It is currently in its third phase and has greatly contributed to the improvement of national wastewater recycling practices in rural areas over its project span. Amongst the measures that were carried out, the project featured recovery systems of wastewater and faeces for irrigation purposes, biogas plants and the construction of waste stream separation in sanitary facilities.¹²⁴

Environmental Programme Morocco (PGPE)

The Environmental Programme Morocco was a project implemented by the GIZ and supported the implementation of the National Charter for Environment and Sustainable Development and the national strategy for providing training in green jobs by advancing the use of green economy tools and approaches in Morocco. The programme emphasized the training of technical waste recovery capabilities, in particular of household and hazardous waste. The programme was implemented from 2014 to 2015.

Model for agricultural production and water management

A modelling tool developed by AFD, for the Moroccan Ministry for the Economy and Finance will enable an impact analysis of different climate scenarios on the Moroccan economy. In particular, they will be able to carry out simulations of agricultural production and necessary surface water resources by 2050 and compare these figures with the resources that will actually be available. In this two-year project, the Directorate for Financial Studies and Forecasts (DEPF) and AFD have entered into partnerships with the Directorate for Research and Water Planning (DRPE), the Directorate for National Meteorology (DMN) and the Mediterranean Institute for Biodiversity and Ecology of Aix-Marseille.¹²⁵

Although CE is usually not the overarching principle under which current EU-Morocco development cooperation is framed, the existing framework of development cooperation projects and programs nevertheless constitutes as a supportive basis and offers a range of opportunities for future CE-related activities, some of which are presented in the following table.

¹²² German Federal Ministry for Economic Cooperation and Development (BMZ) [Morocco: Employment through Green Jobs](#)

¹²³ GIZ (n.d.) [Network of demonstration activities for sustainable integrated wastewater treatment and reuse in the Mediterranean](#)

¹²⁴ GIZ (n.d.) [Integrated water resources management](#)

¹²⁵ AFD (2019) [MOUNSSIF ADERKAQUI](#)

Table 4-3 Opportunities and barriers for future CE-related development cooperation between Morocco and the EU

Opportunities and barriers for future CE-related development cooperation between Morocco and the EU
<ul style="list-style-type: none"> • The positive overarching policy context on both sides as well as the programming process of the next financing period (2021-2027) could contribute to more CE-related development cooperation. • The development cooperation activities carried out as part of SwitchMed form a solid basis for improving and expanding the CE landscape in Morocco. According to SwitchMed, future activities in Morocco will extend the focus of Resource Efficient and Cleaner Production to approach the value chain of the textile and plastic manufacturing sectors with the objective to improve the recuperation of post-industrial waste and to improve the local capacities of maintaining environmental standards in the production.¹²⁶ Development cooperation between Morocco and the EU could aim to complement these measures. • The transition to a CE in Morocco will require to mainstream new consumption models and increased consumer awareness, this may provide a unique starting point of intervention. To this regard, small pilot projects may serve as a promising way to achieve first tangible results and encourage a shift at large-scale projects (upscaling) in order to accompany the emergence of a true national economy linked to CE. • Besides the priority sectors identified in chapter 2, further promising sectors with regard to CE-related development cooperation and mutual knowledge exchange in Morocco include the textile and clothing sector, as well as the tourism sector. Regarding the management of waste streams, household waste, plastics, paper and cardboard, edible oils, used lubricating oils, batteries, tyres, organic waste, WEEE, construction and demolition waste, used batteries, animal waste (fish, poultry waste, slaughter waste) and metal waste are most suitable to expand CE-related development approaches. • Existing initiatives that benefit the development of the Moroccan industrial sector by promoting the efficient use of resources and CE such as PCP Maroc, GGGI (Global Green Growth Institute) may form a good basis for enhanced CE-related development cooperation between Morocco and the EU. To this regard measures relating to the promotion of the Circular Economy under the Green Pact for Europe, the European Green Deal can constitute an axis for future cooperation with Morocco. • Current barriers of Development Cooperation projects with respect to supporting a transition to a CE in Morocco include the lack of a supportive legal framework as well as a lack of awareness of the general public on the circular economy (see 2.6.1). Further twinning approaches as conducted under PACC are a promising tool to address these shortcomings. • The current deficiencies of CE-related development cooperation are often based on shortcomings in the areas of governance (lack of coordination between partners, convergence of priorities, disregard for synergies between policies and strategies, lack of diversity of actors, lack of transparency, etc.), financing (availability of funds, granting and management of procedures) and implementation methods (few integrative projects allowing the use and consolidation of existing structures, limited technology transfer, etc.).

¹²⁶ UNIDO (n.d.) [SwitchMed - Enabling the Switch to resource-efficient and circular economies in the Southern Mediterranean](#)

4.3 Activities by the EIB and European Development Finance Institutions (DFIs)

The following table provides an overview of the major CE-related activities on the European Investment Bank (EIB) and other European Development Finance Institutions (DFIs) in Morocco.

Table 4-4 Activities by the EIB and other DFIs

EIB
<p>Morocco is a long-standing partner of the EIB, which has been active in the country since 1979 and financed 123 projects until today. Besides many projects of the bank which focused on building infrastructure and enabling access to drinking water in rural areas, the EIB has also been active in a solid waste management project (BMCE LIGNE VERTE) since 2016 which comprises several projects implemented by private promoters in Morocco. The program aims to reduce environmental, health and climate impact from waste disposal by increasing recycling and recovery from waste. Besides the local intermediary bank Banque Marocaine du Commerce Extérieur (BMCE) being a central part of the program, the Dutch FMO has also contributed to the project with technical assistance¹²⁷. Besides the technical assistance division, the contract consisted of a term loan of € 20 million to support the BMCE in initiating sustainable finances, towards an improvement of solid waste management practices and standards. The loan is meant to support the national waste management ambitions to rehabilitate or close all existing dumping sites until 2020 and reach a recycling rate of 100 percent by 2030.¹²⁸</p>
European Bank for Reconstruction and Development (EBRD)
<p>In Morocco the EBRD focusses on supporting sustainable energy, direct and indirect financing of private enterprises and promoting infrastructure reform as well as establishing sustainable water systems. One of the programs which concerns the latter is the Saïss and Garet water conservation project covering an overall loan of € 150 million. As part of this project the construction, rehabilitation and modernisation of key components of the Saïss water transfer and distribution network was co-financed. As a second component of the project sustainable water management was facilitated within the Saïss plain. Some of the key objectives of the project were to enable the switch from unsustainable groundwater abstraction from the Sebou/ Saïss basin to a generally more efficient, sustainable, and environmentally friendly water infrastructure as well as the use of more climate resilient surface water resources from the M'Dez dam in specific^{129,130}.</p> <p>Another CE-related project was the provision of a long-term loan to Elephant Vert Maroc, a producer of bio inputs such as bio-fertilizers, bio-pesticides and bio-stimulants from organic waste. The loan was set at EUR 24 million and supported the projects objective to develop and distribute bio-inputs from organic waste for local and for export markets¹³¹.</p> <p>Building on experiences and lessons learnt from the implementation of Morocco Sustainable Energy Financing Facility (MORSEFF), targeting the SME and corporate sectors in Morocco, the EBRD has further developed the Green Economy Financing Facility for Morocco (GEFF), the first comprehensive framework dedicated to financing green economy investments in the retail and corporate banking and leasing sector in Morocco. The GEFF facility in Morocco has established the Green Value Chain (GVC), a € 90 million credit line to local Participating Financial Institutions (PFIs) to on-lend to Moroccan SMEs operating in value chains for their investment in high-performing equipment that integrate energy, water and resource efficiency. The GVC is specifically designed to help industries to green their production processes and move from low value-added to high value-added production in terms of know-how and skills¹³².</p>

¹²⁷ EIB (2016) [BMCE LIGNE VERTE](#)

¹²⁸ Global Recycling (2019) [Morocco: "Huge potential for investment"](#)

¹²⁹ EBRD (n.d.) [Saïss and Garet water conservation project](#)

¹³⁰ EBRD (n.d.) [Saïss water conservation project](#)

¹³¹ EBRD (n.d.) [Elephant Vert Bio-Inputs](#)

¹³² EBRD (n.d.) [The facility](#)

KFW

The focus areas of the German KFW in Morocco include water, energy and sustainable economic development. In the Moroccan water sector KFW is promoting ongoing programs to facilitate an Integrated Water Resources Management with an amount of € 700 million. The Loukkos and PAGI projects for instance were designed to develop new and rehabilitate existing irrigation areas. Investments were for example targeted at dikes and protection measures against floods, pumping stations, equalising tanks, pipeline network and sprinkling equipment (irrigation measures). The project objectives of PAGI were to increase the economic autonomy of farmers and to durably ensure a reliable and demand-oriented supply with irrigation water in the sectors of R'Mel and Drader¹³³. Another project co-financed by the KFW aimed to improve wastewater disposal in the two Moroccan cities Khénifra and M'Rirt. While for both cities an adequate collection and drainage of household wastewater was pursued, a water treatment plant was additionally constructed in M'Rirt¹³⁴. The collection and purification of wastewater was furthermore the goal of another project (Sewerage Rural Centre 2), which was implemented in small and medium-sized towns of rural Morocco. Some of the key measures in this project were the rehabilitation and expansion of the wastewater networks in the cities Essaouira, Errachidia, Sidi Mokhtar, Biougra and Tiznit, as well as the construction of water treatment plants in all locations.

As mentioned above, sustainable economic development especially of SMEs has been another focus area of KfW as they provide nearly half of the jobs in Morocco. To facilitate SMEs' access to funding, the KFW therefore helps to establish structures in the financial sector, for example in the area of innovation and start-up financing, for financing more energy-efficient production processes or for providing financing in rural areas. A range of industries from agriculture, electronics, IT and telecommunications to health care and plant-based pharmaceuticals has been supported through these activities¹³⁵. FODEP I was one of the earlier projects in this area with a contribution of € 12.1 million which was provided for the purpose of financing environmental protection investments in industrial enterprises. One of the main project objectives was to reduce the use of resources and harmful emissions of industrial plants. The target of this Environmental Fund was set on small and medium-sized enterprises producing wastewater, but the intention was also to include air-polluting industrial plants. Seven of the 18 projects which were financed dealt with food processing, four with cement production and two to three each for the textile, chemical and metal processing industries^{136,137}.

DFIs activities in Morocco currently show a strong focus on improving the Moroccan water systems and distribution networks as well as promoting access to more sustainable energy sources. However, none of their activities is specifically targeted to achieve a circular economy. The following table lists opportunities and barriers for facilitating future DFI investments in CE-related projects in Morocco.

Table 4-5 Opportunities and barriers for facilitating DFI investments in CE-related projects in Morocco

Opportunities and barriers for facilitating DFI investments in CE-related projects in Morocco

- As current CE-related projects in Morocco are often rather small in size, they usually do not fall within the scope of DFI funding as the corresponding financial risks are too high. By establishing cooperation's with local financial service providers in Morocco such as the Bank of Africa, DFIs expand their support to smaller initiatives while at the same time reducing the financial risks involved in such investments. Additional financial support from the EU, aiming at securing investments in CE in Africa, may also enable increased DFI investments in African countries, including in smaller initiatives and business.

¹³³ KFW (2005) Morocco: [Agricultural Development Loukkos III and Project](#)

¹³⁴ Ibid

¹³⁵ KFW (n.d.) [Ex post evaluation - Morocco](#)

¹³⁶ KFW (n.d.) [Morocco](#)

¹³⁷ KFW (2016) [Morocco: Industrial Depollution Fund I \(FODEP I\)](#)

- Promoting the recovery and valorisation of value within used resources such as plastics in Morocco's industries is a gap that could be addressed in future DFI activities. In this context DFIs might for instance seek the cooperation with large beverage/bottling companies that seek to increase their PET recycling rate.

4.4 CE-related trade and investments in Morocco

As the recipient of roughly 65% of Moroccan exports and the source of about 55% (2018) of Moroccan imports, the EU is Morocco's largest trading partner. While the EU's imports from Morocco are dominated by machinery and transport equipment, agricultural products, and textiles and clothing, exports to Morocco are dominated by machinery and transport equipment, followed by fuels, metals and minerals textiles and clothing and agricultural products¹³⁸.

Under their Association Agreement, which entered into force in March 2000, the EU and Morocco established a Free Trade Area (FTA) liberalising two-way trade in goods. The FTA was developed further through an agreement on trade in agricultural, agri-food and fisheries products and a protocol establishing a bilateral dispute settlement mechanism, which both entered into force in 2012. Building on these agreements, negotiations for a Deep and Comprehensive Free Trade Area (DCFTA) between the EU and Morocco were launched in 2013. The goal of the DCFTA is to create new trade and investment opportunities, better integrate the Moroccan economy into the EU single market and bringing the Moroccan legislation closer to that of the EU in trade-related areas¹³⁹. Morocco is furthermore part of the Euro-Mediterranean Partnership (Euromed). Euromed is one of the key initiatives of the European Neighbourhood Policy through which the EU offers its neighbours a privileged relationship, to jointly promote economic integration while building upon a mutual commitment to common values¹⁴⁰. So far, both the DCFTA and Euromed do not particularly focus on the enhanced trade of environmental goods and services, not to mention CE-related trade. However, looking at the international component of greening the economy, the DCFTA is likely to reinforce the general trend of green products becoming more and more important in international trade. One example is the compliance with EU (environmental) product standards which will become a prerequisite for successful exports.¹⁴¹

At a national level, this trend is further supported by the implementation of Morocco's Sustainable Development Strategy (NSND), which aims to implement the fundamentals of a green and inclusive economy in Morocco by 2030. To this regard, the Moroccan Ministry of Industry, Trade, Green and Digital Economy (MICEVN) – together with the technical and financial support of the EU – contributes to achieving the strategies objectives and will work towards its implementation. As a result, the country shows increasing tendencies to adopt market-based instruments allowing it to gain access to financing for supporting the sustainable development of the economy from private sources.

To address pollution caused by single-used plastic, the Moroccan Government Council has adopted a strict ban on single-use plastic bags through the law 77-15, effective since July 2016. The Law prohibits the manufacture, import, export, marketing, and use of plastic bags¹⁴². Whereas in other African countries this has resulted in a variety of impacts including a strong decrease in plastic pollution and at the same time complications in trade of goods, the law has not yet been strictly enforced in Morocco. According

¹³⁸ European Commission (n.d.) [Countries and regions - Morocco](#)

¹³⁹ Ibid

¹⁴⁰ Ibid

¹⁴¹ Ecorys (2013) [Trade Sustainability Impact Assessment in support of negotiations of a DCFTA between the EU and Morocco](#)

¹⁴² Morocco World News (n.d.) [Morocco Amends Law on Banned Plastic Bags, Adds Measures for Seizure](#)

to a study by the Moroccan NGO Zero Zbel there is an overlaying informal market of bags that threatens the achievements made on a legal basis¹⁴³. Moreover, the import of scrap plastic as considered a Green Listed Waste from the EU is still facilitated by simplified customs procedures. A legal restriction to trade which has been much more effective, based on the countries motivation to protect the local textile industry has been the restriction on import of all used clothing and textiles. Used tires also fall under a similar trade restriction^{144,145}.

The existing association agreement as well as the currently ongoing negotiations for an improved DCFTA offer a solid framework which can open up great opportunities for cooperation between the EU and Morocco in terms of technology transfer and capacity building, thus facilitating the transition to a Circular Economy (EC). The following table lists potential opportunities and barriers for further expanding the trade and investment in environmental goods and services in Morocco.

Table 4-6 Opportunities and barriers for expanding CE-related trade and investments in Morocco

Opportunities and barriers for expanding CE-related trade and investments in Morocco
<ul style="list-style-type: none"> • Morocco's National Sustainable Development Strategy identifies 7 Challenges and 137 detailed development objectives to operationalize the sustainable development strategy, alongside budgetary and implementation strategies. In order to improve so-called green-based trades, the country aims to incentivize and encourage more trainings within industries to better address the changes in regulatory and environmental standards. To achieve these goals additional research needs to be conducted about environmental protection and the green economy including the recycling of water and waste as well as water and energy efficiency and clean production mechanisms. The existing association agreement between the EU and Morocco as well as the currently ongoing negotiations for improving the DCFTA constitute an important opportunity for exchange and investment in several areas. This opportunity must take into account the transfer of know-how, supervision, support and accompaniment, training, R&D as well as technology transfer. • Establishing Integrated Industrial Platforms represent one of the principal tools for implementation of Morocco's green industrial strategy. Such platforms could raise the attractiveness of a given territory as they are meant to develop a circular economy approach making it possible to promote synergies within a community of actors such as local authorities, partners, suppliers or enterprises and to limit the environmental impacts for example via the use of waste materials as resources¹⁴⁶. • Morocco has established solid partnerships with the EU and fulfils many of the requirements to access investments in the promotion of environmental goods and services. However, trade measures that aim to protect not only the local economy but also the environment are often not very effective. This is mostly due to a lack of law enforcements and a secondary priority of environmental issues. As the National Sustainable Development Strategy is specifically pointing towards the circular economy as a goal and suggests effective measures for sustainable transformation in the country's economy and trade processes, it could present a starting point to support the development of CE in Morocco. • Increasing the focus of education and training on the valorisation of waste as well as environmental protection could offer the opportunity to expand Morocco's market for recycled products as inputs for the European Industry. At the same time the countries production of valued end-products for a green economy has to be pushed. To this regard the transfer of recycling technology between the EU and Morocco is important and could significantly promote Morocco's transition towards a CE.

