OUTLOOK

View Rwanda Differently

RWANDA

Issue 8



GREENING RWANDA

Climate Resilience and Sustainable Management of Natural Resources



OUTLOOK
View Rwanda Differently RWANDA

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ENVIRONMENT AND NATURAL RESOURCES

FACTS AND FIGURES

1. Land Management and Use:

11,000,000
land parcels
have been registered.

30
district land use master plans in place

2. Wood Processing and Value Addition:

11,500,000
electrical poles
Tanzania Energy Authority

10,000,000
electrical poles
supplied to Rwanda Energy Group
as a substitute to import

3. Forest and Nature Conservation:

58.9
Billion Rwf
collected from timber
harvested as fuel wood

786
Million Rwf
collected from timber harvested
from state forests

736,886
Hectares
covered by protected forests and agroforestry,
plantations and lakeshores

21,494
Jobs
encompassing agro-forestry, woodlot
plantation, roadside and lake shores

4. Mining, Petroleum and Gas Board:

US $248.5
Million
from minerals exports in 2017

60000
Valuable Jobs
expected to be created in the mining sector

Famous Quotes on environment



President Paul Kagame

"Africa's natural resource proceeds must catalyse the socio-economic transformation and long term development whereby management and resource exploitation must be determined by the needs of Africa and the benefits of our citizens."



Mahatma Gandhi

"The good man is the friend of all living things"



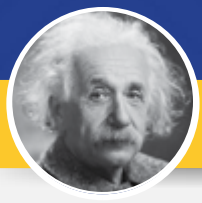
Wangari Maathai

"We owe it to ourselves and to the next generation to conserve the environment so that we can bequeath our children a sustainable world that benefits all."



Dr. Emmanuel Nkurunziza
DG Regional Centre for Mapping of Resources for Development (RCMRD)

"Natural Resources are national heritage and we have a responsibility to manage them properly, maximising benefits for today's population while remaining mindful of the generations to come."



Albert Einstein

"Look deep into nature, and then you will understand everything better."



Dr. Vincent Biruta
Minister of Environment, Republic of Rwanda

"We are a nation in which the management and protection of environment are more rational and well-regulated in order to bequeath to future generations the basic wealth necessary for sustainable development."



"There is no trade-off between economic growth and protecting our environment. They complement each other. When we protect our environment, we are also taking care of ourselves. The more we put efforts in conservation, the more benefits we amass. This means that the communities will even benefit more,"

H. E. Paul Kagame

President of the Republic of Rwanda

Protecting our Environment and Developing Natural Resources



Vincent Biruta, Minister of Environment

For more than two decades, Rwanda has demonstrated an unwavering commitment to protecting our environment, developing natural resources sustainably, and more recently, addressing the impacts of climate change.

The country's green growth and sustainable development efforts have been undertaken in partnership with our valued stakeholders, including government institutions, the private sector, civil society organisations and international development partners.

In this time, much has been achieved in the areas of environmental protection and conservation, land and forestry management, water resources management, meteorological services and mining. Policies, master plans, laws, ministerial orders and other strategic frameworks have been developed and, to a great extent, implemented with commendable results.

Most importantly, these efforts are improving the lives of Rwandans, increasing our nation's resilience to climate change and natural disasters, and protecting our wildlife and wild places.

Rwanda's Green Growth and Climate Resilience Strategy, introduced in 2011 with 14 Programmes of Action, is ensuring the environment is part of every policy, strategy and decision the government makes.

We have registered important and necessary progress in the area of data collection on weather and climate patterns and forecasting. This work is availing historical data to Rwandans and investors, and improving our day-to-day response to climate change, as well as extreme weather events such as flooding.

To improve our weather observation capacity, a Doppler Weather Radar Station has been installed at Maranyundo Hill in Bugesera District. The station primarily detects hazardous wind shear weather systems prevalent at Kigali International Airport, and also monitors other weather phenomena in Rwanda and beyond.

Given that the average temperature in Rwanda has increased by 1.4 degrees Celsius since the 1970s, the government takes climate change adaptation very seriously. We have invested significantly in climate resilience initiatives, and have mobilised both domestic and international resources to support this. These efforts have created green jobs, protected waterways and landscapes against erosion, increased the country's forest coverage and supported climate smart agriculture.

Rwanda's environmental protection obligations do not stop at our borders and so we are committed to supporting, implementing and meeting our targets related to international agreements, such as the Paris Agreement and the Montreal Protocol.

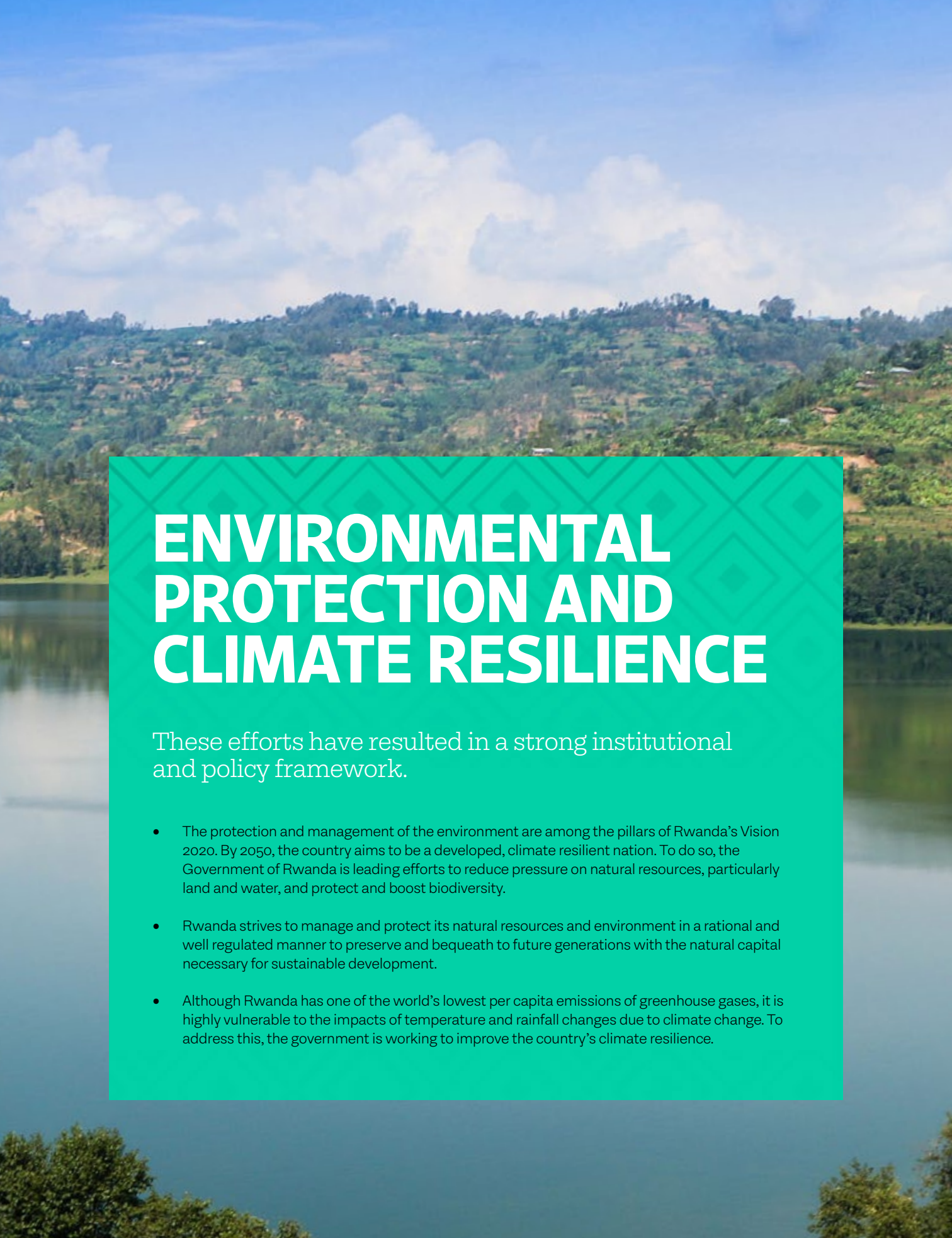
Rwanda's outstanding contribution to the preservation of the ozone layer earned the country the 2012 Ozone Protection Award from the Ozone Secretariat of the United Nations Environment Programme. In 2016, Rwanda hosted the 28th Meeting of the Parties to the Montreal Protocol at which the historic Kigali Amendment was adopted. We can be very proud of our role in this milestone, which could see up to half a degree of warming avoided by the end of the century.

These examples are a demonstration of just some the noteworthy progress registered by the Environment and Natural Resources sector in Rwanda. As a country, we are committed to sustainable development, reducing pressure on natural resources, particularly land, water, and biodiversity and stopping environmental pollution and reversing degradation.

Proper management and protection of environment is essential if we are to bequeath to future generations the basic wealth necessary for sustainable development.

We are pleased that our efforts as a nation to protect our natural heritage are showing good results. We look forward to continue working with all Rwandans and other partners to realise our goal of becoming a developed, low carbon economy by 2050. ■





ENVIRONMENTAL PROTECTION AND CLIMATE RESILIENCE

These efforts have resulted in a strong institutional and policy framework.

- The protection and management of the environment are among the pillars of Rwanda's Vision 2020. By 2050, the country aims to be a developed, climate resilient nation. To do so, the Government of Rwanda is leading efforts to reduce pressure on natural resources, particularly land and water, and protect and boost biodiversity.
- Rwanda strives to manage and protect its natural resources and environment in a rational and well regulated manner to preserve and bequeath to future generations with the natural capital necessary for sustainable development.
- Although Rwanda has one of the world's lowest per capita emissions of greenhouse gases, it is highly vulnerable to the impacts of temperature and rainfall changes due to climate change. To address this, the government is working to improve the country's climate resilience.