¹⁴³ SwitchMed (n.d.) [Morocco promoting responsible alternatives to guarantee the success of the ban on plastic bags and Prevention of Marine litter](#)

¹⁴⁴ German Federal Environment Agency (2018) [Export of "Green Waste" \(Annex III and IIIA\) from the EU to countries to which the OECD Decision does not apply \(Country List\)](#)

¹⁴⁵ Societe Generale (n.d.) [MOROCCO: REGULATIONS AND CUSTOMS](#)

¹⁴⁶ Government of the Kingdom of Morocco (2017) [National Sustainable Development Strategy](#)

- In order to facilitate the trade of recycled products the EU and Morocco may consider the elimination of unnecessary quotas and regulatory barriers on imports of recyclable waste from the EU and import bans, e.g. those on PET or scrap metal. These aspects might be considered during the current negotiations of the DCFTA.
- The DCFA can offer preferential opportunities for trade between Morocco and the EU both in goods and services (recovery materials as well as products which support activities linked to the environment, like pumps, recycling machines, etc.), and Morocco is ready to strengthen these exchanges with a view to advancing its transition to CE. The importance of Free Trade Agreements that reflect the enhanced objectives of the circular economy is further specifically addressed in the EU's Circular Economy Action Plan.
- Morocco has launched several projects to accelerate its transition to the CE. The Industry sector, through MICEVN, has carried out and is in the process of carrying out several programs and action plans contributing to the acceleration of its transition to a green and sustainable industry. The realization of these sites implies investments in techniques and technologies affecting, among others:
 - o household and industrial waste management (upstream of the value chain (collection and sorting, formalization of the informal sector, etc.);
 - o management of hazardous and non-hazardous waste;
 - o industrial and energy recovery of waste.
 - o The green ecosystem has identified industrial and energy recovery channels for the waste to be developed;
 - o the promotion of eco-design and the introduction of the EPR principle;
 - o the acquisition of Green Technologies;

The establishment of these sites involves exchanges and investments of goods and services and products allowing the facilitation of CE.

4.5 EU companies with circular economy operations in Morocco

The following table provides an overview of the most relevant EU companies with CE-related operations in Morocco:

Table 4-7 EU companies with circular economy operations in Morocco

Indra Recycling
<p>French company Indra Automotive Recycling runs a global network of 350 used vehicle centres, in which up to 350.000 cars are dismantled and processed per year. Their recovery and reuse rates are over 95%¹⁴⁷. In 2018 Indra was chosen for diagnosing and improving the end-of-life system in the Moroccan automotive sector. Their main task in the first period of the project was to analyse the current state of the sector in all 12 Regions to understand the situation of end-of-life vehicles in Morocco. In the second period a master plan had to be established to determine the target organization as well as various action plans in collaboration with the Moroccan government in order to move forward.</p> <p>The overall objective of the project was to create the basis for a legal system which encourages and incentivizes the treatment of end-of-life vehicles¹⁴⁸.</p>
Suez
<p>Paris-based Suez is in charge of the management of a variety of waste types for car manufacturers in Morocco. This includes the collection of waste materials in the production workshops, the sorting of pallets, cardboard, metals, process oils, packaging and plastics from production and finally the recovery or treatment by qualified sectors. Besides Renault, which is their partner since 2008, Suez also supports PSA Peugeot and Citroën in the treatment and recovery of their industrial waste. In 2019, Suez has invested in two additional multimodal platforms</p>

¹⁴⁷ Recycling International (2018) [Indra opening the door to car recycling in Morocco](#)

¹⁴⁸ Move It Magazine (2018) [INDRA AUTOMOBILE RECYCLING AND DELOITTE COMMISSIONED BY THE MOROCCAN STATE TO ORGANIZE THE END-OF-LIFE VEHICLE SECTOR](#)

to recover industrial waste from the free zones of Tangier and Kenitra, in addition to its formerly built Bouskoura platform. For PSE Suez will deploy the Green' Compact solution which includes a condensed collection plan and a tailor-made industrial waste management park in the latest project. The company is committed to supporting PSA in their goal to achieve "zero landfill waste" by offering innovative solutions for the recovery of all waste, including composting of organic waste¹⁴⁹. Moreover, Suez also collaborated with coffee capsule manufacturer Nespresso in 2017. This pioneer in the portioned coffee market, wanted to extend the recycling of its capsules to the Moroccan market. As an expert in waste recovery, Suez supports Nespresso in improving the end-of-life of its individual capsules. Today, the coffee grounds and the aluminium that make up the coffee capsules are recycled and reintroduced into Morocco's local economy. Used coffee capsules are collected and transported to the Suez recycling and recovery platform in Bouskoura. The coffee grounds and the aluminium that comprise the capsules are then separated for recovery into organic matter and aluminium. While the organic matter of the coffee grounds is given to the association Earth & Humanism where they are transformed into compost and fertilizers to improve soil quality, the recovered aluminium is reinserted into the economy via recovery streams¹⁵⁰.

Elephant Vert

With financial support of the EBRD as mentioned above, the French-Moroccan company Elephant Vert manufactures organic pesticides and organic fertilizer in Morocco since 2014. The products are based on organic waste which the company collects locally in order to use as a raw material to produce an estimated amount of 60.000 Mtons per year.¹⁵¹

Sovamep

French company Sovamep collects, recycles and recovers various industrial metals in Morocco including ferrous metals, non-ferrous metals and WEEE. Their subsidiary Valdeme has been based in Morocco for 18 years. The local teams have been collecting and recycling industrial waste both on national territory and in free zones for two decades¹⁵².

Texaid

Swiss-German Texaid collects old clothes, shoes and home textiles, sorts and finally recycles the used textiles. A sorting facility based in Morocco has belonged to TEXAID since 2013 and is situated in Tangier, in close proximity to the important African sales markets. Approximately 130 employees sort over 7,000 tons of used textiles each year¹⁵³.

VEOLIA (France)

The French company Veolia is actively involved in supporting Moroccan cities in addressing urban sprawl and population growth. Through its subsidiaries Amendis and Redal, Veolia has made significant progress over the past 16 years in the management of essential services (water, electricity and sanitation) in the regions of Tangier-Tetouan and Rabat-Salé. As a result, Service and supply rate for drinking water, electricity and sanitation as well as yield rate for water and electricity have improved considerably.

Another primary focus area of Veolia in Morocco is the treatment of wastewater. The company has built several treatment facilities according to the most modern quality standards. The pollution clean-up programme is part of a global policy to promote sustainable development and improve the quality of living of inhabitants.¹⁵⁴

Wolkat

The Dutch company Wolkat is a group of seven innovative textile recycling companies. Their headquarter is based in the Dutch city Tilburg, where research is conducted about various circular processes and-of other waste products from materials such as textiles and plastics. For more than 25 years the company operates in Tangier, where the factories are based near a major port for most effective trade opportunities. In the Moroccan factory old textiles are sorted, cleaned and spun into new yarns. Later, these yarns are used to yield new products¹⁵⁵.

¹⁴⁹ SUEZ (2020) [SUEZ wins two contracts in the automobile sector in Morocco](#)

¹⁵⁰ SUEZ (n.d.) [SUEZ is giving Nespresso capsules a new lease of life in Morocco](#)

¹⁵¹ GIZ (2014) [Report on the Solid Waste Management in MOROCCO](#)

¹⁵² SOVAMEP (n.d.) [Valdeme](#)

¹⁵³ TEXAID (n.d.) [Our Locations](#)

¹⁵⁴ VEOLIA (n.d.) [Our solutions in Morocco](#)

¹⁵⁵ Wolkat (n.d.) [Locations](#)

With its market-based approach, Morocco was able to attract many EU companies to engage in CE-related activities, especially from French speaking countries. The following table lists opportunities and barriers to further expand CE-related activities of EU based companies in Morocco.

Table 4-8 Opportunities and Barriers for expanding CE-related activities in Morocco by EU companies

Opportunities and Barriers for expanding CE-related activities in Morocco by EU companies
<ul style="list-style-type: none"> • The areas in which EU companies are operating in Morocco are diverse and especially well-established around the Moroccan waste management, water, agri-food and textile recycling industry. Although some companies have established long-term partnerships in the country, some of the global EU brands operating in Morocco seem to exploit the local cost benefits, while awarding contracts yet again to international brands. A better integration of company activities in the Moroccan context including the involvement of local SMEs could address this shortcoming. • Currently most EU companies with operations in Morocco focus on recovering resources. An increased collaborative engagement with local companies and service providers could increase recovering rates and promote general awareness of CE in the country. • An extensive mapping and analysis of actors operating in the circular economy both in Morocco and the EU might offer the opportunity to highlight the various interests, challenges and synergies involved, thus enabling the development of optimised solutions for future CE-related operations of EU companies in Morocco.

4.6 Research and technical cooperation

In an effort to establish a formal cooperation framework for scientific and technologic research the EU and Morocco have signed the international agreement on Morocco's participation in the 'Partnership for Research and Innovation in the Mediterranean Area' (PRIMA) in 2018. PRIMA is supported by Horizon 2020, the EU's research and innovation framework programme on the basis of Decision (EU) 2017/1324. It is the first public-public partnership under Horizon 2020 enabling participation of non-EU countries that are not associated to the EU research framework programme on an equal footing with Member States and Associated Countries.¹⁵⁶ Research and technical cooperation under PRIMA focuses on three priority areas:

- water management;
- farming systems;
- agri-food value chains.

PRIMA's annual work plan 2020 is, among other things, structured along the priority to create opportunities towards a transition to the circular economy in the Mediterranean Area in line with the recently adopted Circular economy EU package and Action Plan.¹⁵⁷ Accordingly, CE plays a central role in the 2020 Calls for project proposals for all three thematic priority areas.

In the past, Morocco and the EU have also been involved in research and technical cooperation under the EU Framework Programme 7 (FP7) and its successor programme Horizon 2020. The following table

¹⁵⁶ European Commission (n.d.) [International Cooperation - Morocco](#)

¹⁵⁷ European Commission (2020) [ANNEX to the Commissions decision on the financing of the Partnership for Research and Innovation in the Mediterranean Area \(PRIMA\) for the years 2020 to 2028 and on the approval of the annual work plan for 2020](#)

provides an overview of CE-related projects conducted either in Morocco, or in cooperation with Moroccan partners.

Table 4-9 CE-related research and technical cooperation between the EU and Morocco

<p>RESLAG - Turning waste from steel industry into a valuable low-cost feedstock for energy intensive industry (2015 - 2019)¹⁵⁸</p> <p>RESLAG was funded under Horizon 2020 and aimed to develop solutions for the valorisation of steel slag through 4 eco-innovative industrial alternative applications that will be proved in 4 large scale demonstration pilots. The project was conducted in cooperation with the Moroccan Agency for Sustainable Energy.</p>
<p>BIOWASTE4SP - Turning biowaste into sustainable products: development of appropriate conversion technologies applicable in developing countries (2012 - 2015)</p> <p>BIOWASTE4SP developed environmentally appropriate and socio-economically sustainable biotechnological processes for converting biodegradable fractions of identified African and Mediterranean agricultural and industrial waste as well as fractions of municipal and animal solid waste into food, feed, value-added products for nutraceuticals and healthcare, biogas and organic based fertilizer. The project, which has been funded under FP7, was conducted in cooperation with the Association Marocaine des Déchets Solides (Amades).¹⁵⁹</p>
<p>MOSES - Managing waste water Saving with Enterprise Services (2015 - 2018)</p> <p>MOSES aimed to put in place and demonstrate the application of an information platform devoted to water procurement and management agencies (e.g. reclamation consortia, irrigation districts, etc.) to facilitate planning of irrigation water resources, with the aim of (i) saving water; (ii) improving services to farmers and; (iii) reducing monetary and energy costs. The project, which has been funded under Horizon 2020, was conducted in cooperation with the Chouaib Doukkali University in El Jadida.¹⁶⁰</p>
<p>MADFORWATER - DevelopMent AnD application of integrated technological and management solutions FOR wastewater treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries (2016 - 2020)</p> <p>The aim of MADFORWATER is to develop a set of integrated technological and management solutions to enhance wastewater treatment, reuse for irrigation and water efficiency in agriculture in three MACs (Tunisia, Morocco and Egypt). MADFORWATER will develop and adapt to three main hydrological basins in the selected MACs technologies for the production of irrigation-quality water from drainage canals, municipal, agro-industrial and industrial wastewaters, and technologies for water efficiency and reuse in agriculture. The project is funded under Horizon 2020 and conducted in cooperation with the Institut Agronomique et Vétérinaire Hassan II in Rabat.¹⁶¹</p>
<p>RAISELIFE - Raising the Lifetime of Functional Materials for Concentrated Solar Power Technology (2016 - 2020)</p> <p>RAISELIFE focuses on extending the in-service lifetime of five key materials for concentrated solar power technologies: 1) protective and anti-soiling coatings of primary reflectors, 2) high-reflective surfaces for heliostats, 3) high-temperature secondary reflectors, 4) receiver coatings for solar towers and line-focus collectors, 5) corrosion resistant high-temperature metals and coatings for steam and molten salts. The Horizon 2020 project brings together a broad consortium formed of industry partners, SMEs and research institutes of the concentrating solar thermal and material science sector, including the Moroccan Foundation for Advanced Science, Innovation and Research (MAScIR).¹⁶²</p>

Although CE is not yet specifically addressed in recent and ongoing research in technical cooperation, it is evident that some key aspects of the concept are already addressed. The following table lists

¹⁵⁸ CORDIS (n.d.) [Turning waste from steel industry into a valuable low cost feedstock for energy intensive industry](#)

¹⁵⁹ CORDIS (n.d.) [Turning biowaste into sustainable products: development of appropriate conversion technologies applicable in developing countries](#)

¹⁶⁰ CORDIS (n.d.) [Managing crop water Saving with Enterprise Services](#)

¹⁶¹ CORDIS (n.d.) [DevelopMent AnD application of integrated technological and management solutions FOR wasteWATER treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries](#)

¹⁶² CORDIS (n.d.) [Raising the Lifetime of Functional Materials for Concentrated Solar Power Technology](#)

opportunities and potential barriers to expand the focus on circularity in future research and technical cooperation between Morocco and the EU.

Table 4-10 Opportunities and barriers for future CE-related research and technical cooperation

Opportunities and barriers for future CE-related research and technical cooperation
<ul style="list-style-type: none"><li data-bbox="284 405 1388 548">• The clear focus on circularity in the annual work plan 2020 of PRIMA offers a good opportunity to develop new, CE-related project ideas in the field of water- and agri-food management. The strong commitment to CE of Horizon 2020s final Work Program and its successor program horizon Europe could further secure a continuous support for CE-related R&T cooperation activities between the EU and Morocco.¹⁶³<li data-bbox="284 562 1388 622">• Future cooperation activities could draw on the expertise and experience of local research institution that have already been involved in CE-related projects in the past (e.g. MASclR, Amades, etc.).

¹⁶³ European Commission (2017) [CIRCULAR ECONOMY RESEARCH AND INNOVATION](#)

5 Recommendations

5.1 General recommendations

5.1.1 Recommendations to strengthening policy dialogues

1. Consider and integrate the Circular Economy as specific focus area in the EU-Morocco Dialogue.

Currently the political focus is on waste as a value-chain (waste management, water waste, renewable biomass energy). The dialogue will be strengthened with the integration of CE as a whole, i.e. according to life-cycle principles and based on the waste hierarchy, by setting up a knowledge management of CE to ensure authorities at all levels are fully aware of CE extent, stakes, potential and opportunities.

There is a need even at the highest level to explain the full scope of the circular economy and to move away from the vision of CE being only the waste economy. It will certainly help local decision makers to better integrate the CE in policy and create a favourable environment for stakeholders to seize business opportunities. The European Commission can organise workshops, training, learning expeditions and other activities for a better understanding of CE potential and opportunities in Morocco.

The narratives of the dialogue can focus on:

- the economic opportunities related to CE: how it translates into job creation, GDP, new businesses and value chains, better natural resources management;
- the social impacts of CE, i.e. providing benefits to the workers of the informal sector;
- the environmental benefits: preserving natural resources, mitigating climate change and reducing (plastic) pollution.
- The role that CE can play in the economic recovery from the pandemic (using the lessons learnt from the COVID-19 crisis to accelerate the transition, making value-chains more circular and resilient, etc)
- The focus of the EU-Morocco dialogue could also be put on the development of an ambitious and clear CE strategy and roadmap for Morocco.

2. Put in place an efficient governance structure to effectively allow the establishment of a real circular economy model.

National authorities can assign the responsibilities of (re)structuring governance, establishing a framework and leading efforts of the CE agenda and related projects to independent entities. Obviously, there is no need to create new structures — they already exist. Potential entities to deliver this task could be the Moroccan Agency for Energy Efficiency (AMEE) operating under the Ministry of Industry, Trade and Investment and the Digital Economy (MICEVN). However, they need to be reinforced in terms of roles and responsibilities, capacities and financial means with regards to the CE agenda.