RWANDA'S PROSPERITY HINGES ON GREEN GROWTH AND CLIMATE RESILIENCE

Through its policies, laws and regulations, Rwanda has made environmental protection central to its efforts to build a green and sustainable nation.

Environmental Regulation and Pollution Control

- The Government of Rwanda's commitment to sustainable development and green growth led to the creation of the Resource Efficiency and Cleaner Production Centre in 2008 to support the private sector and industry to boost productivity, improve competitiveness and reduce environmental impact by using fewer resources and producing less waste. Industries, hotels and other major resource users have benefited from initiatives led by the centre, including the efficient water and electricity use programmes, and best waste management practices.

- Rwanda is also promoting resource efficiency through the 'Reduce, Recycle and Reuse' principle. The private sector has been encouraged to invest in waste management and a number of private companies are involved in plastic waste and electronic and electrical waste recycling.

- At the household level, the Government of Rwanda introduced a rain water harvesting programme to ensure the efficient and sustainable use of water resources. A rainwater harvesting loan scheme, which operates as a public-private partnership, is supporting communities to access the financial support they need to acquire rainwater harvesting systems.

- Through Integrated Development Plan Model Villages and Green Villages, new settlements have been built with a range of environmental friendly components including clean energy (from hydro, solar and biogas) and water harvesting facilities, among others. These villages maximise water and energy efficiency and promote hygiene and sanitation.

- Green Villages have led to significant improvement in the quality of life for residents because the homes are inhabited by families that have been relocated from high risk zones, thus reducing vulnerability to climate change.

- Schools have also been a key focus of environmental protection through the "Greening Schools" concept that was

introduced in schools across the country. The concept integrates efforts to make schools environmentally friendly and ensuring the community participates in finding solutions to the environment and sustainability issues they are confronted with. Examples include water harvesting, sanitation, tree planting and the separation of waste. In conjunction with the Ministry of Education, the Rwanda Environment Management Authority has been training teachers and students and supporting these initiatives to be scaled up.

- Through the Ministry of Infrastructure and the Rwanda Energy Group, the Government is also promoting the use of renewable energy (hydro, solar, biogas and gas) coupled with the use of energy saving cooking stoves, energy saving lights and solar water heaters.

Keeping the eco-equilibrium

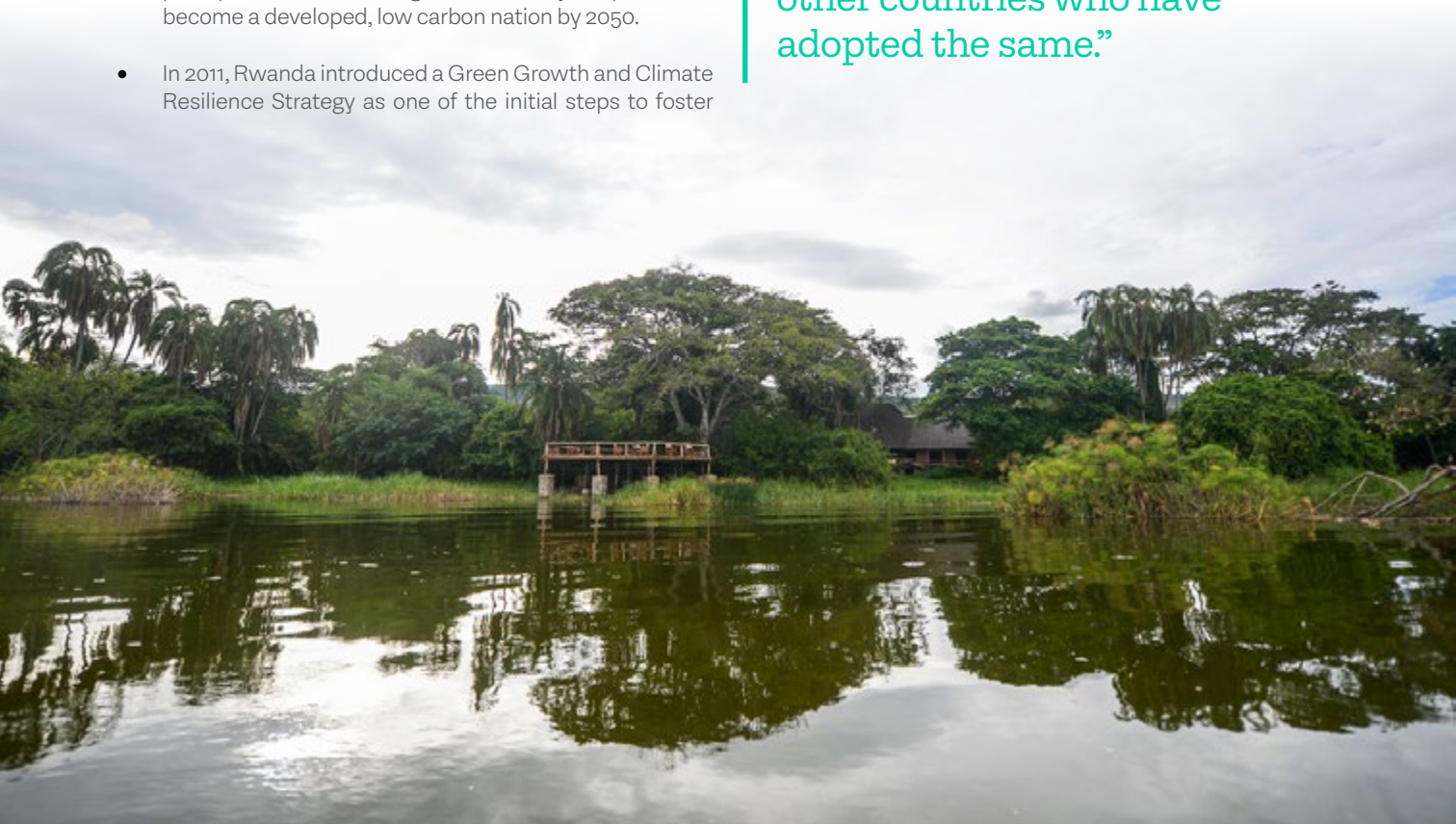
- Rwanda's sustainable development and green growth efforts have attracted the attention of other countries who have adopted the same. This have been made possible thanks to the country's commitment to sustainable resource utilisation and the protection of the ecological equilibrium.

- The country's flagship Vision 2020 recognises three principles of a green economy: social cohesion, economic empowerment and environmental stewardship. These principles are contributing to the country's aspiration to become a developed, low carbon nation by 2050.

- In 2011, Rwanda introduced a Green Growth and Climate Resilience Strategy as one of the initial steps to foster a sustainable, secure future in which the country is prepared for the risks associated with climate change and the opportunities of sustainable development. The strategy builds upon work already being done on climate change, focusing various projects and policies into a holistic national effort with long-term and short-term actions.

- The Green Growth and Climate Resilience Strategy lays the foundation for the country's environmental priorities through 14 Programmes of Action that span different sectors. These include sustainable intensification of small scale farming, agricultural diversity of markets, sustainable land use, integrated water resource management, a low carbon energy grid, small-scale energy access in rural areas, disaster management and disease prevention, green industry and private sector development, climate compatible mining, resilient transport systems, low carbon urban systems, ecotourism, conservation and payment of ecosystem services, sustainable forestry, agroforestry and biomass, and climate data and projections.

> "Rwanda's sustainable development and green growth efforts have attracted the attention and praise of other countries who have adopted the same."





- Today, Rwanda's sustainable development and green growth efforts are winning praise from around the world. Many countries, from both across Africa and further afield, are looking to the land of a thousand hills to draw inspiration as they seek to build green economies.

Fostering Community Conservation Efforts and Disaster Preparedness

- The involvement of the community is essential if policies and strategies are to be implemented effectively. In Rwanda, this has been done by always identifying the problem, key stakeholders and later determining the role every individual in the community can play in environmental protection. Consultation meetings have also been organised to plan how these strategies are going to be implemented, and how they will be monitored and evaluated.

- The community has also been mobilised through awareness programmes on radio, TV, in newspapers, and through environmental clubs and community gatherings, including at monthly community work known as Umuganda. These channels are used to inform the general public about their role in environmental protection and the steps they can take to build a green Rwanda.

Green Growth Initiatives

- Since the adoption of the Green Growth and Climate Resilience Strategy, Rwanda sought to introduce climate resilience and low carbon development across key sectors of the economy. Investments have been made to promote green growth and renewable energy. These include large scale and off-grid solar, hydro and waste to energy, biogas, LPG gas, green technologies, resource efficient and cleaner production technologies, sustainable mining, as well as green homes and villages, sustainable transport and low emission technologies.

- Some of the notable projects include a 8.5 MW solar power plant in Rwamagana District, methane gas extraction in Lake Kivu generating 25 MW, and the many green villages across the country that demonstrate how integrated sustainable natural resource management can help reduce poverty, enhance environmental sustainability, empower communities and improve quality of life.

- Five years ago the country established the Rwanda Green Fund (FONERWA) to support the best public and private projects that have the potential for transformative change and that support Rwanda's commitment to building a green economy. The fund has mobilised more than US $130 million to date and is a leading example of the impact that well-managed climate financing can have.

- The concept of green growth has been embraced by Rwandans because it has reached households and industries alike, and improved quality of life in terms of efficient use of energy and productivity.

- In addition, Rwanda is also investing forestry, with an ambitious target of increasing forest cover to 30% of the country's total surface by 2020 from a baseline of 10% in 2000. Today, the country's forest cover stands at an estimated 29.8% or 708,255 hectares - a clear indication that the target will be easily achieved.

The Challenge Ahead

- Rwanda has made great strides forward as evidenced by the increased understanding of the importance of environmental protection across all sectors. Today, government institutions, the private sector and civil society make and implement plans in accordance with environmental protection policies and laws.

- Awareness has also been raised about the role every stakeholder has to play in conserving the environment. Initiatives such as the banning of plastic bags have helped build understanding of environmental conservation and these kinds of homegrown solutions have been adopted by a number of other countries.

- Despite these efforts, there remain a number of challenges. These include the need to fast-track the transition from biomass burning for cooking to cleaner alternatives such as gas and electricity. Air pollution from biomass burning, as well as the transport sector, remains a threat to the health of Rwandans. There is also the need to tackle the scourge of single-use plastics and improve the protection of the country's wetlands.

> "The concept of green growth has been embraced by Rwandans because it has reached households and industries alike, and improved quality of life in terms of efficient use of energy and productivity.

Role of the Private Sector

- The private sector is a key partner in Rwanda's green growth and sustainable development ambitions. Today, private companies are working hand-in-hand with the government and civil society organisations on a range of initiatives from forest management to e-waste recycling and solid waste management.

- The private sector is also investing in renewable energy and green technologies, such as electric motor bikes and water treatment systems that are improving the lives of Rwandans.

- The sustainable utilisation of resources, promotion of green homes, sustainable transport, green cities, waste management and recycling, are all areas in which the private sector is heavily involved.

The Future

- As Rwanda strives to be a developed, low carbon nation by 2050, the government and its partners are working hard to strengthen the country's resilience to climate change, foster green growth, improve air pollution control through air quality monitoring, and enhance environmental education and mainstreaming programmes.

- Rwanda is also focused on the promotion of clean energy, green cities and villages, capacity building for communities and stakeholders, waste management, research and development, and strengthening partnerships with other institutions, organisations and the public to ensure sustainable resources utilisation and a healthy environment.■



RWANDA E-WASTE DISMANTLING & RECYCLING FACILITY:

FROM TRASH TO TREASURE

By Kelly Rwamapera

As Rwanda positions itself as a leader in Information and Communication Technology (ICT) in the region, there has been an increase in the use of electronic equipment such as laptops, televisions, computers and smartphones. This, paired with high consumer demand for the latest gadgets, has led to significant growth in e-waste. In response, the Government of Rwanda, through the Ministry of Trade and Industry, went about solving this problem in partnership with the Rwanda Green Fund (FONERWA).

In 2014, the Rwanda Green Fund invested close to US $1.5 million (Rwf 1.26 billion) to develop a national e-waste management strategy. Thanks to the fund's investment, Rwanda established an e-waste recycling facility, with the capacity to employ more than 1,000 people - making it the second state-of-the-art e-waste dismantling and recycling facility in Africa.

In its first six months of operations alone, the Rwanda E-waste Dismantling and Recycling Facility processed more than 120 tonnes of materials and prevented 279 tonnes of carbon dioxide equivalent emissions from entering the atmosphere.

At the official opening the plant in December 2017, Rwanda's Minister of Environment, Vincent Biruta, said:

"This investment demonstrates the power of public finance as a catalyst for private sector investment. By putting in place a strong policy and regulatory framework for e-waste, we now have a solid foundation to unlock private sector investments. This result represents the kind of paradigm shift we need in all sectors of our economy if we are to address the environmental challenges we face today, and that we will continue to face well into the future."

Olivier Mbera, Country Manager of Enviroserve Rwanda, which operates the plant, says the facility is improving e-waste management across the country:

"This project has greatly transformed waste management because there was no solution before, especially for e-waste.

> "The new facility has the capacity to employ more than 1,000 people - making it the second state-of-the-art e-waste dismantling and recycling facility in Africa."

Rwandans used to keep electronic and electrical waste in their offices and homes, or in storage. When we conducted the initial assessment study, we found that some of the waste was even dumped in landfill. This facility provides a solution to that. It is also protecting the health of Rwandans and our natural environment by avoiding contamination from e-waste."

While the project aimed to provide a sustainable solution for electronic waste to support the continued growth of ICT in Rwanda, it has also created green jobs for more than 300 people. This number is expected to rise to more than 1,000 once the facility and nationwide collection points are fully operational. According to Oliver Mbera, more than 400 computers have also been refurbished and distributed to local schools.

Jean de Dieu Munyankindi has been employed at the e-waste recycling facility since November 2016. He says that working at the facility has tremendously improved his life.

"The first and most important benefit I am getting from working at the facility is the new skills I have developed. I did electronics at university, but now I understand much more about how they work. I have realised that all the electronic devices we think are complex, are actually very simple.





I have also become more financially secure from the salary I earn." Jean de Dieu says he is proud to contribute to Rwanda's green growth.

With the facility now operational and able to process 10,000 tonnes per year, local and regional plastic and metal manufacturers have expressed interest in using the recycled raw materials to produce new products. This will support Rwanda's efforts to foster a circular economy. The management team also plans to raise awareness on the benefits of the facility, locally and internationally, so that others may learn from Rwanda's experience.

> "Rwanda has positioned itself to become an importer of e-waste and benefit substantially from turning trash into treasure."

A private-public partnership agreement has been signed with Enviroserve Rwanda to facilitate the running of the facility and the collection of e-waste from across the country, which will increase the number of people employed in e-waste recycling in Rwanda. Under the agreement, the lease fee paid to the Government of Rwanda will be reinvested in environmental and green growth initiatives through the Rwanda Green Fund.

As the facility grows, and potentially extends to lead-acid battery recycling and precious metals recovery, Rwanda has positioned itself to become an importer of e-waste and benefit substantially from turning trash into treasure.■

FINANCING A GREEN AND CLIMATE RESILIENT RWANDA



ABOVE: ○ The Send A Cow project supported by the Rwanda Green Fund invested in communities to ensure the sustainable management of natural resources and environmental rehabilitation for poverty reduction.

In 2012, the government established the Rwanda Green Fund, known also as FONERWA. The Fund invests in public and private projects that have the potential for transformative change and that align with Rwanda's commitment to building a strong climate resilient and green economy. The Fund also provides technical assistance to ensure the success and impact of these investments.

REMA was set up as a regulatory body but the Fund took some time because at the time not much was understood about the relative importance of environment in development.

The Fund invests in sustainable wealth creation and poverty reduction by providing strategic financing that accelerates Rwanda's transformation to a green economy. Funding proposals are approved based on careful and thorough evaluation to ensure their return on investment contributes to Rwanda's sustainable development, climate resilience and green growth.

The Fund is an initiative to support environment protection and deal with the impact of climate change – acting as the avenue through which development partners can contribute to Rwanda's green growth ambitions. The Fund accepts contributions from both public and private institutions. The Government of Rwanda demonstrated its commitment to the fund by contributing seed capital of US $4 million.

Partnering for People, Planet and Prosperity

Over the last five years, the Fund has worked with a range of local and international partners to expand its operations and increase its impact. Some of the Fund's key partners include the UK Department of International Development (DFID), the United Nations Development Programme (UNDP), the German Development Bank (Kreditanstalt für Wiederaufbau, KfW), the Development Bank of Rwanda (BRD), the Climate and Development Knowledge Network (CDKN) and the Global Green Growth Institute (GGGI). The Fund also works with the Green Climate Fund (GCF), the World Bank, the African Development Bank, the Global Environment Facility, and Climate Investment Funds.

The Fund also mobilises financial resources from the government's own revenue sources, including environmental fines and fees, environmental Impact Assessment fees such as proceeds from forestry and mining funds and other environmental revenue and seed financing from domestic stakeholders.

Investing in Environment, Conservation and Climate Resilience

Financing from the Fund can be accessed by government ministries and agencies, districts, civil society organisations including academic institutions and the private sector. In this way, the Fund is an instrument to facilitate direct access to international environment and climate finance, as well as to streamline and rationalise external aid and domestic finance.

There are four financing priorities through which the Fund provides investment:

1. Conservation and Sustainable Natural Resources Management
2. Research and Development and Technology Transfer and Implementation
3. Environment and Climate Change Mainstreaming
4. Environmental Impact Assessment Monitoring and Enforcement

Climate financing is provided by the Fund through the following investment products:

- Grant: Legal entities in Rwanda can apply for grant based funding for initiatives that meet set criteria. There is no cap on grant funding.

- Innovation Investment: This product is a performance based investment for research and development, proof-of-concept and demonstration. Private sector companies can apply for up to US $300,000 and must provide 25% match funding.

- Credit Line: The Fund provides Rwanda's cheapest money with a credit line that provides financing at 11.45%, well below market rates. Developed with Rwanda's Development Bank, private sector companies must provide 30% match funding. The minimum loan amount is USD 70,000.

Return on Investment

The work of the Rwanda Green Fund has resulted in transformational change in Rwanda. The fund has committed investments of approximately US $40 million to 35 projects that have created more than 136,000 green jobs, provided more than 27,000 households with improved access to off-grid clean energy, and protected 19,000 hectares of land against soil erosion.

These investments have also supported more than 100,000 people to cope with the effects of climate change, added 38,000 hectares of forest and agro forest coverage and protected 19,000 hectares of watersheds and water bodies across the country. In total, the Fund has raised approximately US $130 million for strategic climate resilience investments.

Thanks to the effectiveness and good management of Rwanda's climate finance, the international Green Climate Fund (GCF) accredited the Ministry of Environment to access project-based climate finance. The GCF accreditation allows Rwanda to receive up grants up to US $50 million to foster the country's transition to a truly green and sustainable economy.

Since then, the country has accessed the GCF Readiness Support and Preparatory programme through a grant of US $2.5 million. In March 2018, Rwanda was also awarded a GCF grant of US $32.8 million to strengthen climate resilience in Rwanda's north. Rwanda also recently received a US $600,000 grant from Green Climate Fund to support studies on Green Development Projects in Secondary Cities of Rwanda.