The European Commission can advocate for, advise and support the development of an integrated and participatory CE governance system where expectations of the main stakeholders (Government, Private Sector, NGOs and Research and Development Institutions, civil society) are taken into account and are translated into a concrete and measurable action plan to allow the transition towards CE at a national level and on a scale critical enough for a deep change. Actions required to achieve that could fall under so called “CE one-stop-shops” (circular hubs) where stakeholders can obtain and access all kinds of resources related to CE. Those could be established both at national and regional level but also at a city-

level. The EC could capitalise on some programs like SwitchMed to establish such one-stop-shops in the form of Public-Private-Partnerships, like Circular Flanders.

3. Strengthen the implementation of the National Strategy for Sustainable Development (SNDD)

Local authorities could reinforce the regulatory framework with regards to waste management by integrating Extended Producer Responsibility (EPR), which can be more efficient than the polluter pays principle that is currently in application. Member States, like France which has already implemented 20 EPR schemes across 14 sectors, could be taken as example¹⁶⁴.

On a more general note, the European Commission could share experience and best practices of Member States who are progressing successfully in their CE transition, like the Netherlands¹⁶⁵. It could also be an opportunity to integrate monitoring indicators (quantitative and qualitative) for the implementation of the SNDD. The European Commission can support in inaugurating monitoring and decision-making tools and systems. These have the potential to help oversee and guide the CE approaches: such as interactive mapping of resources (primary and secondary) and actors, collaborative tools for the development of CE models, and knowledge sharing.

5.1.2 Recommendations for successful development cooperation projects and programmes

In order to seize the opportunities arising from the current trend in CE-related policies in both Morocco and the EU, as well as the programming process of the next financing period (2021-2027), it is important that Morocco develops an ambitious and clear CE strategy and roadmap. Under the framework of a Green Economy Plan, the Ministry of Industry, Trade, Green and Digital Economy (MICEVN) is currently working on these documents¹⁶⁶. The national CE roadmap should clearly define the roles of all stakeholders, such as policy makers, civil society as well as the public and private sector. For the national CE strategy, it should be structured by sectors, similar to the European one, with a particular focus on the, waste and wastewater, e-waste, construction, agriculture and fisheries, as well as textile/clothing and tourism.

As the transition to a CE in Morocco will require to mainstream new consumption models, a national CE strategy should further focus on creating consumer awareness as this may provide a unique starting point of intervention. To this regard, small pilot projects may serve as a promising way to achieve first tangible results and encourage a shift to large-scale projects (upscaling) in order to accompany the emergence of a national economy interlinked with CE.

Apart from defining the framework for future CE-related development cooperation, it is recommended that existing programs, such as SwitchMED, which have already formed a solid basis for improving the CE landscape in Morocco and will expand these efforts in the future, are complemented by EU-Morocco development cooperation programs in a targeted manner. To this regard the coordination between development partners/ donors needs to be improved. This may for instance be achieved by complementing the existing thematic working groups on water, solid waste and climate change with a dedicated working group or platform for CE-related efforts.

¹⁶⁴ Assises Nationales des Déchets (2017) [The future of EPR](#)

¹⁶⁵ Ecopreneur.eu (2019) [Best practices from The Netherlands for a European Circular Economy](#)

¹⁶⁶ According to Mr Mouline, Director of Agency for Energy Efficiency (AMEE) and AMME (2020) [La valorisation des déchets](#)

Besides building on existing development cooperation projects, future development cooperation should also take into account current national developments that facilitate a CE in Morocco. To this regard the following efforts are especially promising:

- The establishment of the Coalition for Waste Recovery (COVAD);
- The transformation of the AMEE into a Green Economy Agency;
- The country partnership programme signed between UNIDO and the Kingdom of Morocco which has a component on circular economy;
- The membership of Morocco to the PAGE (Partnership on Action for Green Economy) and the action plan being finalized by UNIDO in this framework.

In order to adapt successful models and good practices from Europe to the Moroccan context, it is recommended to consider the EU's twinning instrument for institutional cooperation between Public Administrations of EU Member States and of beneficiary or partner countries. Twinning could support future development cooperation to build the Moroccan CE capacities in a more targeted manner by providing local authorities with the necessary training and resources.

5.1.3 Recommendations for effective cooperation with the European Investment Bank (EIB) and other European Development Finance Institutions (DFIs)

Besides building on existing DFI activities, future DFI investments could be facilitated by more strongly promoting current national developments that facilitate a CE in Morocco in the European context. Moreover, the following project recommendations are promising as regards attracting DFI investments:

- Diversify project foci: whereas many former projects that received DFI investments focused on water and energy related topics, future project portfolios could become more diversified by including other CE-related topics, such as the recovery of materials, plastics or e-waste in Morocco's industries, of which a majority is, as yet, unrecovered implying a great economic value loss and an unexploited trade opportunity when just being dumped or incinerated;
- Scaling-up: instead of small-scale projects that do not qualify for investments, future activities could focus on matchmaking, finding complimentary collaboration with partners in large-scale industry actors, such as beverage/bottling companies. This way, small initiatives can qualify for funding while having access to the network and experiences of their more established partner. In turn, the larger partner will benefit from being part of potential innovations arising (open innovation).
- Increase outreach of projects: in order to develop projects with a larger scope, future projects could establish cooperation's with financial service providers and partners active on different geographical levels. Besides European DFIs, also the AfDB could be considered as partner operating on a continental level, but also banks that are active in several Sub-Saharan countries, such as the Bank of Africa, Attijariwafa Bank, BMCE Bank or Banque Populaire.
- Support local and national financial institutions to design and implement new financial instruments, in particular for micro, small and medium enterprises (MSMEs): these are aimed at not only taking economic criteria into account (such as adapted taxation, tax incentives or grants for green activities), but also CE and sustainability related benefits (internalisation of social and environmental costs). With this kind of support the European Commission could, for instance, help to set-up new frameworks or financial backing with guarantee funds. It will allow financial institutions to offer low interest rates for loans, subsidies and easier access to banking solutions with no warranty conditions. As an example, the intervention of the CCG (the Central Guarantee Fund) offers many advantages, such as the facilitation of access to credit, reduction of the cost

of financing, preferential treatment of SMEs and the improvement of the relation bank-enterprise.

5.1.4 Recommendations for advancing CE-related trade and investments between the EU and Morocco

Currently, the Moroccan trade environment already shows many prerequisites, that can be considered necessary to develop stronger trade relations of environmental and CE-related goods and services between the EU and Morocco. In order to build on these and strengthen the existing structures the following recommendations should be applied:

- Deepening the partnership: the association agreement between the EU and Morocco offer many opportunities for exchange and investment in several areas. This exchange could even be strengthened by promoting the transfer of know-how, support and accompaniment, training, R&D as well as technology transfer. Current agreements have not included enhanced trade of environmental goods and services, nor CE-related trade, which should be addressed in future ones;
- Incentivising trainings on green trade: in order to improve green trade, more training opportunities should be available within industries and agriculture stakeholders to better address the changes in regulatory and environmental standards and address exports concerns;
- Collaborations of industry and research: more research needs to be conducted to not only identify environmental challenges such as resource scarcity but to stimulate the development of innovations to address these challenges including recycling innovations for water and waste as well as energy efficiency and clean production mechanisms. the development of innovative recycling solutions could strongly enhance green-based trade;
- Benefit from established Integrated Industrial Platforms: the usefulness of Integrated Industrial Platform and particularly the network of authorities, suppliers, industry actors etc. on these platforms should be increased by actively promoting synergies;
- Increase effectiveness of trade measures: the secondary priority of environmental issues should be addressed and the effectiveness of trade measures required to ensure green trade should be improved.

5.1.5 Recommendations to create a supportive environment for EU / African companies with circular economy operations in Morocco

1. Create a platform for CE private actors within the suggested CE hubs to allow networking, training, scouting and capacity building:

- Raise awareness and train: since most European companies operating under the banner of CE in Morocco focus primarily on waste collection and recovery, it is important to also promote CE-activities with potential and benefits, such as industrial symbiosis or eco-conception. Developing a portal with the latest CE news and developments both in Europe, Morocco, Africa and the rest of the world would allow practitioners to keep up with innovations, legal framework, opportunities, etc.;
- Create a mapping and match-making platform: for skills, expertise, activities, needs. Initiate activities to facilitate linkage between European and Moroccan companies, such as in-person or online events;
- Foster collaboration: organise knowledge and best practices sharing workshops. The vehicle for this could be a collaborative platform for CE case studies in Morocco where public, private and civil society can be referenced and where enablers and barriers can be identified;

- Support private actors to put in place a practical, simple yet informative monitoring and evaluation system. It can take the form of a series of toolkits that can allow initial diagnostics, setting up indicators, monitoring and evaluation.

2. Support European chambers of commerce to become vehicles of the transition to CE.

Chambers of commerce can play a pivotal role in promoting CE and dedicated CE resources, i.e. data and policy framework library on CE, case studies, learning materials, databases of experts, trainings, etc. Complimentary to this, the type of support offered by the European Skills, Competences, Qualifications and Occupations (ESCO) can be used but with a focus on waste instead of energy. Chambers of commerce could also act as connecting element between businesses and academic institutions when it comes to promote the involvement of universities in the standardisation processes and decision as well as policymaking.

5.1.6 Recommendations to advance research and technical cooperation between the EU and Morocco

The continuation of further developing a genuine cooperation strategy between Moroccan and EU universities and research centres, could be important to:

1. Set up a CE platform for researchers, universities and research institutions which facilitate collaboration between EU and Morocco.

This platform can give the opportunity to:

- Share projects, studies and publications, past and on-going, with a focus on learnings and best practices related to CE;
- Promote developed technologies and models in relation to CE and facilitate technology transfer;
- Access to educational resources, tools and methodology on CE research. This can be a broad platform with basic as well as higher education resources on CE with global as well as contextualized content both for trainers and trainees. Such resources could be also channelled from recognized institutions and organizations like the Ellen MacArthur Foundation;
- Encourage knowledge sharing between Moroccan and EU-based universities by organising online workshops and webinars;
- Find opportunities to participate in major international research projects in CE-related fields beyond global European programmes, like Horizon 2020 or Horizon Europe. This could include specific and targeted opportunities pursued by research institutions from the EU and Morocco, referring to the advanced status granted to Morocco by the European Union.

2. Promoting international mobility programs with a particular focus on CE.

R&I programmes like the ones from the European Research Council (ERC) and Marie Curie, operating under Horizon 2020 and Horizon Europe, are open to all scientists in the world and to any innovation area for free. Instead of fragmenting the topic of CE, further promoting these international and interdisciplinary programmes with a particular focus on CE, will contribute to advance CE as a cross-cutting topic. This can open new paths to future and emerging technologies by supporting collaborative, interdisciplinary research and innovative ways of thinking.

3. EU can promote and encourage partnerships between universities & private sector through an enabling ecosystem for open innovation.

This can be done by duplicating the example of OCP with UM6 Benguerir and Mascir institution. This bridge can be established through:

- a match-making platform where private sector will publish their needs, projects, challenges in relation to CE, and universities or research institutions can express their interest in participating in such research;
- networking events and co-creation workshops between companies, researchers, innovators, entrepreneurs;
- a call for proposals promoting EU-Moroccan business and research partnerships.

4. Encourage local research and production.

Morocco is still relatively import-dependent and, thereby, holds significant potential to become more independent in material and product categories that have potential to be further developed in Morocco to supply its domestic demand. One proven example that has been observed during the COVID crisis is that Moroccan students at engineering and industrial universities were able to take up the challenges to develop new technologies and products for local consumption that Morocco used to import at a very high cost from Europe or Asia. Taking it a step further, the development and advertisement of labels such as “made in Morocco” or “made sustainably in Morocco” will potentially drive awareness, demand and certainly comfort consumers in their choices. This demands to decide upon underlying criteria defining these labels. Once the European Sustainable Finance Taxonomy is completed, the development of sustainability criteria in Morocco could be inspired or even aligned to this important European framework.

5.1.7 Other recommendations: COVID-19 Impact

The impact of the current crisis on the CE agenda is positive, it will place CE at the centre of the International Agenda for Sustainable and Inclusive Development. The consequences inherent in the COVID19 pandemic, particularly in terms of the reduction or even the limitation of trade between countries, revealed the need to refocus consumption and production methods at the local level and reduce dependence on resources produced elsewhere.

- Circular economy practices can help SMEs reduce their dependence on resources, especially from abroad;
- An industrialization of the country for national self-sufficiency and invest upstream to ensure its raw materials will reinforce the resilience of territories for the benefit of the local economy. For example: The paper and cardboard sector was very much in demand for the packaging of basic needs (food, pharmacy, detergent, disinfectant, masks, etc.). International logistics were interrupted due to COVID 19 crisis, but GPC was able to meet demand thanks to its investments and notably that of its paper recycling plant. This security of supply could have prevented a significant shortage;
- The lessons learned from this experience can help companies and countries to prepare for other types of crisis such as climate change;
- Policies to preserve natural resources need to be reinforced and their use rationalized to minimise the cost of environmental degradation;
- Covid-19 pandemic has delayed the progress of programmes such as the Switch Med II program, launched in November 2019. Certain activities such as training, meetings and workshops have been adapted to be carried out online due to the travel ban. For the future of these CE-related programmes, greater reliance needs to be placed on national partners and experts;

5.2 Sector-specific recommendations

5.2.1 Agriculture and food production

Rethinking agriculture and food as a system, not just a sector.

In a country where agriculture is without doubt an important pillar of economic and social development, it is necessary to have an holistic approach, which takes into account all components of the agricultural system as well as the interactions between them: from soil quality to final agricultural products, and seeds, water, including valorizing by-products which can create new value-chains and economic opportunities. This could only be done through:

- increasing awareness of farmers on the importance of sustainability, circularity and its benefits through national campaigns and local events;
- sharing best practices from Europe but also from African countries through online platforms, workshops but also international events such as the 1st EU/North-African Conference on Organic Agriculture (EU-NACOA) held in November 2019 in Marrakech-Morocco;
- promoting innovative start-ups in the agri-tech and biotech sectors;
- setting up financial incentives (tax reduction) and easier access to funds to encourage the different stakeholders in the agricultural value chain to integrate sustainable practices¹⁶⁷ in their operations or to create ventures responding to identified problems. One example, amongst others, is that composting companies that can recycle agricultural organic waste. The valorisation of these wastes by the composting process can therefore be an effective solution as a treatment approach. It allows removing pathogenic microorganisms, recovering organic matter, nutrients and producing an amendment for organic agriculture and carbon sequestration to depleted soils. Circular economy would be enhanced through composting which will fill the gap to empower organic agriculture in Morocco.
- encouraging the creation of coops to benefit from government aid and increase their credibility with banks in order to create value and employment in different regions;
- supporting local production and consumption of Moroccan organic farming by promoting the "Maroc Bio" label;
- structuring the distribution channels of organic products;
- investing in R&D in the field of organic fertilizers and pesticides as most of them are imported;
- integrating sustainability and the notion of CE in agronomy training and courses.

5.2.2 Household waste

1. Rethinking the role of informal sector in household waste management.

As part of the National Household Waste Plan (PNDM), the experience of the sorting center at the Oum Azza landfill (Rabat) was successful. Replicating this model in other cities of the kingdom can make a lot of sense for several reasons.

- Integration of rag pickers into a formal system through collaboration between the Oum Azza landfill in which learnings will be transferred. However, instead of copying the concept to other waste management and treatment facilities, rather each new approach should be considered in a case-by-case scenario as other cities have failed in simply replicating it.

¹⁶⁷ Generally, a sustainable practice is defined as one that does not harm the environment or negatively affects local societies. However, it is recommended to initiate a multi-stakeholder process that develops a definition for sustainable practices relating to the Moroccan context specifically.

- Giving the informal waste pickers back their dignity through stable work, social coverage- improve the image of rag picker work and highlight the positive impact and essential role of their work in improving the social, economic and environmental impact.

The replication will require to authorise officially rag pickers to collect recyclable waste in urban areas with a change in the legislation which:

- supports the structuration of those workers by creating a simple registration system for those informal rag pickers in dedicated cooperatives, associations, or directly at the recycling plants;
- equips cooperatives and associations to train registered rag pickers and provide with at least basic equipment to guaranty the safety and efficiency of their work.

2. Making households one of the main actors of the municipal waste management strategy.

- Involving households to make them rethink their relationship to waste by organizing sensitization and awareness campaigns in collaboration with local NGOs and on-the-ground initiatives, and providing sorting bins to facilitate home sorting.
- Giving incentives or penalties to encourage households to sort their waste.

3. Integrate innovations.

The EU can also support Morocco in the creation of startups offering innovative models in intelligent waste management by integrating key players in waste collection such as grocery owners for example.

5.2.3 Water and wastewater

1. Reinforcing the legal and institutional framework for water resource.

To allow for the competitiveness of the sector and benefits to all stakeholders, the legal and institutional framework needs to be adjusted by:

- Setting a clear and enforceable water code integrating regulatory aspects;
- Reinforcing coordination, arbitration and mediation missions;
- Setting up a conducive framework for investment in the water sector (Water Sector Investment Charter). This could be done through attractive fiscal policies, like tax benefits for private companies investing into the water sector, but especially in water sanitation.