In Focus: Gaseke Hydropower Plant

In 2015, the Rwanda Green Fund invested in the construction of the Gaseke Hydropower Plant in Gakenke District in the Northern Province. The power plant came as a solution to the lack of electricity in the area. The 500 kW plant is now providing clean power to communities living around the Gaseke river and demonstrates the potential of small scale renewable energy to meet the country's electrification targets. Through

the generation of renewable energy, this fund investment has created hundreds of green jobs and prevents 3,321 tonnes CO2-eq from being emitted into the atmosphere every year.



In Focus: Water, Energy and Food Security Nexus

In 2015, the Fund invested close to Rwf 700 million (approximately US $800,000) in a broad ranging project to provide evidence-based policy guidance and promote climate resilience and participatory sustainable development in the Akagera Watershed in Rwanda's east.

Led by ARCOS Network, the project uses the water, energy and food security nexus to boost climate smart agriculture and development.



Some of the major outcomes of the fund's investment include 850 green jobs created, 2,800 hectares of watershed protected, 13,600 people engaged to promote climate resilience and sustainability, 300 members of Nature Based Community Enterprises trained on sustainable development, 2,800 hectares covered with permanent vegetation and 14,500 people trained on the project's impact and lessons.

In Focus: Sustainable Biodiversity

In 2015, the Fund invested in sustainable biodiversity by providing a grant to Kigali Farms to map and domesticate the mycological riches of the country's forests. This investment has created an inventory of edible mushroom populations in Rwanda's forest ecosystems and identified species that are suitable for export and have the potential for cultivation. Today, mushrooms grown in Rwanda are exported across the region, improving the health and livelihoods of tens of thousands of farmers and customers.

The results of the Fund's investment include 20 species of mushrooms mapped, of which a number have been domesticated, 70 full time jobs and 1000 casual jobs created, the creation of new laboratory business to produce species adaptive to the local environment and soil, increased capacity by Kigali Farms to create its own mushroom spawn, and farmers and cooperatives who have been trained in the benefits and growing of mushrooms.



Future Plans

The Rwanda Green Fund aims to be a dynamic, independent resource facility providing targeted financial and technical support to catalyse climate resilient development at scale, contributing to Rwanda's vision of becoming a low-carbon and climate resilient economy by 2050■

CIVIL SOCIETY CHAMPIONS ENVIRONMENT PROTECTION

By Michel Nkurunziza

Non-governmental organisations are supporting efforts to conserve the environment across the country. A range of local and international organisations are involved in climate change adaptation and mitigation, water and forestry management, biodiversity conservation, renewable energy, and sustainable agriculture, among others. By working together, civil society, the government and the private sector are having a tremendous impact in building a green Rwanda.

One of the leading non-governmental organisations working in Rwanda on environmental issues is ARCOS Network. Established 1995, the group's operations stretch throughout the Albertine Rift region as well as the Africa Great Lakes and Mountain regions.

Gilbert Muvunankiko, Head of Information Systems and Communications at ARCOS Network, says that they have achieved much over more than two decades of supporting environment and conservation in Rwanda and across the region.

"ARCOS Network is focused on enhancing sustainable management of terrestrial and freshwater ecosystems and their services, supporting community livelihoods and human well-being, promoting grassroot actions to build community and ecosystem resilience, and improving the availability and sustainable use of water resources," said Muvunankiko

He also underscored the need to work with governments, communities and the private sector to develop innovative solutions that enable access to affordable and sustainable energy, promote sustainable farming and ensure ecosystem resilience.

In Rwanda, ARCOS Network has a signed a Memorandum of Understanding with the Ministry of Environment to promote sustainable development of local communities. The NGO also supports government's decision-making process and environmental policy formulation.

ARCOS also facilitates the public to participate in the environmental impact assessment process by establishing a platform for dialogue and exchange on key issues in the environment and development sectors, in addition to promoting awareness of environmental issues.

"ARCOS and the Ministry of Environment partner to mobilise resources necessary to achieve the objectives of our work and improve the lives of Rwandans and our environment," Muvunankiko said.

Through this partnership, ARCOS is protecting various species in different ecosystems ranging from forest, wetlands and the agricultural ecosystem.

"Our approach does not target a particular species but the whole ecosystem and landscape. However, we put more efforts into restoring and protecting the habitat of some endangered species," he stressed.

Achievements

Through various initiatives, ARCOS is enhancing environmental resilience and promoting sustainable agriculture technologies, as well as soil and water protection. The organisation's activities also include forest landscape restoration, ecosystem-based adaptation, promotion of green energy technologies such as energy saving cooking stoves, biogas and solar energy, among others.

"Our work with communities in different parts of the country has has resulted in increased awareness and understanding of environmental sustainability. For example, community capacity in tree nursery development has grown significantly," he said.

One of the key achievements in enhancing the community's climate resilience is the construction of a 1.5 km gravity fed water supply system for irrigation and domestic consumption in Kigarama Sector. In addition, irrigation solar water pumps were constructed in Kabungeri Village in Kirehe District and Rugarama Village in Bugesera District, with support from the Rwanda Green Fund (FONERWA).

> "This resulted in the increased capacity in tree nursery development. The management, awareness and understanding of environmental sustainability also increased significantly."

Farmer cooperatives have also been supported through the provision of livestock including cows, goats and pigs. This has enabled them to conduct organic farming using manure, avoiding the need for harsh and dangerous chemical fertilizers. The cooperatives have also been trained on the integration of agroforestry in their day-to-day work.

"The results are impressive. For instance, farmer cooperative from Nyagihunika Sector in Bugesera District increased production from 957 kg to 24 tonnes per season per 2 hectares. Twigiremuhinzi Rusebeya cooperative increased potatoes production from 5 to 38 tonnes per season on a 3.5 hectares of land, while KOIMIZANYA cooperative saw maize produce increased from 8 to 24 tonnes and KOAUKI cooperative's banana harvest rose from 158 to 250 tonnes."

"As far as water security is concerned," he added, "a coffee farming cooperative in Kigarama Sector (KOAKAKI) was facilitated by the rehabilitation of a water spring in addition to a treatment plant that was constructed to treat water from their washing station, thus curbing pollution downstream. 45 households were also provided with rainwater harvesting equipment."

ARCOS has also established 10 Nature Based Villages as model community settlements to inspire improved livelihoods and environmental sustainability.

"In each village, a Nature Based Community Fund was created to support farmer projects that have an economic component at the same time contributing to enhanced community resilience to climate change. Today, 100 farmers have benefited from those funds and most of them are involved in banana, cassava, potatoes, maize, livestock farming and horticulture," Muvunankiko said.

"In the green energy sector, with the partnership of Bugesera and Rutsiro districts, we supported 97 households to own biogas cooking systems. Our irrigation facilities also rely on green solar energy," he added.

Throughout 2017, 300 hectares of watershed were protected or restored through tree planting, soil conservation and agroforestry interventions while 100,000 seedlings were planted in Bugesera, Kirehe and Rutsiro districts.

"We also provide a platform for dialogue on environment and development with a focus on climate change adaptation and mitigation. For example, last year we organised an Environment and Sustainable Business Development Dialogue that brought together representatives of private companies, civil society and government."

The ARCOS-led conservation interventions work with 18 cooperatives which comprise 3,450 members - all of whom have benefited for the work of this NGO to support Rwanda's sustainable development.

> "Our work with communities in different parts of the country has has resulted in increased awareness and understanding of environmental sustainability. For example, community capacity in tree nursery development has grown significantly,"

MANAGING WATER RESOURCES FOR DEVELOPMENT

Integrated Water Resources Management

From west to East Rwanda is divided into two major drainage basins: The Congo Basin to the west which covers 33 per cent and handles 10 % of all national waters and the Nile Basin to the east covering 67 per cent and delivering 90 per cent of the national waters

Rwanda is endowed with a dense hydrological network comprising of numerous small rivers, streams and wetlands that drain into lakes and other water reservoirs. The annual water resources availability per capita is estimated at 670 m3, according to the (National Water Resources Master Plan, 2015 This is less than) the globally accepted water stress index threshold of 1,000 m3/capita.

Rwanda receives an average annual precipitation of 1200mm and the rainfall ranges from as low as 800mm in Eastern Province to about 2000mm in high altitude of North and Western Provinces.

Surface water bodies in Rwanda occupy a total of 135,000 hectares, eight per cent of the country's surface area. These include 101 lakes (1,495 km2), 861 rivers totalling 6,462 Km and a network of wetlands. Three of the country's largest lakes are shared with neighbouring countries. Lake Kivu is (shared with DRC while), Lake Cyohoha and Lake Rweru are (shared with Burundi).

The inland lakes are sustained by inflows from a network of rivers, streams and wetlands. Rwanda has 860 wetlands, which cover 278, 536 hectares, accounting for 10.6 per cent of the country's total surface area.

Role of Groundwater

Groundwater resources in Rwanda are estimated to discharge about 66 m3/second and about 22,000 sources have been recognised. Extensive borehole drilling and shallow well construction have been done countrywide. At least 757 boreholes and wells have been recorded across the country.

Although groundwater is deemed safer than surface water, increasing pollution from agro-inputs (through leaching and erosion), and the declining ability of ecosystems to naturally purify water, raise quality concerns as this water source accounts for 86 per cent of safe drinking water supply for rural areas.

The pressure on water resources primarily results from utilising the natural resources to meet basic needs as well as social-economic development. The three major water consuming sectors are agriculture, domestic and industry.



ABOVE: Rwanda is investing significantly in water management and treatment systems to improve access to drinking water

Catchment Protection, Conservation and Preservation

Rwanda's water resources are under increasing pressure due to population growth, urbanisation and the country's aspiration for development. This is in addition to the degradation of water resources due to human activities including unsustainable agriculture and mining and deforestation. As a result, Rwanda's surface water resources are highly silted and this becoming a serious constraint for some socio-economic development initiatives such as hydropower development and domestic water supply provision.