2. Support the development of environmental-friendly technologies and solutions.

The adoption of CE-related solutions and systems for water treatment is fundamental for the balance of the environment. With this regard, the EC can help:

- identifying and supporting the development of easy-to-implement solutions against water pollution and recovery like nature-inspired solutions (biomimicry), e.g. lagooning, methane fermentation, phyto purification, etc. Pilot projects gathered by local authorities, research institutions, private sector including start-ups and SMEs, can assess the feasibility and benefits of such environmentally friendly approaches especially at municipal level. With this input an exchange platform with similar European projects can be created;
- supporting the improvement of a rigorous planning process with the following strata: strategy, plans and programs with their territorial variations.

3. Reinforce the framework for investments in water sector by:

- Regulating and structuring investment decisions with standardization of feasibility studies, investment opportunities challenged according to financial criteria, and establishing a systematic post-evaluation system. This will allow transparency and comparability of projects, as well as a clear monitoring of outcomes;
- Adopting new approaches for investments that will allow for more efficiency, better management and adaptability by moving from a classic infrastructure paradigm to an industrial, technological and digital mode (reuse, desalination, etc.).

4. Strengthen the involvement of stakeholders.

As water is a cross-cutting sector, it will be necessary to operationalise the convergence of public policies in programmes, sectorial master plans, donors and territorial development plans by giving importance to Community projects. EU companies active in the water and sanitation sector may profit from a collaborative engagement, promoting better water management in Morocco.

5. Encourage users to play an active role in the water resource management.

- Setting up fiscal benefits and incentives for users to have a rational use of water at home, offices, in industrial activities, etc.;
- Organising sensitization campaigns, events and training for citizens to better manage the water resource.

5.2.4 Construction and demolition

1. Promote local, low-cost and natural building materials and techniques.

This can be done through:

- Creating a bridge with European associations, professional bodies, EU-funded projects who are promoting construction with mud and other natural material (e.g. in France: Asso Lesa, AsTerre, CRATerre; Italy: Citta dela terra cruda). Subsequently a framework for exchange and networking with Moroccan counterparts could be established, given the fact that the Kingdom of Morocco has a long tradition of building with soil and other natural materials;
- Training young people and craftsmen in the use and development of local and environmental-friendly construction materials such as Ecodome Maroc. Not to forget, architecture and civil engineering schools should also be targeted by raising awareness on the economic, social and environmental benefits of using local and natural materials, in particular related to end-of-life / demolition compared to cement. This could also be done through e-learning platform like “Mooc Batiment durable” supported by ADEME in France¹⁶⁸;
- Raising awareness of local authorities about the value-added and benefits of using local materials and techniques that have been used for centuries and which are now disappearing. The challenge will be to change the perception of those materials, which are considered as old-fashioned and out-dated or not robust enough. Present concrete examples of realisation of administration and public buildings, schools and home developments can be taken from Europe (France: Rennes, Montreuil, Austria: Vorarlberg, Spain, Italy). Additionally, the support of policy makers should include to consider in regulatory framework the use of environmentally friendly materials that fit to the CE approach. Examples can be taken from EU members countries, like France (with a certain percentage of bio-based materials in new construction and renovation);

¹⁶⁸ MOOC (n.d.) [Formations actuelles](#)

- Bearing in mind the lobbying power of cement importers and industrialists, advocating for innovative eco-friendly building materials local production is not to underestimate and should therefore be done. Especially in context of the sand crisis, it is a good opportunity to find safe and environmentally friendly alternatives. It is also an opportunity to promote European companies' expertise and innovations with regards to eco-materials and solutions., for instance, Saint-Gobain and EU-funded public agency Euromediterranée with their project with earthen construction;
- Raising awareness of building professionals, project developers and the general public on the benefits of building with local and eco-friendly materials. This can be done through the organisation of or participation to events targeting those specific public.

2. Focus on amendment and levelling of legislation.

It is also recommended that the future in the sector of C&D Waste, projects in CE must focus on the amendment and the levelling of regulations relating to the management of C&D waste and also on the normalisation aspect of the products resulting from their valuation.

3. EU support for local actors.

The EU can provide advocacy support to local private actors (especially start-ups and SMEs), through involvement in the policy dialogues to facilitate the delivery of messages to ministries, structured consultation and a stronger involvement in policy dialogues related to C&D waste.

4. Encourage the use of recycled material for building.

- Create a framework for networking, exchange, transfer of knowledge and technologies between local construction professionals and European and other African innovations and programs with regards to secondary building materials like recycled plastic bricks or recycled concrete. It is an interesting opportunity for European programs to showcase their expertise and learnings in terms of re-using material for construction e.g. in France the national program Recybeton¹⁶⁹;
- Set up a legal framework and standards favourable to use secondary raw material in construction, for instance, demanding a mandatory share of recycled materials in the parts that get refurbished in the building fabric or built newly.

¹⁶⁹ Recybeton (2013) [News](#)

6 Conclusions

6.1 Circular economy trends in Morocco

The Kingdom of Morocco considers the green economy as an essential pillar for its development. It is translated into the adoption of the national strategy for sustainable development (SNDD) in 2019. As such, the circular economy, primarily seen and understood as waste management and recovery, is an important driver of this national strategy. This is reflected in a significant number of policies, projects and programmes integrating circular economy principals and fundamentals.

On the production side, actions and efforts are arising to apply circular economy principles. The private sector is also aware of their role to play in resource efficiency and waste management, as well as opportunities that can be seized. However, on the consumption side, Morocco is still a market for first time buyers. This stresses even more the need for a holistic approach reducing current disabling factors, such as inappropriate consumption and waste disposal patterns across sectors, and increasing enabling aspects for CE like empowering local initiative to accelerate innovation and CE solutions tailored to the local context.

For the circular economy to be really adopted in practice and to increase its positive impacts, it requires innovative partnerships between stakeholders. Adapted investments and technological solutions as well as improving local skills are key enablers for such partnerships. Innovating SMEs and community-led initiatives are a real driving force towards the circular economy, although they have limited capabilities and should benefit directly from new green funding facilities and appropriate supporting regulatory framework. The informal sector is of great importance in the circular economy and waste management and finding sustainable ways of integrating it in the value-chain is essential. The role of the banking sector in financing the circular economy is critical and should be strengthened. Banks and financial institutions are called upon to develop innovative financial products geared towards the green economy

6.2 Trade and investments in the circular economy in Morocco

Reforms and sector specific policies have raised the trade and investment profile of Morocco and yielded significant increases in FDI in the last decade. Trade agreements like the Association agreement and the DCFTA being negotiated between Morocco and the EU have also contributed significantly to this development. The potential for circular economy activities exist across many sectors in Morocco, which should be explored by businesses. Although Morocco's trade environment already shows many prerequisites for increased activities related to CE, environmental and CE-related goods and services need to be made more explicit in regulation like trade standards and taxation. This would stimulate the emergence of new trade and investment opportunities which will inevitable strengthen the local economic and labour force.

6.3 Existing awareness and capacities on circular economy in Morocco

Although still not in the centre of interest, the national awareness for the circular economy concept is clearly on the rise in Morocco. Enterprises and industry initiatives are more and more concerned with the economic potentials of new resource-saving and environmentally friendly business models. These efforts are increasingly supported by national institutions. However, the financial success of large-scale CE business projects is often still hampered by a lack of consumer awareness, which is usually also linked to consumers' financial constraints.

As yet, the Moroccan education system fails to sufficiently qualify graduates for a career in branches of the modern economy and green jobs (e.g. renewable energy, management and re-use of waste), all of which offer a good opportunity to facilitate Morocco's transition towards a CE. Technical, Vocational Education and Training programmes broadly have not yet included circular economy or environmental focus. Notable efforts to this regard include activities under SwitchMed, aiming to facilitate a green entrepreneurship ecosystem in Morocco.

6.4 Existing and future economic, environmental and social impacts and benefits

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

- creation of new business and employment opportunities;
- improved life quality through reduced pollution from untreated waste and increased access to sanitation, awareness-raising on the preservation of the environment as well as secured working conditions (e.g. social security and medical insurance) and capacity building;
- increased waste collection rates and controlled disposal which reduce the risk of water, air and soil pollution, and the reduction of waste generated as well as water, energy and CO₂ savings.

The 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, prognoses that the circular measures could lead to an increase in economic activity and create additional jobs by 2030.

- **Economic benefits:**
 - A 0.7% increase of GDP (+ €1.3 bn) compared to business as usual;
 - An improvement of the trade balance, through a reduction in imports worth € 354 m;
 - 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:**
 - 25,700 additional jobs would be created compared to business as usual, which is equivalent to an increase of 0.2%;
 - 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, construction, post and ICT as well as financial intermediation and business activities. 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 Morocco's economy. This illustrates that circular economy could be one of the cornerstones of Morocco's economic diversification and green growth strategies without jeopardising its future economic growth potential.

6.5 EU-Morocco CE-related cooperation activities

Despite the ongoing discussions between the EC and Morocco for the creation of an EU-Morocco green strategic partnership, which is an important element that could provide a renewed momentum to put green topics at the core of the relations EU-Morocco, there are still significant gaps. In order to further strengthen policy dialogues between the countries, CE has to be integrated as a holistic concept. In that way, the EC can play a supportive role in advocating for an integrated CE governance system with high stakeholder engagement and measurable action plans. One aspect, the dialogue needs to put special attention to is EPR, which could replace the polluter pays principles, currently in practice. Finally, the EC could support local and national financial institutions to introduce new financial instruments that not only account for economic criteria but also integrate CE related measures.

Although CE is an important aspect of many of development cooperation approaches between the EU and Morocco, most do not specifically address CE. The majority of projects are moreover limited to the water, sanitation and agriculture sectors. Other identified challenges of CE-related cooperation developments concern shortcomings in the regulatory framework such as a lack of coordination between network actors, disregard of synergies between policies, and lack of transparency as well as barriers of accessing funds and existing structures for technology-transfer. Existing initiatives that continuously benefit the development of the Moroccan industrial sector by promoting the efficient use of resources and CE such as PCP Maroc, GGGI (Global Green Growth Institute) form a good basis for enhanced CE-related development cooperation between Morocco and the EU. Future developments towards CE will require the promotion of sustainable consumption models and increased consumer awareness. The most promising sectors with regard to CE-related development cooperation and mutual knowledge exchange in Morocco include the textile and clothing sector, construction, waste, wastewater, electrical and electronic waste, agriculture and fisheries, and tourism.

Many of the EU-based companies, which are actively engaged in CE-related activities in Morocco are international brands which benefit from Morocco's established infrastructure and experience with CE. Especially around Morocco's priority industries such as the automotive or the textile industry, EU companies have started to use established resource recovery systems to close their products lifecycles. Nonetheless, many of these companies only make use of established structures in Morocco rather than creating close relationships with local CE actors. Identified gaps were therefore the lack of platforms for exchange between EU and local CE actors as well as the lack of collaboration between the various Chambers of Commerce. These can be offset through CE one-stop-shops (circular hubs), match-making events and standard and monitoring systems.

6.6 Sector-specific conclusions

6.6.1 *Agriculture, food production and household waste*

In the field of agriculture, Morocco must accelerate the ecological conversion of its production in order to ensure not only the coverage of its food needs, but also to position itself as a global player in food security, through the development of the production of organic fertilisers, targeting in particular the African continent, which represents the most nourishing potential on the planet. Through regenerative agriculture, green technologies and capacity building for farmers, Morocco would be able to mobilise the significant margins it has in terms of improving agricultural productivity sustainably.

6.6.2 *Waste, with a focus on household waste*

With rising material consumption and waste production, the amounts of waste generated in Morocco must be properly managed, i.e. through thorough collection, ambitious recovery and safe treatment. The waste

management sector, with special regard to household waste, hold large potential to increase collection and recycling rates; these would unlock economic opportunities as well as the reduction of negative environmental and social impacts, that the circular economy promises. In connection to the agricultural sector, appropriately collected organic household waste can serve as significant contribution in the organic fertiliser production.

6.6.3 Water and wastewater

Several water management problems like water scarcity and pollution, reduce the potential and availability of water resources in Morocco. In spite of big efforts on water supply such as legislative and organisational upgrading of the water management sector or interest shown in the reuse of treated water for agricultural purposes, efforts have not been followed up for a rapid transition, and significant delays have occurred in the fields of water sanitation and wastewater treatment, especially in rural areas. The high costs of conventional treatment processes have led national authorities to search for creative, efficient and environmentally sound ways to control water pollution. The largest challenge is to overcome all the socio-economic and institutional barriers that hindering their development.

6.6.4 Construction and demolition

The construction industry is responsible for producing large amounts of building-related waste which is often disposed in landfills. This is of great concern as a growing number of municipalities in Morocco face limited capacity and lifespan of their landfills. Reducing, reusing, recycling and rebuying C&D materials are key element of circular architecture. There is a clear need for re-use and for recycled materials to be included in material specifications. Standards should be defined and widely adopted, inspired by best practices and learning from other frontrunning African countries and the EU.

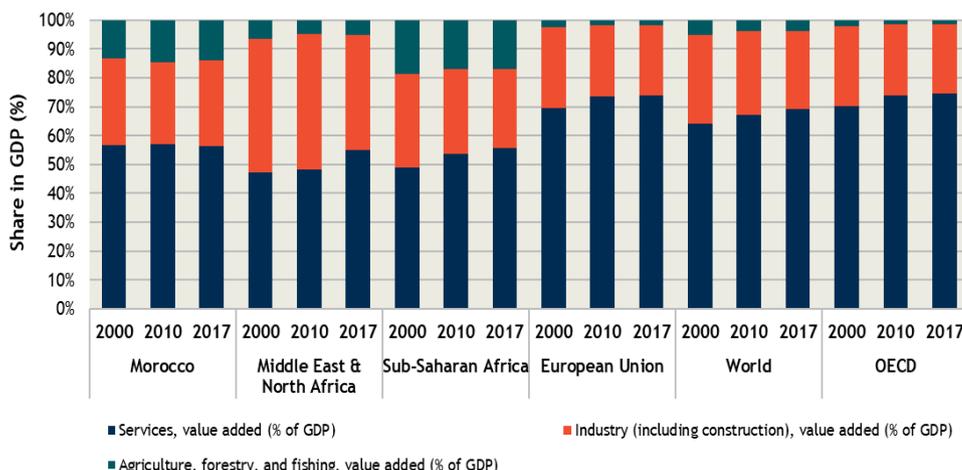
Annex A - List of Interviewed Stakeholders

Table A-1 List of interviewed stakeholders

Stakeholders	Contact	Position	Status
Walloon Agency for Export and Foreign Investments	Takis Kakayannis	Economic and commercial advisor	Completed
EU Delegation-Morocco	Sandrine BEAUCHAMP	In charge of cooperation programs	Completed
Embassy of Spain in Morocco	MJ Ball	Commercial Advisor	Completed
Embassy of Finland in Morocco	Heikinheimo-Pérez Karoliina	Deputy Chef de Mission	Completed
GIZ Cluster Environnement	Youssef Mountassir	Technical Adviser	Completed
Department of the Environment	Nassira rheyati	Head of the International Cooperation Division	Completed
ONUDI - Switchmed Program	Roberta de Palma	Chief Technical Advisor	Completed
Ecodome Maroc	Youness Ouazri	General manager	Completed
Cluster Solaire	Soukaina Htramsi	Incubator manager	Completed
Coopérative Attwafouk	Yassine Mazot	president of the cooperative	Completed
Amaz	Fadela Bennani	General Manager	Completed
COVAD	Sheryn Ziani	Chargée de mission à la COVAD	Completed
GPC carton- Gharb Paper Cardboard	Mounir Elbari	General Manager	Completed
GIZ- CESAR	Zakarya Baicha	Technical Adviser - -CESAR	Completed
Biochar	Hassan El Hemer	General Manager	Completed
CIMAR	Mohamed Chaibi	General manager - Director COVAD	Completed
Crédit Agricole du Maroc Foundation for Sustainable Development	Leila Akhmisse	Executive director	Completed
Ecofertil	Mona Alami	General Manager	Completed
Green WATECH	Salma Bougarrani	General Manager	Completed
Ministry of Industry	Rachid El Hassouni/M/ Chaqor	Director of cooperation / Director Green Economy	completed
University Center for Entrepreneurship of UM5	Karima Ghazouani	Director of the University Center UM5	Completed

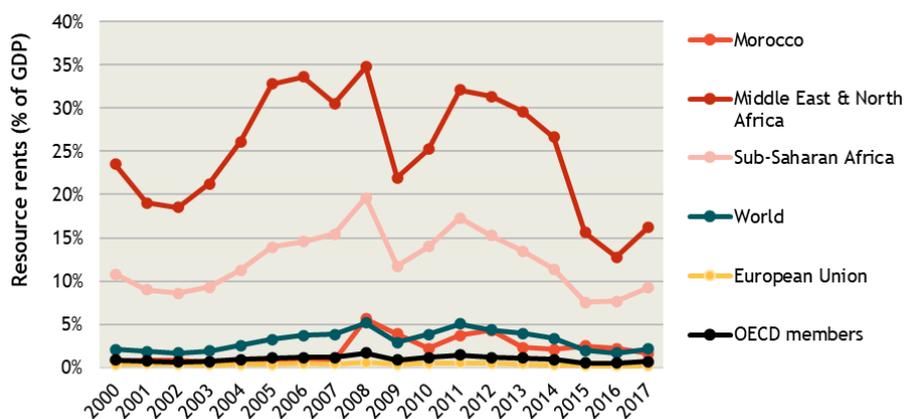
Annex B - Additional graphs, information and case studies relating to Chapter 2

Figure B-1 Comparison economic structure Morocco with regional averages



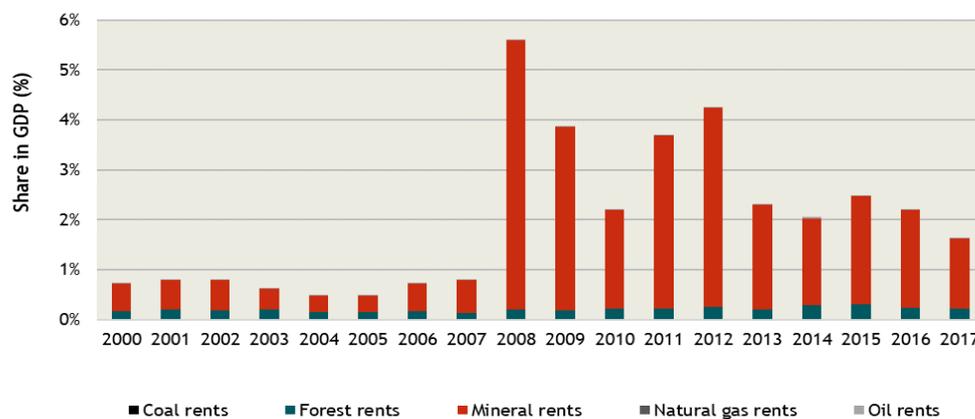
Source: World Bank - World Development Indicators

Figure B-2 Resource rents as share of GDP (%) in Morocco compared to regional averages



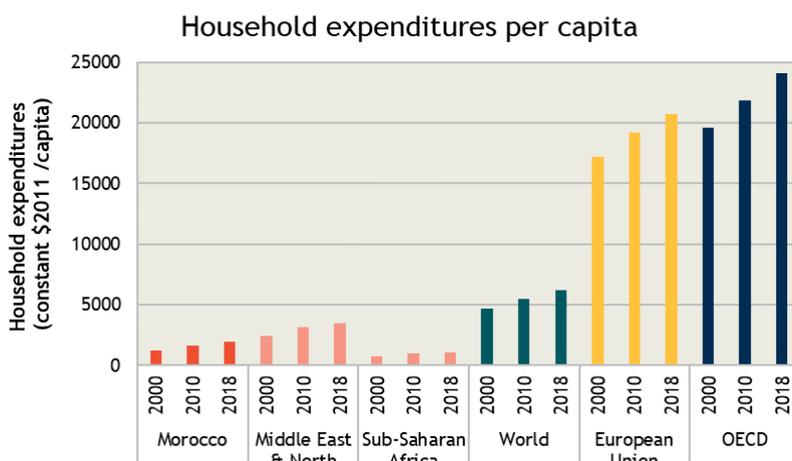
Source: World Bank - World Development Indicators

Figure B-3 Resource rents as share of GDP (%) by type of resource



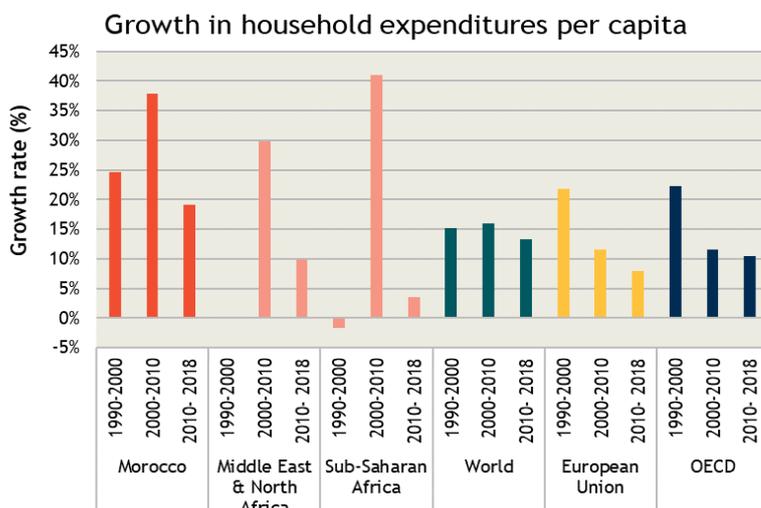
Source: World Bank - World Development Indicators

Figure B-4 Household expenditures in Morocco compared to regional averages



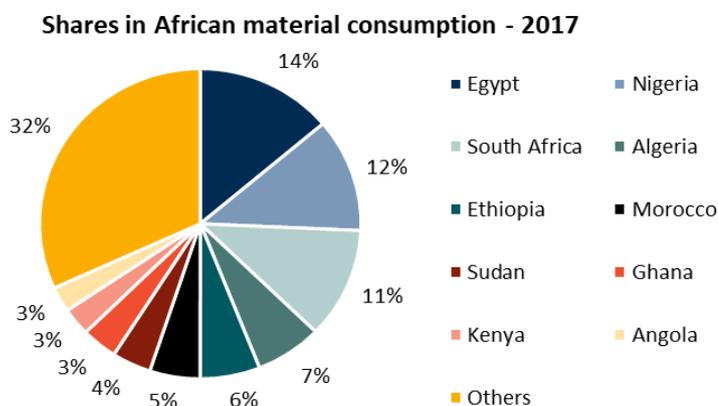
Source: World Bank - World Development Indicators - Households and NPISHs Final consumption expenditure, PPP (constant 2011 international \$) per capita

Figure B-5 Growth in household expenditures in Morocco compared to regional averages



Source : World Bank - World Development Indicators - Households and NPISHs Final consumption expenditure, PPP (constant 2011 international \$) per capita

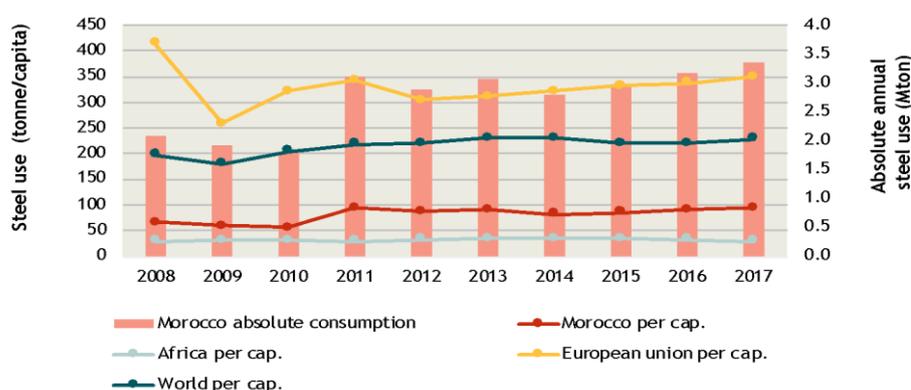
Figure B-6 Share of Morocco and other African countries in total domestic material consumption Africa



Source: SDG Indicators - Indicator 12.2.1 Domestic Material Consumption by type

Globally, cement, steel and plastics account for almost 70% of the direct global GHG emissions from industry (incl. construction). Therefore, it is relevant to look at the trends in the consumption footprint for these materials. Morocco's cement consumption is relatively modest but increasing strongly. From 2017 to 2018, the total cement consumption increased with 20% from 688 kilo tons to 1.04 Mtons.¹⁷⁰ However, the per capita cement consumption in Morocco in 2018 was only 29 kg/capita, compared to a world average of 537 kg/capita. When we look at steel, we see that consumption is growing slowly in absolute terms, and the per capita consumption is growing slowly as well (Figure B-6, Annex B). Still, in Morocco, the steel consumption per capita was only 41% of the global average and only a quarter of the average per capita consumption in the European Union in 2017. And with a plastic consumption of 19.9 kg/capita plastic in 2017¹⁷¹, Morocco ranks significantly lower than the European Union (+Norway and Switzerland) with 95.5kg/capita and compared to the global average of 44.9 kg/capita.¹⁷² However, the per capita consumption of single-used plastic goods remains still high. Before the 2015 ban of single-used plastic bags, Morocco was with 900 plastic bags per capita/year the second-largest consumer of plastic bags globally. Now, Morocco generates daily around 0.07 kg per person per day plastic waste¹⁷³ of which 55% end up in nature¹⁷⁴ and 8% is recycled¹⁷⁵.

Figure B-7 Consumption of finished steel products per capita in Morocco compared to regional averages



Source: World Steel Association (2019) World steel in figures 2019.¹⁷⁶

Table B-1 CE-related industry initiatives funded by SwitchMED in Morocco

SUNOV Engineering
With the help of SwithMed funding the start-up SUNOV Engineering was able to conduct a feasibility study to implement a pilot project on a reward system for beverage containers, that is, plastic (PET) bottles and aluminum cans, using reverse vending machines in supermarkets. The project is inspired by international experiences by which the collection of containers has been highly increased when providing incentives to consumers. The tested system is not a “deposit-refund” scheme, successfully applied in countries like Denmark or Norway, but rather a reward system where the consumer does not pay a deposit but receives a reward when returning the empty bottles or cans. This approach is less complex and does not require any prior legal or financial arrangements. The initiative is aligned with the priority on “promoting the circular and low-carbon

¹⁷⁰ Cemnet.com (2018) [Cement consumption in Morocco up 20% in September](#)

¹⁷¹ Euromap (2016) [Plastic Resin Production and Consumption in 63 Countries Worldwide](#)

¹⁷² PlasticsEurope (2017) [Plastics - the Facts 2017](#). Combined with population statistics from: UN - World Population Prospects 2019.

¹⁷³ Our World in Data (2018) [Plastic Pollution](#)

¹⁷⁴ WWF (2019) [Stop the flood of plastic](#)

¹⁷⁵ Oxford Business Group (2018) [Modernisation of Morocco's waste-management infrastructure receives international support](#)

¹⁷⁶ Worldsteel Association (2019) [Worldsteel in figures 2019](#)

economy” of the National Framework Plan on Sustainable Consumption and Production, and also complements the National Programme on Waste Valorization.¹⁷⁷

Biodôme du Maroc

As well supported by SwitchMed, Biodôme is the first Moroccan company specialized in the recovery of organic waste through natural treatment and environmentally friendly processes. The rural population of this region requires energy for cooking, heating and pumping water. The process that Biodôme uses to produce methane as an energy resource is the micro-methanization. It occurs through the construction of a tank in which are deposited everyday farm animal waste, organic waste and wastewater. Waste is simply placed in a dome and then is fermented in a second chamber underground. In the absence of oxygen, organic materials placed in the tank called "digester" undergo a natural process of degradation. It takes around 4 to 5 weeks to create good quality compost, which is a lot quicker than under natural conditions and it further has the advantage that no bad odours are released. The project not only offers farmers independent power supply with a permanent production of biogas and alternative fertilisers that will limit the use of pesticides, but it also reduces greenhouse gas emissions from abandoned organic waste.¹⁷⁸

ENRD2-Engrais Bio

ENRD2-Engrais Bio, a project developed by Khaoula Remmal, aims to give new life to organic waste. By transforming this waste into renewable energy used for electricity, heating and fertiliser, Khaoula seeks to pursue a more sustainable and inclusive economy. ENRD2-Engrais Bio currently collects 32 tons of organic waste per cow per month, which means 3,400 tons per year saved. By creating a cleaner source of electricity and heating, the farm is also saving money. Additionally, they contribute to reducing organic waste by around 40% in terms of sludge to be treated. This also serves to reduce pollution, bad odours and the health risk for local inhabitants living close to waste decomposing in nature. Moreover, the organic fertiliser produced contributes to reducing the amount of chemicals used in nearby fields.¹⁷⁹

VDMpneu - Recycling of used tyres

The ‘PUNR - Recycling of used tyres,’ venture aims to recycle tyres and transform them into rubber shreds, granulate or powder, which is then used in the manufacture of a variety of sports facilities, roads, sound-proof walls and synthetic turf, providing a second life to used tyres, which is exactly what the circular economy is all about. VDMpneu created a system where the value of tyre materials and resources is retained within the economy for as long as possible.¹⁸⁰

Plastic4Life - Reducing pollution by activating the plastic recycling chain in Morocco

Plastic 4 Life aims to preserve the environment and develop the recycling chain in Morocco by giving the plastic waste generated through agricultural activities a second life. The initiatives plan to recover film, pipes, nets and other non-biodegradable materials from the greenhouse farming operations that stretch across many miles of countryside and replace their material and equipment every two to three years. Following a process of transformation and an injection of colour, Plastic 4 Life facilitates the reintegration of plastic waste into the economy. More than 23,000 tons of agricultural waste are discarded after use, presenting a real problem when it comes to disposal. Recycling one tonne of this waste would reduce CO₂ emissions by up to 1.5 tons. The goal is to reduce up to 3,530 tons by recycling 2,300 tons of plastic waste per year. The project aims not only to reduce its impact on the environment but also to reduce the rate of poverty in the region by creating eight direct job opportunities and approximately another 20 within the local area.¹⁸¹

¹⁷⁷ SwitchMed (2018) [Morocco](#)

¹⁷⁸ Biodomemaroc.com (n.a.) [Biodome](#)

¹⁷⁹ SwitchMed (2018) [Morocco](#)

¹⁸⁰ SwitchMed (2018) [Morocco](#)

¹⁸¹ SwitchMed (2018) [Morocco](#)

Table B-2 Interprofessional Federation of the Organic Sector

The Interprofessional Federation of the Organic Sector (FIMABIO)
<p>The Moroccan Interprofessional Federation of the Organic Sector (FIMABIO) was created on 2nd June 2016, as part of the Green Morocco Plan, comprising three constituent members, namely the associations ANAPROBIO, VALBIO and ANADEXBIO.</p> <p>The main objective of FIMABIO is to improve the productivity of the organic sector and its competitiveness on the national and international markets. For this, the program to upgrade the organic sector is structured around the following axes:</p> <ul style="list-style-type: none"> • Axis 1: Development of the research & development component; • Axis 2: Improving the conditions for the promotion, marketing and promotion of organic products on the internal market; • Axis 3: Development and promotion of the export sector; • Axis 4: Improvement of the framework conditions of the sector.¹⁸²

Source: *Fimabio (n.d.)*

Table B-3 Green Generation 2020-2030, the new national strategy for the agricultural sector

The Interprofessional Federation of the Organic Sector (FIMABIO)
<p>The new development strategy for the agricultural sector, the “Green Generation 2020-2030”, aims to consolidate the achievements of the “Plan Maroc Vert”, while giving priority to the human element. The objective is to bring about an agricultural middle class able to play an important role in the socio-economic balance of the rural environment.</p> <p>This new strategy, which operates on High Royal Instructions, draws the Kingdom’s agricultural strategy with the objectives to bring out a new middle class which concerns 400,000 households in rural areas, and to perpetuate the membership of 690,000 households in this class.</p> <p>To achieve these, the strategy will work to improve farmers’ incomes through continued investment efforts, the establishment of a new incentive system geared towards young people, the generalization of agricultural insurance, which will affect 2.5 million hectares, and the establishment of a specific framework to enable farmers to benefit from services linked to social protection, with the assistance of the private sector. The objective by 2030 is to enable three million farmers to benefit from social protection services and to reduce the difference between agricultural income and that of other sectors of the national economy.¹⁸³</p> <p>Another axis of this strategy concerns the development of a new generation of young agricultural entrepreneurs, through the mobilization and development of one million hectares of collective land, in accordance with the Royal High Guidelines. Concretely, this will result in the emergence of some 350,000 new farmers and agricultural entrepreneurs, both in agriculture and in businesses intended to provide agricultural services. All of these efforts will be supported by the departments of the Ministry of Agriculture, Maritime Fisheries, Rural Development and Water and Forests, in particular through the training of more than 150,000 young people in the agricultural sector.</p> <p>Another important dimension of this strategy concerns the emergence of a new generation of agricultural organizations with the objective of multiplying by five the rate of regrouping of farmers, in particular at the level of new generation cooperatives and aggregations, in order to strengthen the independence of agricultural professions so that they can fully play their role in the development, support and execution of part of the budget linked to the agricultural sector. The strategy also intends to set up a new generation of support mechanisms which will concern the introduction of new technologies and the digitization of agricultural services for the benefit of almost 2 million active farmers, noting that the Agricultural Council is not to be outdone, with the mobilization of 5,000 advisers for the benefit of young farmers. All of these points go hand in hand with other foundations of the strategy, which concern the sustainability of agricultural development and the consolidation of agricultural sectors with the aim of doubling agricultural GDP and agricultural exports by 2030.</p>

Source: *own table*

¹⁸² Fimabio (n.d.) [Contrat programme entre la fimabio & l’état](#)

¹⁸³ Ecoactu (2020) [Détails De La Stratégie “Génération Green 2020-2030” Avec Le Dg De L’ADA](#)