To ensure sustainable water resources management, a National Water Resources Management Master Plan was developed and approved in 2015 under which the country was divided into nine catchment areas and appropriate and specific management measures for each catchment are being elaborated. These include the protection, conservation, safeguarding and rational use of water resources.

Various institutions have been put in place at both central and decentralised levels for a proper management of water resources notably the National Water Consultative commission, which is a high level policy organ with the mandate to guide any plan or programme related to water resource management and development. It is assisted by a technical Inter-ministerial Committee.

At decentralised level, water management committees are in place at each district and recently Task Forces bringing together the districts sharing one catchment have been introduced.

In order to reverse the current water resources degradation trends and ensure an integrated water resources management approach as adopted by the National Policy for water resources management and its implementation strategic plan, various programmes and projects are being implemented in various catchments country wide. They include the Water for Growth, a programme funded by the Kingdom of Netherlands and implemented by the Rwanda Water and Forestry Authority. Main interventions are recorded in Upper Nyabarongo, Sebeya, Nyabugogo and Muvumba, the Lake Victoria Environmental Management Project (LVEMPII) under REMA intervening in Upper and Lower Nyabarongo catchments, the Climate Adaptation Project being implemented in Nyabihu and Musanze Districts and other afforestation projects under the Water and Forestry Authority.

Demand Vs Supply

In order to ensure sustainable and rational water use, a

BELOW: Rice paddy irrigation will remain one of the Rwanda's biggest water consumers



Ministerial Order No 002/16.01 of 24/05/2013 determining the procedure for declaration, authorisation and concession for the utilisations of water was put in place and this requires that any abstraction of water resources for any activity like irrigation, hydropower, fish farming, mining other than domestic activities, has to have a permit to use water. The concerned water uses that are subject to water use permits include hydropower plants, irrigation schemes of above 1 ha, water treatment plants, industries abstracting water directly from surface water or underground, mineral washing and fish farming in lakes and ponds.

In the same context, water allocations plans using appropriate modelling tools are being developed for most of the catchments starting with the most water scarce, mainly Muvumba and Akagera catchments.

To be able to monitor the fluctuation of water resources, advanced automated water monitoring stations have been installed on various rivers and lakes.

Water Harvesting.

Rain water harvesting (RWH) is used as an alternative source of water, which helps to meet the ever increasing and conflicting water demands for human needs, socioeconomic development as well as environmental protection. Depending on the location and the availability of alternative water resources, RWH becomes the cheapest option locally available. RWH techniques are used as exclusive or as complementary supply source for economic activities in the form of hill side irrigation, cattle watering and for industrial processes.

According to EICV4, 2013/2014, the proportion of households using rainwater as the main drinking water source is 0.2 per cent for both urban and rural households against 2 per cent for urban and 0.4 per cent for rural households in EICV3, 2010/2011. The highest rate is 0.6 per cent for the Western Province and the lowest is zero per cent for Kigali City and the Southern Province.

BELOW: Rwebeya River, Northern Province.





ABOVE: Government officials and development partners join hands with local communities to improve drainage in the Upper Nyabarongo Catchment

On the other side, rainwater harvesting is one of the mechanisms to control floods in flood prone areas by the fact that these rainwater harvesting systems being those at household level or the in-situ rainwater harvesting systems like ponds and dams reduce the volume of direct surface run off after rainfall. It is even in this context that the Rwanda Water and Forestry Authority is piloting a project since 2013 through funding from FONERWA with the main goal being to support people to access RWH tanks through a loan and subsidy scheme in some Districts that are the most vulnerable to floods namely Nyabihu, Rubavu, Musanze, Gasabo, Kicukiro and Nyarugenge.

However, following to the prolonged droughts that affected the Eastern Province last year and taking into account that RWH can be a tool to cope with drought; the project has been now extended to some Districts of the Eastern province namely Kayonza, Gatsibo and Nyagatare.

Major achievements in Water resources management

In terms of governance:

- A National Water Resources Management Policy was adopted by Cabinet in 2012.
- A National Water Resources Master Plan was adopted by Cabinet in 2015.



ABOVE: A hydrometric station on Ntaruka River monitors the water level and flow.

- A high level National Water Consultative Commission and its supporting Inter Ministerial Committee were put in place and are operational;
- A Water use permitting System was established and is operational
- Rwanda has ratified the Nile Basin Cooperation Framework Agreement and initiate the framework for joint management of Lake Kivu and Rusizi Basin (ABAKIR)

In terms of water resources protection and conservation:

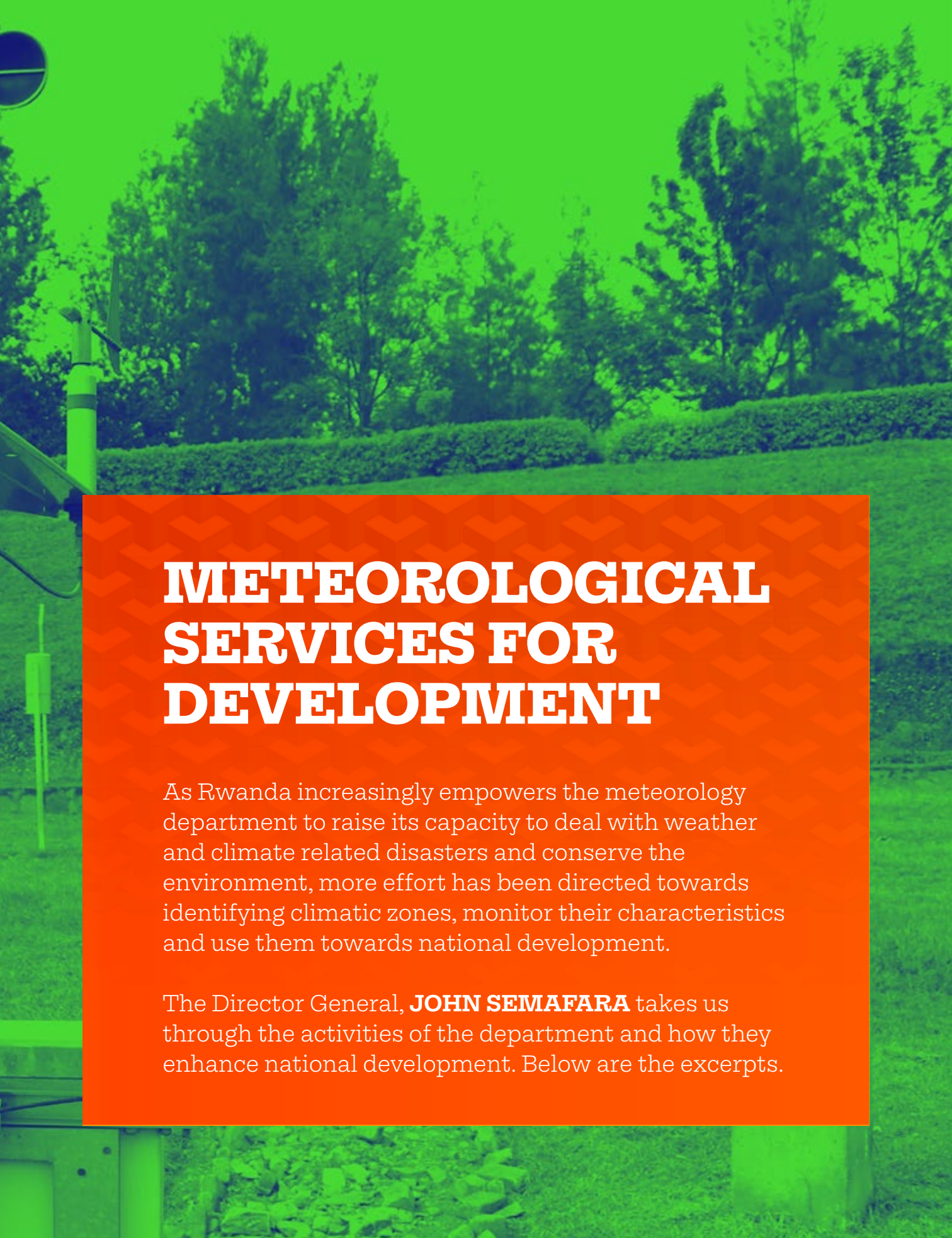
- More than 2200 ha of degraded watersheds rehabilitated over the past five years;
- More than 6, 600 people were supported to access RWH systems through a loan and subsidy scheme
- Catchment characterisation for Muvumba, Sebeya, Nyabugogo and upper Nyabarongo catchments has been completed.

In terms of water storage and floods control:

- A feasibility study and detailed design for a multi-purpose dam on Muvumba river with a storage capacity of 35 Million cubic meters have been completed
- An integrated plan for flood mitigation in City of Kigali has been elaborated
- A study on volcano flood management in Northern part of the country has been completed
- With support of various watershed projects, gabions and check dams have been constructed in lava region
- A total volume of 36,779.5 m3 water storage capacity was reached through the RWH loan and subsidy scheme and the construction of water tanks on social and public buildings as well as grouped settlements totalized a volume of 3,050 m3







METEOROLOGICAL SERVICES FOR DEVELOPMENT

As Rwanda increasingly empowers the meteorology department to raise its capacity to deal with weather and climate related disasters and conserve the environment, more effort has been directed towards identifying climatic zones, monitor their characteristics and use them towards national development.

The Director General, **JOHN SEMAFARA** takes us through the activities of the department and how they enhance national development. Below are the excerpts.

Generating timely weather data has facilitated efficient planning

A word from the Director General Meteo

TNT: How have your activities so far fed into Rwanda's development and which sectors can we say have benefitted the most from such activities and information?