Table B-4 Full list of national water strategies and plans

Name of National water strategy or plan	Budget
National Water Plan (PNE) 2020-2050: 384 Billion DH;	384 Billion DH
National Water Strategy (SNE) 2010-2030	82 Billion DH
National Remediation Program (PNA) 2005-2020	43 Billion DH
National Sanitation Program (PNAM): 2020-2030	50 Billion DH
PAGER	10 Billion DH

Source: own table

Table B-5 General information on water resources in Morocco

General information on water resources in Morocco
<p>The production of drinking water in Morocco is 1,143 million m³ in 2018, transported to the various localities of the country by means of adductor systems which linear is about 12,600 km. The drinking water saving program adopted has contributed to record some progress to bring this output to 76.5% in 2017 and should reach 80% by 2025. This effort has been accompanied by the construction of distribution networks in the 715 localities where the Office ONEE manages the drinking water distribution service, enabling 2.2 million customers to be served at home.</p> <p>These infrastructures have enabled almost universal access to drinking water in urban areas and an access rate of about 97% in rural areas, the irrigation of nearly 1.5 million hectares and the protection of vast areas against flooding. In addition, under “Local irrigation conversion program”, which will continue until 2030, the total area converted has reached 540,000 ha by the end of 2017 (i.e. 98% of the conversion target of 550 000 ha set in 2020).</p> <p>An average rainfall of 140 billion m³ per year, with a heritage of 140 large dams with an overall storage capacity of 17.6 billion m³ and several thousand boreholes and wells to capture groundwater. This is in addition to 14 large dams and about 10 small dams that are under construction, with an additional storage capacity of nearly 3.5 billion m³. The potential of renewable water resources in Morocco is currently estimated at 22 billion m³ per year, mainly conventional, including 18 billion m³ of surface water and 4 billion m³ of subterranean water, i.e. the equivalent of 650 m³/inhabitant/year against 2,560 m³ in 1960, representing a decrease of 74.6%, thus crossing the threshold of hydric stress.</p> <p>The seven main watershed in Morocco are the Loukkos, Moulouya, Sebou, Bouregreg, Oum Errabia, Tensift and Souss-Massa basins. The Sebou, Bouregreg and Oum Rbia basins alone hold more than two thirds of the country’s water potential. This represents a spatial and temporary variability, with basins in the north receiving more water than in the south, and a chronic deficit within the basins knowing that the resources mobilized versus withdrawal is critical.</p> <p>In addition to accelerating the pace of investment in hydraulic infrastructures, Morocco is increasingly resorting to non-conventional water resources through wastewater reuse and seawater desalination.</p> <p>The water reuse plan will contribute to mobilize an additional volume of 325 million m³ by 2030, i.e. a 100% wastewater treatment rate. Concerning sea water desalination, a volume of 510 million m³ per year has been set as an objective to be reached by 2030 by the National Water Plan.</p>

Source: own table

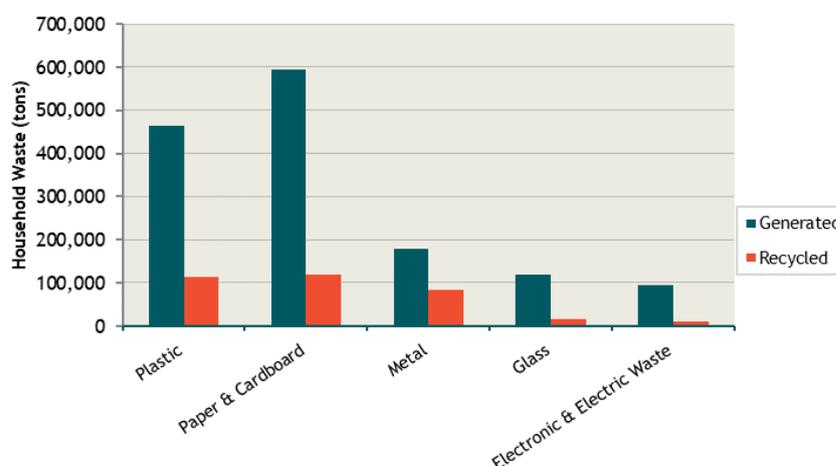
Table B-6 Examples of projects of water reuse in Morocco

Examples of projects of water reuse in Morocco
<ul style="list-style-type: none"> The artificial recharge of the aquifer: in Agadir city, the treated wastewater in Ben Sergao station is used for the artificial recharge of the aquifer using an amount of about 10 M m³ /year through filtration basing; Agadir's water authority (RAMSA) is carrying out a tertiary treatment of its wastewater of which 300 m³/d is already sold to a golf course. A second tranche from the Mzar plant should increase this reuse of treated wastewater by the golf courses to 3,000 m³/d. The project is financed by Agence Française de Développement (AFD); Industrial recycling Treated wastewater is recycled for some industrial process purpose in the Sidi Yahia Gharb region, especially in the cooling. This project is realized by the ONEE; Marrakech WWTP: the largest project for the reuse of treated wastewater is being built in Marrakech, where 98,842 m³/d of treated wastewater is to be reused for the irrigation of golf courses; Tidili project: small-scale projects combining a treatment process for mostly rural wastewater with a system for redistributing the treated water within the nearby agricultural areas.

Source: own table

Household and similar waste was estimated at 5,936,392 tons in 2015. The potentially recyclable quantity is 1,446,136 tons of which the actual recycled portion is only 343,971 tons. The following figures indicate that the recycling rate compared to the total waste was only around 6% in 2015.

Figure B-8 Household waste recycling rate by sector



Source: own table based on Secrétariat d'Etat auprès du Ministre de l'Energie, des Mines et du Développement Durable, chargé du Développement Durable (2019) *Stratégie nationale de réduction et de valorisation des déchets*

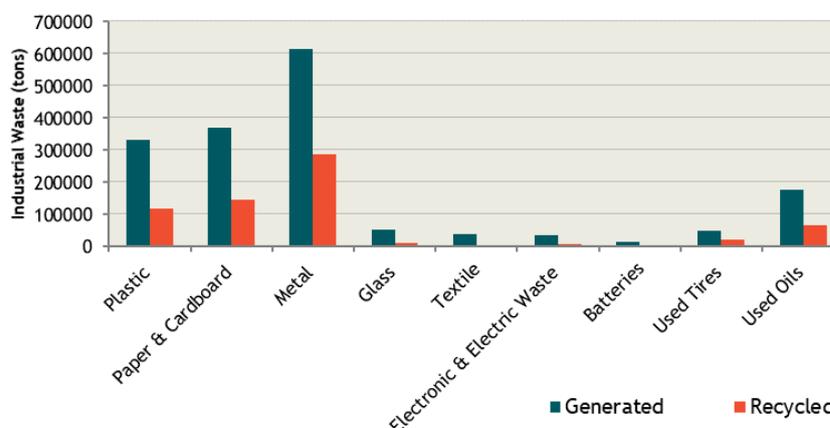
Table B-7 Household waste recycling rate by waste type

Type of waste	Generated [tons/year]	Recycled [tons/year]	Recycling Rate
Plastic	464,316	114,628	25%
Paper & Cardboard	593,639	118,727	20%
Metal	178,091	82,456	46,30%
Glass	118,727	16,740	14,10%
Electronic & Electric Waste	93694	11,420	12,50%

Source: Secrétariat d'Etat auprès du Ministre de l'Energie, des Mines et du Développement Durable, chargé du Développement Durable (2019) *Stratégie nationale de réduction et de valorisation des déchets*

The waste generated by economic activities amounted 5,467,508 tons in 2015. The quantity of the potentially recyclable fraction is 1,667,415 tons of which the recycled part is only 640,954 tons, i.e. an average recycling rate of 11.7% compared to the total industrial waste produced.

Figure B-9 Industrial waste recycling rate by sector



Source: own table based on Secrétariat d'Etat auprès du Ministre de l'Energie, des Mines et du Développement Durable, chargé du Développement Durable (2019) [Stratégie nationale de réduction et de valorisation des déchets](#)

Table B-8 Industrial waste recycling rate by waste type

Type of waste	Generated [tons/year]	Recycled [tons/year]	Recycling Rate
Plastic	32,985.91	115,666	35%
Paper & Cardboard	368,609.5	143,757	39%
Metal	613,688.6	284,137	46%
Glass	51,786.75	7,301	14%
Textile	36,235.86	36	0%
Electronic & Electric Waste	32,434.24	4,054	12%
Batteries	12,924.79	3,231	25%
Used Tires	48,179.62	20,235	42%
Used Oils	17,3704.5	62,533	36%

Source: Secrétariat d'Etat auprès du Ministre de l'Energie, des Mines et du Développement Durable, chargé du Développement Durable (2019) [Stratégie nationale de réduction et de valorisation des déchets](#)

Table B-9 Actions to be implemented before and during a construction site¹⁸⁴

Phase of the project	Actions	Actors
Choice of company	<p>Following the launch of the Call for tenders, the company's submission documents must necessarily include the elements related to the management of C&D Waste as stipulated in the special prescription book, i.e.:</p> <ul style="list-style-type: none"> A detailed site management procedure; Organization of the disposal and elimination of C&D waste; The transfer centre / pre-sorting centre to which the waste must be sent / Contract with an authorised waste professional. 	<p>Tendering companies, Pre-treatment Centre</p>

¹⁸⁴ GIZ- ministère de l'intérieur (2017) [Essais de caractérisation des déchets ménagers et assimilés réalisés au Maroc](#)

Phase of the project	Actions	Actors
	The choice of the company will have to be based on those that fulfil the obligations requested in the SPC.	
Course of the building site	<p>Throughout the course of the work, the company will have to put pursuant to the provisions of the CGNSWMP (Construction site waste management procedure)</p> <p>As far as the sorting space is concerned, the company will have the choice between:</p> <ul style="list-style-type: none"> Delegating the sorting through a pre-sorting platform treatment; Sorting on site. <p>This choice depends on:</p> <ul style="list-style-type: none"> the size of the construction site; the requirements of the specifications; the company's ability to carry out this type of task; and The nature of the sorting will need to be stated in the CSWMP. <p>A check will have to be carried out to verify the implementation of the provisions of the CSWMP by the prime contractor.</p>	Companies, Architect, Control Office
Waste collection and transport	<p>For the removal of waste from the construction site, the company will have to do the following call either:</p> <ul style="list-style-type: none"> To a private carrier; At the transfer and pre-sorting centre or the recyclers who will take charge of transporting the C&D Waste. <p>Choose the mode of transport that allows the least amount of conveying. Possible</p> <p>The slip must be drawn up for the tracking and tracing of the waste, indicating:</p> <ul style="list-style-type: none"> The place of loading and unloading; Quantities and nature of C&D waste; Mode of transport; Dates. 	Carriers, Recyclers
Transfer and pre-processing centre	<p>When it arrives at the sorting centre the waste is:</p> <ul style="list-style-type: none"> Weighing; Identified according to their nature. 	Transfer Centre, pre-treatment Valuators, Recyclers
Products from the recycling of C&D waste	After treatment, the recycled products can be placed on the market for reuse.	Recyclers

Source: Rapport, ETUDE DE DEVELOPPEMENT DE LA FILIERE DE GESTION ET DE VALORISATION DES DECHETS DE CONSTRUCTION/DEMOLITION; Mission 1, 2017/2018

Table B-10 Selection of sectorial plans, investments and objectives¹⁸⁵

¹⁸⁵ Heinrich-Böll-Stiftung (2019) [Transparence dans la Finance Climat au Maroc](#)

Sectorial Plans	Investments (M USD)	Climate Change Objectives
Water	843	Water stress reduction
Energy	15,442	Reduction of 147 Mtons CO ₂ by 2030
Forest	359	Reduction of 4 Mtons CO ₂ by 2030
Agriculture	1,278	Reduction of 0,3 Mtons CO ₂ by 2030 and water stress reduction
Cities	3,048	Reduction of 9 Mtons CO ₂ by 2030
Transport	3,994	Reduction of 7 Mtons CO ₂ by 2030
Waste	246	Reduction of 14 Mtons CO ₂ by 2030

Source: National Sustainable Development Strategy

Annex C - Enabling environment on trade and investment - full analysis

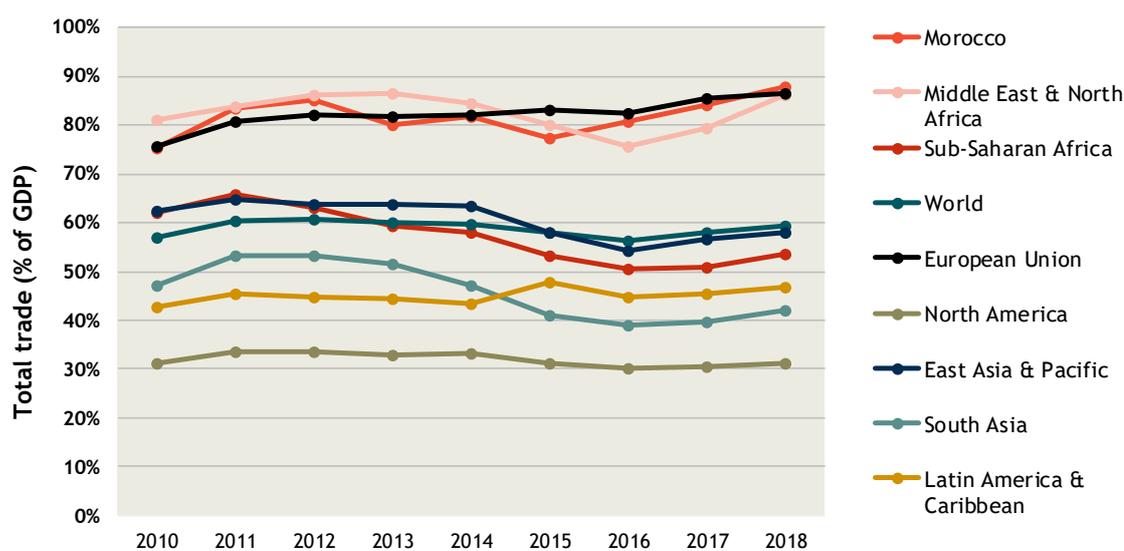
This section looks at the level of trade and foreign investments occurring in Morocco and the factors that influence trade and investment. First, an overview will be given on the trends in trade and investment. Subsequently, several economic, financial and political factors that affect the level of trade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

Overview of ongoing trends in trade and foreign direct investment

Trends in trade

As shown in Figure C-1, the relative level of trade of Morocco with other countries is relatively high, comparable to that of the EU and the MENA region. The highest share of total trade is found in 2018 (at almost 90%) while the lowest share was in 2010 (75%). Between 2010 and 2012 the trend was upwards towards a higher share of total trade, with a declining trend between 2012 and 2015 (peaking at 70%). From 2015 onwards, the trend is a steadily upward trend in total share of trade as fraction of GDP.

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



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

In 2018, around 65% of Morocco's exports were going to the European Union and similarly around 55% of the imports originate from the European Union, and this share has remained relatively stable over the period 2015-2018.¹⁸⁶ In 2018 Morocco accounted for approximately 1% of the total Extra-EU trade of the EU, for 1.2% of the extra-EU exports and 0.8% of the EU imports from outside the EU.¹⁸⁷ In 2018 in total around 12% of the EU exports go to Africa and around 15% of this goes to Morocco. When looking at the EU's imports from outside the EU, we see that Africa accounts for 5% of those imports in 2018, of which in turn over 10% comes from Morocco. As such, Morocco is the second most important export partner in Africa and ranks as the 5th import partner in Africa.

¹⁸⁶ UN Comtrade

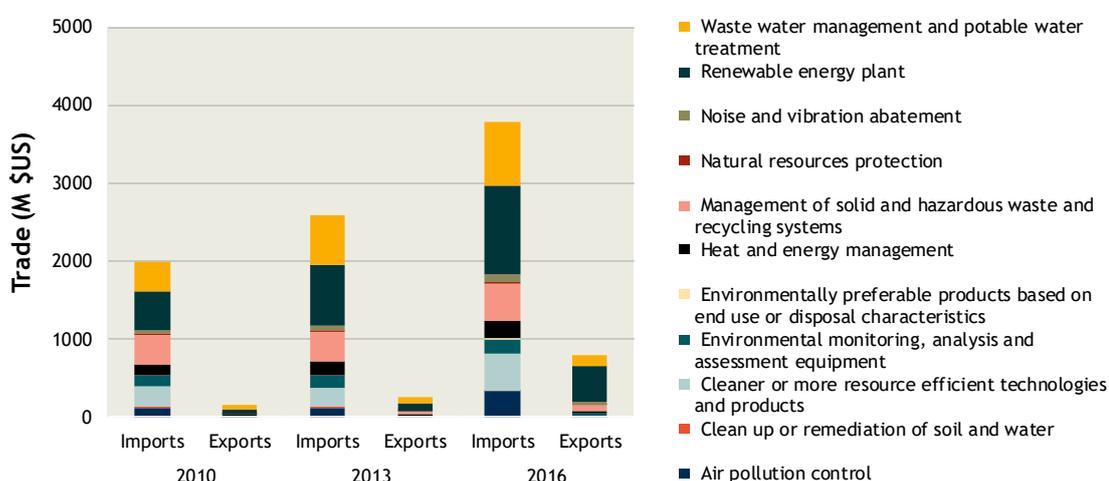
¹⁸⁷ Eurostat - International trade in goods by partner

Trade in environmental goods and services

In the late 1990s, the OECD developed a list of sectors that deliver (as part of their output) environmental goods and services. In several economic databases the level of activity in these ‘environmental goods and services sectors’ is monitored, 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 Morocco in 2010, the environmental goods and services sectors accounted for 3% of the total trade volume and over the years this share increased steadily to 6% in 2016. When looking at the trade balance, we see that imports dominate trade in environmental goods and services, where primarily renewable energy technologies account for the largest part of the imports, closely followed by waste-water treatment technologies. Waste management and recycling systems, and cleaner or more resource efficient technologies or products compose also a relatively large share of the imports (Figure C-2).

Figure C-2 Imports and exports of environmental goods and services in Morocco for the years 2010, 2013 and 2016



Source: OECD - Trade in Environmental goods and services

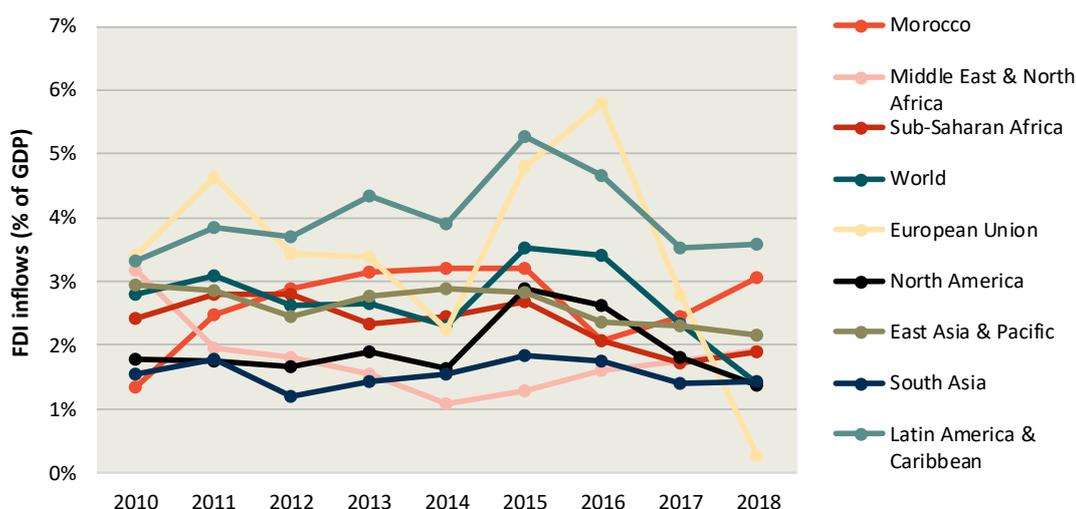
Foreign direct investment

When looking at foreign direct investment (FDI) in Morocco, a logarithmic growth curve is observed from 2010 until 2015 (peaking at 3.2%). New economic reforms, that have made Morocco more attractive to foreign investors and linked the country closer to the global economy^{188,189}. In 2018, the level of FDI in Morocco was again above to the world average. From 2012 onwards, FDI in Morocco has been above the levels of MENA and Sub-Saharan Africa.

¹⁸⁸ Oxford Business Group (2020) [Reforms channels foreign investment into key economic sectors in Morocco](#)

¹⁸⁹ Santander (2020) [Morocco: Foreign Investment](#)

Figure C-3 Share of Foreign Direct Investment (inflows) in Morocco as share of GDP (%)



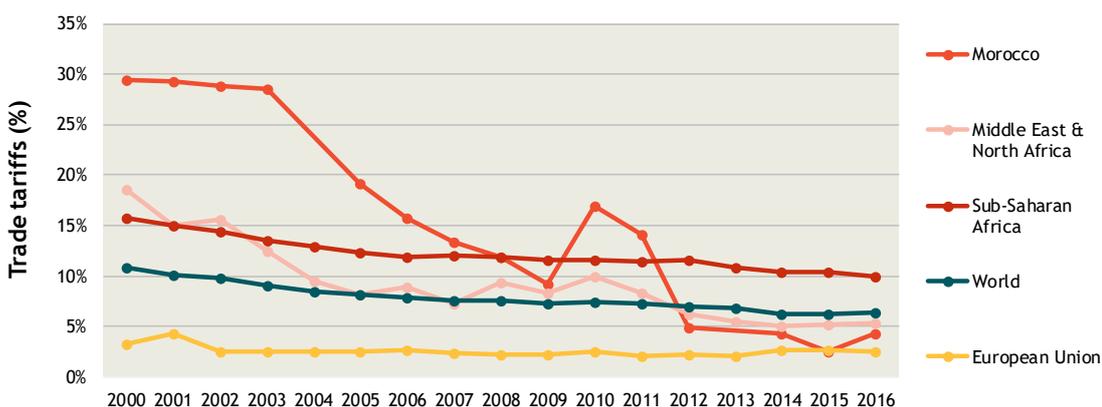
Source: World Bank - World Development Indicators - FDI inflows as share of GDP (%)

In conclusion, for environmental goods and services, there is substantial trade ongoing between Morocco and its international trading partners, with a strong emphasis on imports related to renewable energies. The share of trade in the total economic output is above the world average and comparable to that of MENA and the EU. In terms of foreign investments, Morocco is performing above average and overall better than MENA and Sub-Saharan Africa.

Trade tariffs

As seen in Figure C-4, trade tariffs in Morocco have followed a long-term downward trend. In the early 2000s, trade tariffs in Morocco were very high (almost 30%), way higher than tariffs in the MENA (19%) and Sub-Saharan Africa (16%), and nearly three times higher than the world average (11%). Trade tariffs in Morocco declined abruptly from 2013 ending at less than 5% in 2016¹⁹⁰. Between 2009 and 2010 a steep increase in the tariff rates is observed, before the development matches the downward trend again¹⁹¹.

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



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

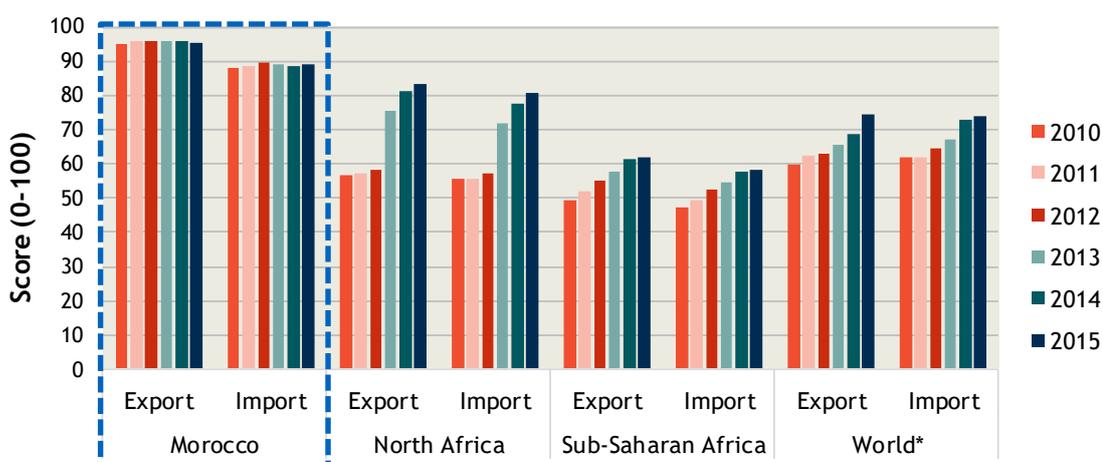
¹⁹⁰ Oxford Business Group (2013) [The report Morocco 2013](#)

¹⁹¹ World Bank (2013) [Enterprise survey](#)

Trade costs

Apart from trade tariffs, there is a wide variety of costs associated with trade of products and services, including cost related to border compliance and documentary compliance (Figure C-5). The 'ease of doing business index' of the World Bank scores the position of a country based on empirical research on the trade costs of countries (the higher the score, the easier doing business is for the country). Based on the index results, Morocco performs well in terms of ease of doing business. It outperforms by far the average score of North Africa, the average score of Sub-Saharan Africa as well as the world average for the six years data has been collected. Morocco's score has remained stable in the period from 2010-2015 at around 95 for exports and at 90 for imports. This implies customs and administration related costs are low, which can therefore be seen as a driver for trade in Morocco.

Figure C-5 Score on cross-border trade costs for exports and imports in Morocco in comparison to global and regional averages



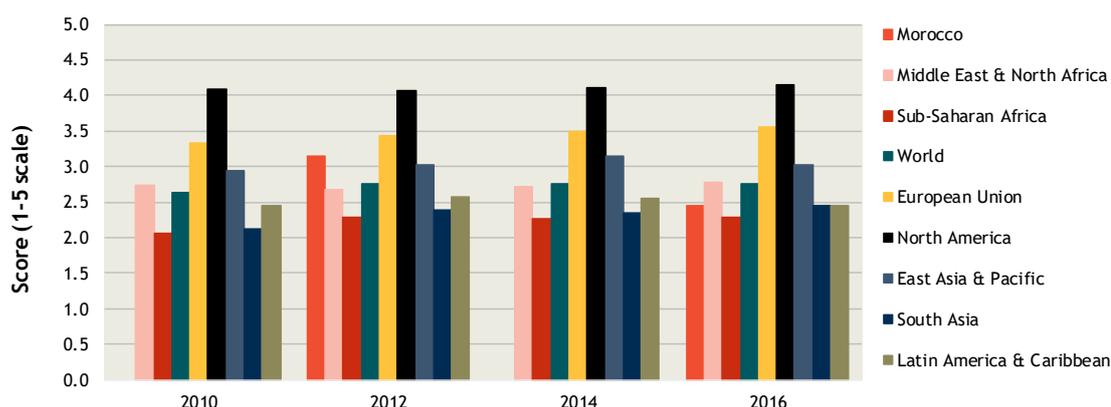
Source: World Bank - Ease of doing business - Trading across borders: Cost to export/import (US\$ per container) (DB06-15 methodology) - Score

Suitability of infrastructure for trade

In order to facilitate trade, reduce transport time and costs, the presence of good transport infrastructure is essential. The World Bank monitors the quality transport infrastructure as part of the logistics performance index. The results of this index for Morocco (Figure C-6) show that the country scores below the MENA region and the world average, and just above Sub-Saharan Africa¹⁹². The figure also shows that from 2012 to 2016 transport-related infrastructure worsened from over 3 (in a scale of 1 to 5), to just below 2.5.

¹⁹² Note that data for 2010 and 2014 are not available for Morocco.

Figure C-6 Score of Morocco in the quality of trade and transport-related infrastructure compared with global and regional averages



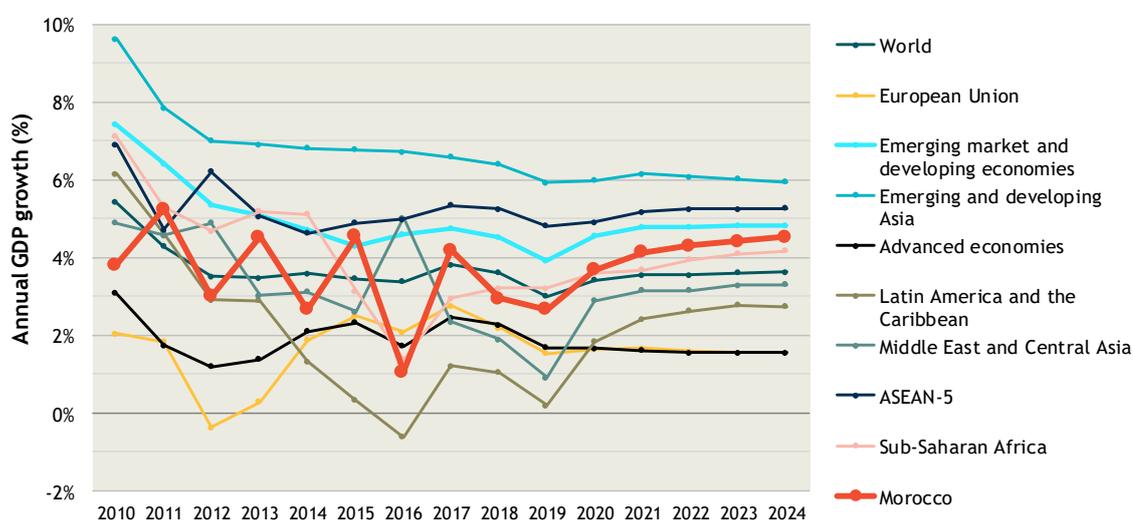
Source: World Bank - Logistics Performance Index - Quality of trade and transport-related infrastructure

Opportunities and barriers for investments

Economic opportunity

As shown in Figure C-7, the development of Morocco's GDP highly fluctuated within the last years.¹⁹³ However, in average the growth fluctuations remain within the average field compared to the other regions shown in the figure below. The deepest point was reached in 2016. The current situation and future outlook regarding the economic situation in Morocco according to the IMF look very positive, with a steady growth trend predicted from 3.7% in 2020 to 4.5% in 2024. This growth curve is above the average growth rates expected in the world, Sub-Saharan Africa, the EU and in other advanced economies. This should act as a driver for investments in the country.

Figure C-7 Historical GDP growth and growth outlook until 2024 for Morocco, 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, because as an organisation you need to get acquainted with all the rules and procedures in the country. The World Bank, in its 'doing business' survey, monitors the ease of starting a business in a country. Morocco scores very well in this

¹⁹³ AfDB (n.d.) [Morocco's Growth Diagnostic](#)

survey (over 92 out of 100 in 2018), with a score that has been increasing steadily over time (in 2009 Morocco's score was just below 86). In this same period (2009-2018), the average score for the EU-28 went from approximately 84 to approximately 89.

Governance, political stability and regulatory quality

Political instability & security

According to the World Bank's enterprise survey (2013 edition)¹⁹⁴, political instability is not a major problem that entrepreneurs identify, with less than 8% of the respondents bringing it as an issue when doing business in Morocco.

Corruption

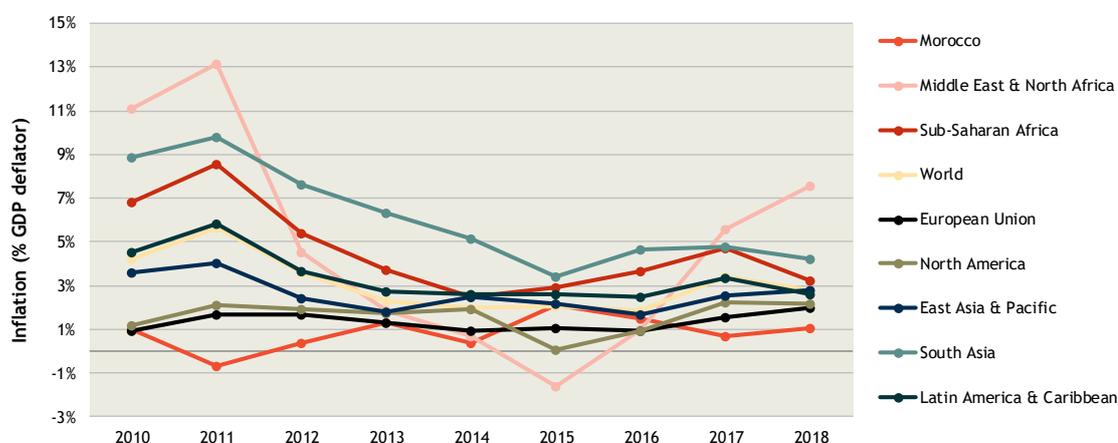
Corruption is still a problem in Morocco, which hampers the economy and acts as a barrier for foreign companies to invest in the country. In the global Corruption Perception Index of 2018 assessing 'the lowest level of corruption', Morocco ranks 73rd (shared place with South Africa), with a score of 43 on a scale from 0-100 (most corrupt-least corrupt). Morocco scores better than Ghana, Egypt, Kenya and Nigeria, and the same as South Africa. In the enterprise survey conducted in 2013 by the World Bank, corruption was mentioned by 20.6% of the respondents as the most important obstacle to doing business in Morocco, making it the most important obstacle for doing business in Morocco. Furthermore, 24.5% of the respondents identified corruption as a major constraint.

Financial stability

Inflation

Morocco has had low (below 0.9% on average) and relatively stable inflation rates in the period 2010-2018 (Figure C-8), well below the inflation rates (as share of GDP) in Sub-Saharan Africa. This is expected to be a result of the modernisation and neoliberalisation of Morocco's economy, through King Mohammed VI and his government, combined with interventions in its currency markets or the continuation of modest subsidies¹⁹⁵. The Moroccan inflation rate in 2018 is 1% which is below the inflation in the MENA region (8%), Sub-Saharan Africa (3%) and the European Union (2%). Inflation in Morocco was lowest in 2011 (-1%) and highest in 2015 (2%). The higher inflation rate might be connected to the growth of Morocco's economy.

Figure C-8 Historical trends in inflation (GDP deflator %) in Morocco compared to global, regional and continental averages



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

¹⁹⁴ Data is not available for other editions.