DG: It's absolute that one of our mandates is to identify climatic zones, monitor their characteristics and use them towards national development. So far, we have a number of meteorological stations that help us collect weather data which are archived for a minimum of 30 years and then scientifically treated ,through analysis to demarcate and know the situation of each climatic zone. The data we have are from the 1900's and are archived here in the digitalized form for use in the present climate related projects and also be used in future generations' planning activities.



Because of our tragic history of 1994, our infrastructure was destroyed but so far we have managed to fill datagaps by carrying out statistical correction of existing data and merge it with satellite data to improve accuracy. Now back on the issue of the sectors that have most benefited, they are many because our sector is crosscutting.

It is worth recalling that meteorological parameters monitor the physical status of the environment in which all living things dwell.

Every sector needs weather and climate information for short, medium and long term planning and decision making for sustainable development. As we all know, over 72% of the Rwandan population depends on rain-fed farming and therefore the Agricultural sector is one of those who benefit most from our weather and climate services.

In that regard, we do have a wide range of products that are specifically produced that are destined to farmers, namely: the Seasonal Forecast, monthly forecast,10 Days Climatological Bulletin, Five Days Forecast andthe Daily forecast ,to mention but a few. The Aviation sector also benefits from our services and products. Any airplane before landing and takeoff, they need to have the enroute weather forecast so that they can plan the flight route and even calculate how much fuel to carry in order to have a safe flight.

We are part of international networks composed of worldwide national meteorological agencies whereby this information for aviation sector is routinely shared or on demand to enable airplanes to safely navigate to Rwanda and elsewhere.

Disaster Management is one other very important sector that benefits from our services as we give them early warning information in form of formatted messages for disaster risk reduction and preparedness. Thanks to the Government of Rwanda for the recently acquired Doppler weather Radar that has contributed very much to the capacity to generate accurate early warning messages.

There other sectors such as tourism, water resources management, energy generation, and all sorts of infrastructure development. Any sustainable infrastructure let's say roads, buildings, power plant and hydropower need to be installed based on the climatological situation of that area. We provide climatological data to different construction plants so that they can choose construction materials that fit the situation of that area.

It is the meteorological data which we generate that is used for determining both Climate Change and Variability, for planning climate change adaptation/and or mitigation.

Climate data is used by both the Ministry of Finance and Economic Planning (MINACOFIN) and the National Bank of Rwanda (BNR) in their planning processes, regularly.

We shouldn't forget Consultants, including University based researchers that work on climate related projects and always come to Meteo Rwanda for climate data.

TNT: Climate change is a universal occurrence that is severely affecting economic development and social structures and functioning of communities; how do your interventions help in the creation of climate change resilience in the country?

DG: I concur with you that climate change is severely affecting the national development and social structures and functioning of communities. We need to understand that climate change is fueled by human activities such as industrialization which pollute the air by sending the carbon dioxide and other polluting gases to the atmosphere.

Further, we recall that the majority of Rwandans depend on agricultural activities. Therefore, since climate change has severely affected the onset and cessation of rainfall, it will completely disrupt the agriculture which supports the bulk of our economy. And because of this climate change, people need to have proper planning to mitigate the effects of climate change. Now back on our contribution, the weather and climate information issues in advance can be used for long-term planning and decision making purposes. We keep providing updates on regular basis of the weather and climate changes which are likely to affect the community thus creating resilience and adaptation to climate change.



A weather forecast equipment

TNT: A total of 304 weather stations are installed and operational throughout the country; of what importance are these in relation to early warning systems and prevention of disaster?

DG: We really invested very much in our meteorological stations infrastructure. Besides these 304 weather stations, we do have also the Doppler weather Radar installed at Maranyundo Hill in Bugesera District that enables our institution to monitor the development of severe weather phenomena ,which information we use to generate early warning information for disaster risk reduction.

The above mentioned meteorological equipment/instruments are used hand in hand with other information from different weather monitoring systems we have got that including satellite images receivers on the ground that capture weather information from global centers. The derived data are analyzed and used in conjunction with data from our observations network to generate the information which supports the disaster management sector.

You will agree with me that the weather does not have boundaries. This is the reason why on a daily basis we connect to a regional teleconferencing center composed of National Meteorological and Hydrological Services of countries within the East African Community so that we closely monitor the weather conditions in their countries that may affect our weather.

TNT: Your mandate is to observe weather, generate information and recommend to other stakeholders; what is the state of capacity of other stakeholders in implementing your recommendations?

DG: The stakeholders have been steadily increasing given the fact that we embarked on creating awareness on use of weather and climate information across the country. With support from different projects, we have had engagement workshops with different sectors especially the Local Government Authorities at District and Provincial level, Farmers' cooperatives, Agriculture Extension Officers, Media community, Red Cross and Disaster Management Representatives at those levels, to mention but a few.

This is the process of sensitizing as many users of climate information as possible and the exercise shall be continued. From the experience gained so far through these raising awareness workshops, we can testify that the uptake of weather and climate information is really increasing and our target is to go an extra miles and continue reaching out to different sectors.

Our ultimate goal is to give products that really benefit our customers and it is through the engagements that we get information on how to tailor our weather forecasts and climate



infomation. Currently we are working on developing our National Communication Strategy for Weather and Climate Information that shall give us the insights of our stakeholders' perception of the services and products we deliver, how are they to be accessed and which improvements should be done to better serve our end users.

TNT: How do you ensure that members of local communities do appreciate and embrace the information that you do provide?

DG: First of all we aim at reaching as many as possible and then engage them to tell us how we should tailor our products(weather and climate information) for them to be able to use it in their planning and decision making.Wehave to explain to them the inherent problems that do affect the accuracy of our products.

We must make sure that the climate information is reliably accurate and regularly provided

This one is evident in demand by the community of weather and climate information that has increased tremendously. We always receive feedback from our end users through a wide range of communication channels. This can be realized on number of visits on our website, phone calls on our toll free number which is 6080, emails, messages on social media and calls in different talk shows conducted.

TNT: What are the major challenges in the process of conducting your activities and how are you addressing them?

DG: There is urgent need to train new staff who are soon to join the Agency. They have science qualifications but they shall need meteorological training.

Another challenge we have, the uptake of the weather and climate information is still low.There is need for carrying out many awareness campaigns aiming at increasing the understanding of the users of weather and climate information.

The dissemination of weather and climate information needs many efforts and we are really committed to make a wide number of users access our services and products for planning purposes and decision making.

Lack of doing research is also one other big challenge that must be addressed as soon as possible. However, this is being addressed because the government signed a MoU with the University of Rwanda(UR) with a view to develop research expertise through joint research ventures.■



IMPROVED ACCESS TO WEATHER INFORMATION AIDING FARMERS

Some 842 million people worldwide cannot afford to eat adequately and are chronically hungry. The links between food insecurity and poverty are clear.

By Joseph Mudingu



BELOW: Nabila Niyonkuru tending to her garden in Bugesera

Factoring in weather and climate information into agricultural decision-making has optimised agricultural production in many countries.

However, in developing countries, where most smallholder farms are rain-fed, access to weather and climate information to guide decision-making is limited.

Wise use of weather and climate information can help to make better-informed policy, institutional and community decisions that reduce related risks and enhance opportunities, improve the efficient use of limited resources and increase crop, livestock and fisheries production.

National Meteorological and Hydrological Services (NMHSs) have an important role to play in providing this weather and climate information to farmers, big and small.

Niyonkuru Nabila is 28 years old and has been involved in farming since when she was a child.

She narrates that long ago while as a child, she would get

excited over the prospect of going with her parents to the farm with a smile-plastered on her face.

"Many may have thought that probably my parents got stuck with babysitting for the day, but in reality I was always looking forward to the days when I would go out with them" says Niyonkuru.

When kids are raised around hard work and determination, it's not a parenting style, it is a way of life and Niyonkuru learnt a lot about farming, seasons and weather.

"I was lucky enough to be one of those kids growing up, whose eyes got huge and heart got excited when Dad would ask if I wanted to go out to the farm to help him with something. Back then, I thought it was all fun and games. Now with the vantage point of years past, I look back and realized the countless lessons I learned from being raised on the farm" she said.

Niyonkunru says that farmers should view such information from the metrological department, crucial as a means of alleviating poverty and hunger.

"Wise use of weather and climate information can help to make better-informed policy, institutional and community decisions that reduce related risks and enhance opportunities, improve the efficient use of limited resources and increase crop, livestock and fisheries production."

Niyonkunru says that farmers should view such information from the metrological department, crucial as a means of alleviating poverty and hunger.

"Without the proper amount of rain water for a particular plant there can be devastating consequences. Farmers may spend money on labor, seed, chemical, and equipment in hope to have the perfect yields for their year, but they have to rely on Mother Nature to provide them rain which is something not in their power. So information on weather forecast is very important," explains Niyonkuru.



Niyonkuru says that from an early age, she witnessed the pain on her parent's faces when the weather was predicted wrongly and they lost crops for the whole season.

"I think the forecast is the ultimate reason farmers are so concerned about the weather. If a farmer receives too much rain their plants can die from being drown. The forecast can also have consequences to overheating. If a plant gets too much sunlight the plant can bake in the sun and burn to death" she explains.

She however says that sometimes though the forecaster can be wrong and also farmers may lack awareness or the metrological information that can lead to a disastrous harvest. Farmers have to rely on nature to decide their decisions for planting at the right time.

"The forecast of the weather events helps for suitable planning of farming activities. It helps in making decisions on whether to undertake or withheld the sowing operation, to irrigate the crop or not, to apply fertilizer or not and whether to start complete harvesting or to withhold it" says Niyonkuru.