¹⁹⁵ Sandberg, E. Binder, S. (2019) [Mohammed VI's Strategies for Moroccan Economic Development](#)

National creditworthiness

Whereas the inflation rate reflects the monetary stability in a country, the creditworthiness reflects the stability and sustainability of public finance. Of the 18 African countries that have recently received a credit rating from the rating agency Standard & Poor's, the majority of the countries received a B rating, whereas the lowest rating of CCC+ was given to three countries (Table C-1). On the high side of the spectrum, three countries received a B+ rating. In 2019, Morocco's rating was BBB-, meaning that the country performs below the African average in terms of creditworthiness. The rating agency also thinks that the rating will remain stable.

Table C-1 Most recent credit ratings by Standard & Poor's for African countries (N=18) with Morocco's rating highlighted in orange

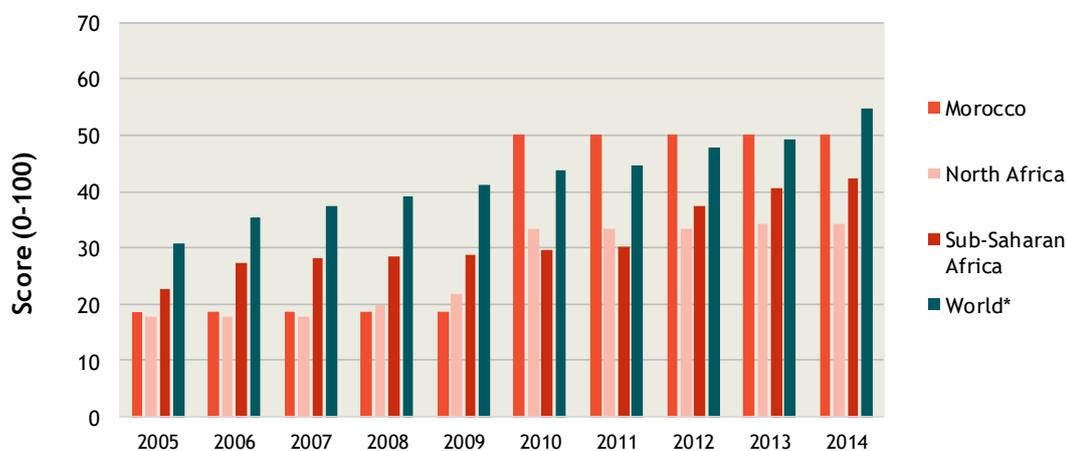
S&P	# countries
A-	0
B+	3
B	5
B-	3
BB-	1
BBB+	1
BBB-	1
CCC	1
CCC+	3

Source: <https://countryeconomy.com/ratings>

Ease of getting credit

For many African countries, access to finance is an important obstacle for people and organisations that want to start up a business. The World Bank's indicator on the 'ease of getting credit' indicates that until 2010, access to finance has been a problem for people and organisations that want to start up a business in Morocco. While in the period 2005-2009 Morocco scored less than 20 (in a scale up to 100), which was less than Sub-Saharan Africa, in 2010, the country's score has gone up notably up to 50 and has remained at that level until 2014 (last year for which data is known). This is way above North African and Sub-Saharan score although it should be noted that in 2013, the lack of access to finance was still mentioned as the fourth largest obstacle to doing business in the country.

Figure C-9 Morocco's 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

Annex D - Method for modelling of impacts

Part 1 Methodological details of the modelling approach

The FRAMES model

The process of estimating economic and jobs impacts of circular economy activities in Morocco was carried out using Cambridge Econometrics' FRAMES model. The direct, indirect, and induced impacts of additional circular economy activities are captured in this modelling framework, to estimate the full impacts of the circular economy transition in Morocco.

FRAMES, the Framework for Modelling Economies and Sustainability, is an advanced input-output tool. It is designed to enable the assessment of socioeconomic and environmental effects of E3 (energy, environment, and economy) policies.

The key features of FRAMES are:

- An economic accounting framework based on the system of national accounts;
- Integrated treatment of the economy, energy, and the environment;
- Detailed sectoral disaggregation, and a national level input-output table, reflecting the specific structure of the economy.

FRAMES was built using the structure and principles of the E3ME model. E3ME is a global, macro-econometric model of the world's economic and energy systems and the environment. FRAMES, as a single-country framework, was designed to minimise data requirements, to enable modelling work for regions where time series data are limited. The data requirements are substantially lower than more complex macroeconomic models like E3ME. Table D-1 summarises the data sources used to construct FRAMES.

Table D-1 Scenario design

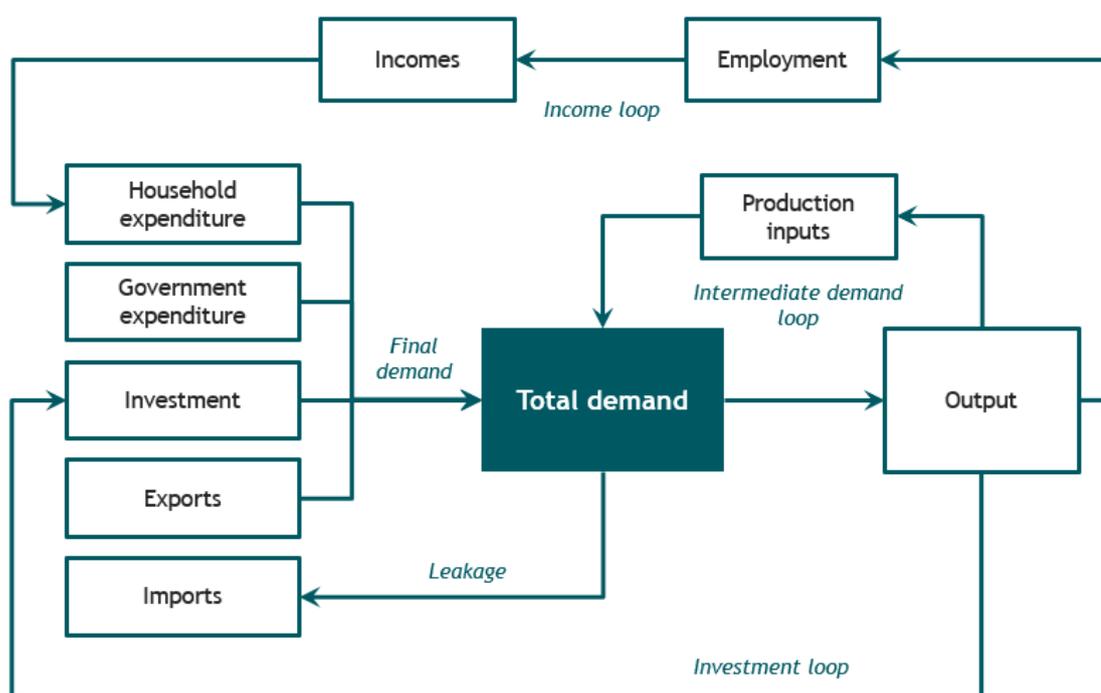
Data	Variables	Source(s)
National accounts	<ul style="list-style-type: none"> • GDP • GVA • Consumption • Investment • Trade • Gross output 	<ul style="list-style-type: none"> • World Bank - World Development Indicators • Eora National IO Tables - Morocco (2015)
Employment	<ul style="list-style-type: none"> • Employment • Compensation of employees 	<ul style="list-style-type: none"> • International Labour Organisation • Eora National IO Tables - Morocco (2015)
Population	<ul style="list-style-type: none"> • Current population • Population forecast 	<ul style="list-style-type: none"> • United Nations - Population Division
Energy	<ul style="list-style-type: none"> • Final energy consumption • Primary energy consumption 	<ul style="list-style-type: none"> • International Energy Agency • Eora National IO Tables - Morocco (2015)
Environmental	<ul style="list-style-type: none"> • Emission coefficients 	<ul style="list-style-type: none"> • E3ME
Economic forecast	<ul style="list-style-type: none"> • GDP forecast 	<ul style="list-style-type: none"> • International Monetary Fund (2019, 2020) • HSBC (2018)

The input-output table used to model the structure of the Moroccan economy was sourced from the Eora National IO Tables database. The economic sectoral classification follows this source input-output table, which includes the following 26 economic sectors:

- | | |
|--|--|
| 1. Agriculture | 14. Construction |
| 2. Fishing | 15. Maintenance and Repair |
| 3. Mining and Quarrying | 16. Wholesale Trade |
| 4. Food & Beverages | 17. Retail Trade |
| 5. Textiles and Wearing Apparel | 18. Hotels and Restaurants |
| 6. Wood and Paper | 19. Transport |
| 7. Petroleum, Chemical and Non-Metallic Mineral Products | 20. Post and Telecommunications |
| 8. Metal Products | 21. Financial Intermediation and Business Activities |
| 9. Electrical and Machinery | 22. Public Administration |
| 10. Transport Equipment | 23. Education, Health and Other Services |
| 11. Other Manufacturing | 24. Private Households |
| 12. Recycling | 25. Others |
| 13. Electricity, Gas and Water | 26. Re-export & Re-import |

Figure D-1 illustrates the economic structure and key relationships in FRAMES. Key parameters estimating the magnitude of relationships were taken from E3ME, specifically an aggregate 'Rest of Africa' region.

Figure D-1 Economic Structure in FRAMES



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.

Our employment results include informal labour, as they are based on International Labour Organisation (ILO) data which estimate informal activity. The economic results in FRAMES are calibrated to World Bank

economic aggregate data, which also incorporate estimates of the informal sector. However, the input-output relationships and sectoral shares in FRAMES are drawn from Eora's National IO Tables, which do not capture informal economic activity. The EORA data therefore required some adjustments to match the ILO and World Bank data, namely by adjusting GVA, wages and household consumption in the agricultural sector to align with World Bank data on GVA shares by sector. The implicit assumption of this adjustment is that the products of informal agriculture are entirely purchased by other households, and the value added from these sales are entirely channelled into labourers' wages (as opposed to profits or taxes).¹⁹⁶

Scenario design

FRAMES has been designed to be 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 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 and a circular economy (CE) scenario with a scale of circularity on top of the level embedded in the baseline, as shown in Table D-2.

Table D-2 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.

¹⁹⁶ For smallholder farmers, there is of course little distinction between wages and profits anyway.

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

Scenario assumptions

Table D-3 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 FRAMES.

Table D-3 Scenario assumptions

Category	Circular economy activity	Modelling input	Input size
Waste management	Improved waste collection rate	Increase in waste sector output	Increase from 85% to 95%
E-waste	Improved enforcement of e-waste trade restrictions Improved recycling of valuable materials in e-waste	Reduction in e-waste (i.e. electronics) imports	n/a
		Investment in recycling sector to improve health & safety standards	€4.5m
		Share of recycling investment paid for by private and public sectors	50:50
		Exports of materials recovered from e-waste recycling	€11.3m
Agriculture	Prevention of food loss in agricultural supply chain through improved storage and logistics	Substitution of agricultural imports by domestic agricultural production	€449m
		Investment in storage and logistical capabilities	€135m
		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 construction sector uses less primary aggregate material, and substitutes these for recycled materials, this change is entered to FRAMES as an adjustment to the input-output linkages (i.e. coefficients) of the construction sector: it purchases less from the mining and non-metallic mineral 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 FRAMES sectors

In some cases, the sectors available in FRAMES were too broad to allow for the targeting of inputs at the level described in Table D-3 above. For example, modelling the shift from virgin plastics to recycled plastics as inputs to the production of electronics requires the disaggregation of two FRAMES sectors. Firstly, we must establish the share of electronics output within the broader “Electrical and Machinery” FRAMES sector. Secondly, we must establish what share of this sector’s purchases from the “Petroleum, Chemical and Non-Metallic Mineral Products” FRAMES sector are actually of plastics, as opposed to other petrochemical and mineral products. Once these shares are established, the magnitude of the modelling inputs can be adjusted accordingly.

Table D-4 provides an overview of how each of the modelled activities corresponded to the sectors available in FRAMES. An estimate of output or intermediate demand shares was required in cases where the activity sector did not correspond directly with the FRAMES sector. These shares were estimated,

where possible, using data from the relevant national accounts and other sources. If no data were available, the shares were inferred using data for the “Rest of Africa” region in E3ME.

Table D-4 Mapping to FRAMES sectors

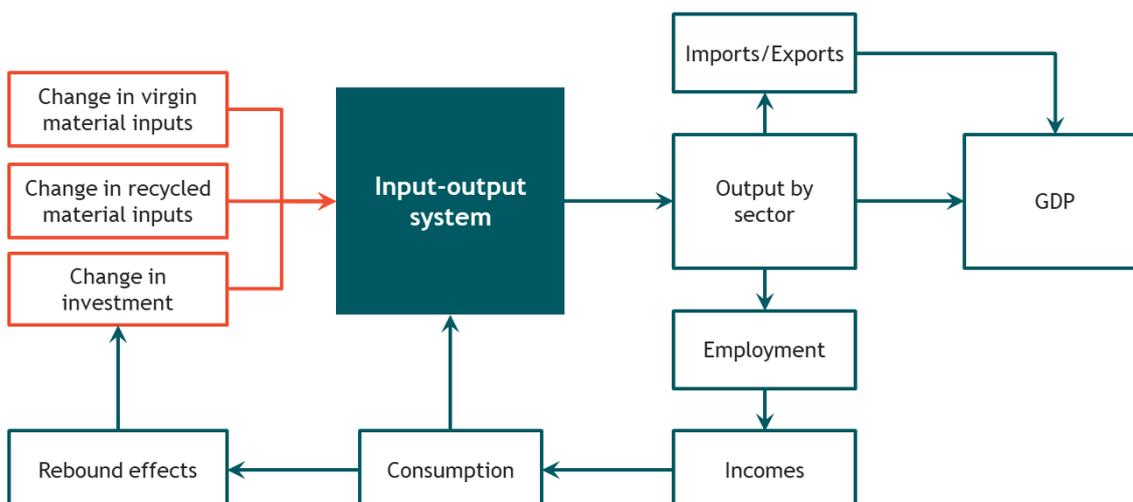
Activity sector	FRAMES Sector	Variables affected by modelling inputs
Waste management	Education, Health and Other Services	Gross output
Recycling	Recycling	IO coefficients, Investment, Exports
Electronics	Electrical and Machinery	IO coefficients, Imports
Plastics	Petroleum, Chemical and Non-Metallic Mineral Products	IO coefficients
Construction	Construction	IO coefficients
Agriculture	Agriculture	IO coefficients, Investment
Metals	Metal Products	IO coefficients (electronics input)
Chemicals	Petroleum, Chemical and Non-Metallic Mineral Products	IO coefficients (plastic feedstock, mineral fertilisers)
Mining of non-metallic minerals	Mining and Quarrying	IO coefficients (construction materials)
Production of non-metallic minerals	Petroleum, Chemical and 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. An advanced input-output model like FRAMES 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.

Figure D-2 illustrates the key linkages in modelling material demand substitution in FRAMES. The modelling inputs adjust input-output coefficients in select sectors, substituting demand away from extractive sectors, towards the recycling sector. This shift in the value of supply-chains affects intermediate demand across sectors, and as a result, levels of gross output across sectors. Differences in output levels result in employment changes by sector; variation in labour intensities across sectors affects net employment change. Output changes across sectors also affect levels of trade and investment activity. Induced effects result from changes in employment, which affect incomes, and therefore consumption.

Figure D-2 E3ME linkages - flow diagram



The net environmental impacts of circular economy activities are not certain, a priori. For instance, the shift towards recycled materials will decrease the share of material use in the economy met by virgin material. 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, FRAMES captures these various effects and estimates the net impacts.

Part 2 Detailed modelling results

Table D-5 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	4005.9	4025.1	19.23	0.48%
2. Fishing	304.3	304.6	0.24	0.08%
3. Mining and Quarrying	83.5	83.5	0.00	0.00%
4. Food & Beverages	137.3	137.3	0.00	0.00%
5. Textiles and Wearing Apparel	96.2	96.2	0.04	0.05%
6. Wood and Paper	123.0	123.0	0.00	0.00%
7. Petroleum, Chemical and Non-Metallic Mineral Products	221.7	221.6	-0.10	-0.05%
8. Metal Products	141.3	141.3	0.07	0.05%
9. Electrical and Machinery	406.4	406.7	0.29	0.07%
10. Transport Equipment	105.1	105.1	0.07	0.06%
11. Other Manufacturing	51.8	51.8	0.00	0.00%
12. Recycling	1.2	1.3	0.06	4.84%
13. Electricity, Gas and Water	45.4	45.4	0.00	0.01%
14. Construction	1240.7	1243.2	2.53	0.20%
15. Maintenance and Repair	44.3	44.3	0.00	0.00%
16. Wholesale Trade	1041.8	1041.8	0.00	0.00%
17. Retail Trade	881.7	881.7	0.00	0.00%
18. Hotels and Restaurants	368.0	368.0	0.00	0.00%
19. Transport	289.4	289.6	0.17	0.06%
20. Post and Telecommunications	310.3	311.7	1.36	0.44%
21. Financial Intermediation and Business Activities	364.1	365.2	1.09	0.30%
22. Public Administration	615.6	615.6	0.00	0.00%
23. Education, Health and Other Services	598.9	599.5	0.62	0.10%
24. Private Households	432.0	432.0	0.00	0.00%
25. Others	316.3	316.3	0.00	0.00%
TOTAL	12226.1	12251.8	25.66	0.21%

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