African governments are challenged with poor agricultural output, water resources management, health and disaster

"The forecast of the weather events helps for suitable planning of farming activities. It helps in making decisions on whether to undertake or withheld the sowing operation, to irrigate the crop or not, to apply fertilizer or not and whether to start complete harvesting or to withhold it" says Niyonkuru





risk, among others, all of which are heavily influenced by weather and climate.

Despite occurrences of drought with attendant crop failure and occasional famine, flooding with the attendant loss of human life and destruction of property, there has been very limited research done to quantify the benefit of weather and climate information and services.

The Rwanda Meteorological Department wants people to know the socio-economic benefits of using weather and climate information and services in agriculture, specifically crop production.

Agriculture is key to the development of Rwanda, contributing directly and indirectly to the Gross Domestic Product (GDP). A significant fraction of government revenue is allocated to achieving food security in the country, thus, agriculture is given special emphasis in national development policies and strategies.

> The management of weather and climate risks in agriculture has become an important issue due to climate change.

The management of weather and climate risks in agriculture has become an important issue due to climate change.

The situation persists because National Meteorological and Hydrological Services in developing countries, including the Rwanda Meteorological Department are not taken seriously by the population.

There is need for government to create awareness of the contribution of meteorological services to national socio-economic development. ■



Ensuring Ecological Integrity

Francine Tumushime, Minister of Lands and Forestry

A man does not plant a tree for himself; he plants it for posterity. This is a salient statement that speaks of why it is important to think and act in keeping and creating an ecological equilibrium that carries the components of life for the current and future generations—sustainable utilization of resources.

Forests being the world's air conditioning system and the lungs of the planet, require devoted and unrelenting efforts in support, protection and incessant unbroken renewal, if the earth life-systems are to be sustained today and generations to come, without putting paid to the invaluable flow of benefits to nature and humanity.

It is therefore by deliberate design that the Government of Rwanda is committing enormous resources and efforts to make development of the forestry sector a national priority, working towards an ambitious target of increasing national forest cover up to 30% of the national territory by 2020.

To attain the said targets, the government of Rwanda has embarked on forestation and re-forestation programmes, forest landscape restoration approach, targeting restoration of 2,000,000 hectares of degraded lands, increasing agro-forestry areas and planting of protective tree alongside roads, river banks and lake shores as well as restoring and protecting natural forests. Through such efforts, in February 2016, the Gishwati-Mukura natural forest

was declared the 4th national Park, rehabilitated under the principles of restoring ecological integrity.

The government is also implementing projects that are projected to contribute to the overall health of the forest environment, including; Protection and Restoration of Ecosystems and Forests (PAREF) and Sustainable Forestry, Agro-forestry and Biomass Energy (SFABE) which targets to rehabilitate 500 ha of degraded forests, creating 3,000 ha woodlots, agro-forestry on 15,000 ha for soil fertility and promoting improved cook-stoves in order to reduce pressure on forest resources.

These and more initiatives, including the distribution of over 180,000,000 seedlings have seen Rwanda taking giant strides towards the attainment of the 30% forest cover by 2020

Land Resources

Efficiency in the management of resources also, to a great extent, defines how people tame nature to defeat necessity. Not only is land a factor of production, but the livelihoods depend on it; living, dwelling, production and exploitation of what nature has provided to refine progress.

The government of Rwanda considers effective land use management with utmost priority, emphasizing rational managementand use of urban and rural land for its increased productivity.

Much attention has therefore been put to implementation of national land policies, laws, strategies, regulations and promotion of activities related to investment and value addition in the activities related to the use and exploitation of land resources, including registration and issuance of authentic land deeds.

A series of activities have been implemented to ensure efficiency in land use planning and productivity beginning with the development of National Land Use Master Plan, the national land use planning portal, where land use plans and related information such as maps are stored, a modern geodetic reference network for Rwanda and Spatial Data Infrastructure for easy surveying procedures, implementation of the districts and Kigali City Master Plan.

Systematic Land Registration legal instruments were developed to enable demarcation of around 12 Million of Parcels, 8,404,407 leases printed and 7,164,230 titles collected by owners. The ministry will continue with sensitizing land owners on the importance of collecting their land titles.

Awareness on these and more activities that ensure sustainable harvesting from nature without compromising future generations will continue to be created, as it is the power of knowledge that breeds ownership of programmemes and projects to be implemented, collective benefits and national progress. So all of us Rwandans should adopt all best practices available to sustainably utilize our resources and promote the virtues of ecological integrity. ■





ABOVE: Asuko cooperative members who are former encroachers attend to their seedlings.

ENCROACHERS EMBRACE REFORMS TO PROTECT NYUNGWE FOREST

By Joseph Mudingu

Residents living around Nyugwe buffer zone forest have embraced economic activities such as growing tree seedlings to continue conserving the forests.

"It was difficult to accept change but as humans, change is part of life," notes Theogene Nzeyimana, President of ASUKO, a cooperative of former encroachers to Nyungwe buffer zone plantation.

He added that, "With proximity to the forest, we felt Nyungwe was our only hope for survival and were always in conflict with authorities but The New Forests Company brought us alternatives."

In July 2011, the government signed an agreement with The New Forests Company (NFC) to manage, develop and make productive the Nyungwe buffer zone plantation.

The agreement put an end on all encroachment activities on Nyungwe and the surrounding communities who depended on such activities thought to look for alternatives.

Nzeyimana with fellow villagers in Uwinkingi Sector in Subukiniro Village overlooking the forest thought their livelihoods were almost over until they met with representative of NFC.

"We used to farm in Nyungwe belt but when the company came all that stopped but we met people from the company and they showed us better alternatives," He says.

The cooperative held discussions with NFC to identify income generating projects and settled on growing seedlings given that it was an easy project to undertake with a ready market from the company itself.

"The company gave us the capital to start the project totaling to Rwf 5, 008, 500," Marie Niyonsaba, Treasurer of ASUKO Cooperative revealed.

We were able to buy all necessary requirements and the project kicked off.

"We sell 98 per cent of our seedlings to the company," she underscored.

During the first season, the cooperative sold 120,000 seedlings to NFC and the second season production was raised to 140,000 seedlings which were all bought by NFC.

However she says that the activity involves a lot of dedication and that you are required to be constantly checking on the seedlings.

"It requires constant inspection of the new seedlings frequently during the first few weeks. It is important to protect seedlings from damage caused by competing vegetation, grazing, fire, wildlife, disease or insects" says Niyonsaba.

Niyonsaba notes that, the company fronted the capital and is ready to buy all seedlings produced.

"This is incredible," she says "their support has not stopped there but have also availed water to our village and have helped to make our village accessible through making roads and building bridges.

She adds that the intervention that brought about their joining a cooperative to grow and sell seedlings changed their lives for the better

"Almost all the members of our cooperative have better live and are sending their kids to school plus affording mutuelle and good feeding from the income that we get from selling the seedlings" she adds.



ABOVE: New Forest Company workers attending to their nursery

Paul Hanganimana, an Extension Forester says the intervention was prompted by a survey that showed that many residents will keep encroaching on the forest buffer zone if they don't get alternatives to such activities.

NFC buys a lot of seedlings for out growers programme while supporting income generating projects like that of ASUKO.

"We do buy all the seedlings and sometimes we find ourselves with a shortfall, therefore for our own replanting, we established our own seedlings nursery bed in order to always have enough supply" says Hanganimana.■

> "The projects have created direct employment opportunities and more members of the community been hired as security guards"



FARMERS BACK AFFORESTATION EFFORTS

By Joseph Mudingu

The scheme seen as a weapon against poverty

The Rwanda Government has stepped up efforts to increase forest cover in order to mitigate the effects of climate change and raise forest generated income for local communities.

Under this plan, which was initiated in 2010, government plans to increase forest cover to 30 per cent of the total national area by next year. This translates into 790,140 hectares of forests.

> "This is exemplary. This company supports us to grow trees that will generate incomes while conserving our region."

The plan, which is contained in the overall national forestry policy, is also seen as a weapon against poverty as government intends to create a conducive environment for the forestry business to flourish.

The new national forestry policy seeks to make the forestry sector one of the key drivers of economic transformation through job creation, increased forest revenues and creating more balanced ecological benefits among others.

Ruboya Hoseya from Mukingo, Gatagara Sector in Nyanza District is one of the farmers who have traded substance farming for extra income from forestry farming.

BELOW: Ruboya Hoseya, out grower in Mukingo, Gatagara Sector in Nyanza District





Following years of low earnings from his farms, Ruboya decided to change the tide of his farming methods while ensuring conservation through forestry farming.

When The New Forests Company (NFC) approached local authorities through its out grower programmeme that supports local farmers with free seedlings, Ruboya was among the farmers who were contacted first. He received training from NFC forester on how to implement the requirements to plant trees on his farm.

"There are many benefits to farm trees, which I did not consider before, but since I was sensitized by NFC, what I will harvest in the future is a sure deal," he says, "Besides, the seedlings given to us were not entirely trees for timber but we were given fruit trees as well, which will also help raise our earnings."

Paul Hanganimana, the NFC Extension Forester says that the company distributes free seedlings to local farmers to grow wood-lots and fruit trees, in addition to following up on the performance of the trees and advise farmers when to thin and prune.

"Before distributing the seedlings to farmers we draw lists of everyone interested, which is conducted at cell level, and this is intended for planning purposes and later we sign non-binding contracts," Hanganimana noted.

The NFCExtension Forester says that even though they keep a close relationship with the farmers, they have distributed free seedlings with technical training, farmers keep right to sale their trees to a buyer of their choice because of the non-binding agreement. However, the out grower should abide with giving the first refusal option to NFC.

"There are many benefits to farm trees, which I did not consider before, but since I was sensitized by NFC, what I will harvest in the future is a sure deal,"

Since 2015, NFC has distributed 714,779 seedlings, which have been planted onsome 541.7 hectares and has benefited 1,417 farmers.

"Our philosophy as a forestry company is economic, social and environment oriented," says Hanganimana, "we equally consider sustainability of all the three aspects."

Mudenge Edison, a farmer from Mukingo cell says that NFC's support is exceptional.

"This is exemplary," he says, "This company supports us to grow trees that will generate incomes while conserving our region."

For Ruboya Hoseya, who has planted trees on three hectares—which is half the size of his land—the NFC project has demystified the misconception that trees absorb water from the soil, which leads to poor crop yields.

He says that the planted crops together with the trees are looking very well.

However, he planted his crops following the correct spacing as advised upon and was given improved seedlings.■

NGOS AT THE FOREFRONT OF CONSERVING GISHWATI-MUKURA NATIONAL PARK

By Michel Nkurunziza

Some Non-government Organisations (NGOs) operating in Rwanda are carving out a status for themselves as wildlife defenders, a role they have assumed in an effort to conserve the country's newest and fourth national park, Gishwati-Mukura National Park.

Some Non-government Organisations (NGOs) operating in Rwanda are carving out a status for themselves as wildlife defenders, a role they have assumed in an effort to conserve the country's newest and fourth national park, Gishwati-Mukura National Park.

With 3,558 hectares today, Gishwati-Mukura accommodates flora and fauna, including four species of primates—the eastern chimpanzee, golden monkey, blue monkey, mountain monkey, tree species and birds.

Located in the south of Volcanoes National Park in Western Rwanda, had been drastically reduced from its original surface of 260 km2 by a series of human activities, among them, a livestock project, a military zone as well as camps that were set up to accommodate displaced persons after the 1994 genocide against the Tutsi.

In the 1990s, the Gishwati region included two remnant natural forests—the Kayove Forest Reserve (now Gishwati Forest Reserve), covering 5,800 hectares and the so called military domain zone covering 6,580 hectares. By 2002, the Kayove Forest Reserve was reduced to 600 hectares.

> "Officials say that the park now is being lined up to be pitching to UNESCO World Heritage for recognition as a biosphere reserve.





It is against this background that the forest, whose troubled tale constitutes poaching and agricultural activities, is being rehabilitatedby government with interventions from NGOs to recover its buffer zone and lost biodiversity.

In 2013, the Albertine Rift Conservation Society (ARCOS), a regional organisation working for biodiversity conservation found that Mukura forest resources and ecosystems services are worth more than $1million per annum. Some scientists estimate that the value of ecosystems services provided by Gishwati forest could be $ 3 million.

Officials say that the park now is being lined up to be pitching to UNESCO World Heritage for recognition as a biosphere reserve. According to Thierry Aimable Inzirayineza, the National Coordinator of Forest of Hope Association (FHA), an NGO—which focuses on the conservation of Gishwati-Mukura National Park, their efforts have contributed to reducing illegal use of Gishwati forest.

Founded in January 2012, the organisation emerged from the Great Ape Trust/Gishwati Area Conservation Programmeme (GACP), which ran from 2008 to the end of 2011.

> "The projects have created direct employment opportunities and more members of the community been hired as security guards."

FHA's main activities are forest protection, conservation education with environment clubs in schools, and human-wildlife conflicts resolution. They also include improving local livelihoods and facilitating research on the biodiversity of the Gishwati Forest Reserve.

"We have a community development (agenda) through income generating activities…such as wood and honey (harvesting)," he said.

This, he said, reduces conflicts between human beings and forest wildlife.

Since 2008, there has been progress. For instance, illegal use of the forest declined sharply with the size of the reserve increasing from 886 to 1,484 hectares. In addition, the number of chimpanzees increased from 13 to 30 while 600 hectares that were added to the core forest are naturally regenerating. Thirteen eco-clubs were established in local schools.

Some 10 local cooperatives which are engaged in agriculture, handcraft making, beekeeping, tree nursery development and others activities have been empowered with skills in cooperative management while three community groups have gained skills in community tourism such as cultural dance, handcrafts and traditional healing.

The projects have created direct employment opportunities with more and more members of the community been hired as security guards.

However, Inzirayineza says that NGOs can do more. Moreover, they are constrained by limited resources, meaning increasing the ability to mobilise financial resources will be a critical aspect for the sustainability of their interventions going forward.■

BREEDING NATURE, FEEDING A NATION



The Forestry sector is playing a key role in supporting livelihoods of all Rwandans especially by providing most of the energy consumed by a majority of the population, controlling soil erosion and protecting water catchments and supplying other goods and ecological services.

The Government of Rwanda, through its Vision 2020 has made the development of the forestry sector a national priority and has committed itself to an ambitious target to increase national forest cover up to 30% of the national territory by 2020.

Today, Rwanda's forest land covers 704,995hectares, about 29.6% of the country's total dry land area of over 2.3 million hectares. From West to East, the country forests are divided in three main categories: Natural and humid forests (Nyungwe, Volcanoes, Gishwati, Mukuraand Busaga forests), commercial plantations (mainly Eucalyptus and Pines plantations) and wooded savannahs (Akagera, Gabiro, Nasho, Gako and Kibirizi-Muyira natural savannah).

The forestry sector contributes significantly to national economy through timber and charcoal trade. Charcoal alone contributes about 4% to the gross domestic products. The public private partnership (coo-management) frameworkdeveloped for public forest management contributes to the value addition of forest products.

Afforestation and Re-afforestation for a greater forest cover

The afforestation and re-afforestation were done in all suitable areas with the target to reach at least 30% of the national land covered with forests by 2020. Today 29.6 % of the national land are covered. These include planted forest, wooded savannah and natural humid forests. Planted forests cover over 437,000 hectares, about 62 % while wooded savannah and natural forests cover around 258,000 hectares, about 38%.

Forest Landscape Restoration approach (FLR)

The FLR is one of the key approaches for sustainable land management and the achievement of agricultural sustainability. This approach aims at restoring functionality to deliver multiple benefits and reducing loss of natural systems. In 2011, the Government of Rwanda committed to restore 2,000,000 hectares of degraded lands through the Bonn Challenge by 2030.

Agroforestry:

One of the key findings of the assessment is that 1.1. million ha has the potential to be transformed from traditional to agroforestry. Thus Rwanda citizens were sensitised to plant agroforestry trees targeting to increase the agroforestry areas to 85 % of all farm lands. Today the agroforestry trees cover 153,901 ha, 7% of national arable land.

Protective forests:

Protective species were planted alongside different roads, on the boundaries of lakeshores (Mugesera, Cyohoha, Kivu) in wetlands buffer (Rugezi,) and around water catchments (Nyabarongo, Sebeya).

Restoration and protection of Natural Forests:

In February 2016 the Gishwati-Mukura natural forest was declared 4th national Park, and today it is being rehabilitated under the principles of ecological integrity–restoring by planting indigenous species while at the same time improving human wellbeing by creating non timber forest products projects.

Other small Natural state forests and savannah (Busaga, Kibirizi-Muyira, Nyagatare, Nyagasenyi, Cyangwe, ...) restored under the same principles in addition to the creation of a buffer zone around the forests and are protected by the Ministerial Order No 006/GOVERNMENT/2015 of 18/06/2015 determining the management of MINIRENA protected state forests not governed by special laws.



BELOW: Agroforestry with alnus trees in Musanze District

To avail to community the various species of plant seedlings appropriate to each region:

Around 180,000,000 seedlings were produced and distributed to the community and at least five tons of seeds per year are being collected and distributed.

Through the PAREF B2, a project supported by the Belgian Technical Cooperation (BTC) working under RWFA, has produced a book about the main tree and shrub species for forestry and agroforestry in Rwanda. Based on this book, a tool has been made with which species can be selected easily and evaluated on suitability to a future planting site, with only District and Sector as needed criteria.

Since 2014 the Tree Seed Center is hosted by the Environment and Natural Resources Sector and experts in the sector were more and more invited to look for innovative ways of strengthening the capacity of Tree Seed Center to make sure that higher quality forest seeds are produced to achieve the target of forest productivity of planted lands.

Engagement of Private Sector in state forest management

Coo management agreements for a forest covering a total 738,64 ha of wood fuel plantations have been signed between the Government and Tea factories. These include: coo management and lease agreement between Environment and Natural Resources and Multi-Sector Investment group (MIG) for the 142 ha of Ndende and Nganzo State forest plantations, for a period of 40 years; the coo management include coo management and lease agreement between Environment and Natural Resources and Pfunda Tea Company for the 273,64 ha of Magaba State forest plantations, for a period of 49 years; the coo management and lease agreement between Environment and Natural Resources and Rwanda Mountain Tea for the 323 ha of small State forests plantations (Bwishinge, Juru, Kinyembogo...) in Rutsiro and Ngororero Districts for a period of 49 years.

Participatory forest management

In line with the sustainable management of both public and private forests, under support of PAREF





ABOVE: Bamboo products workshop in Masaka Incubation centre

NL2 project, supported by the Kingdom of Netherlands the rural population was trained for the participatory forest management and livelihoods improvement in nine districts (Burera, Musanze, Rubavu, Ngororero, Nyabihu, Karongi, Nyamasheke, Rurindo, Rusizi and Rutsiro) through their organised and active cooperatives or associations.

BELOW: Electrical poles produced by the New Forest Company

> By June 2015, 11,500 electrical poles from the plant have been exported to Tanzania Energy Authority and totalising the revenue of 2,114,735 USD$.

Electrical poles produced by the New Forest Company

An electrical pole plant for local supply and export was launched in April 2012 in Nyungwe Buffer Zone under New Forest Company lease agreement.

Since then the plant exports the poles in the region. Eg; By June 2015, 11,500 electrical poles from the plant have been exported to Tanzania Energy Authority and totalising the revenue of 2,114,735 USD$. More public forests are expected to be managed under concession agreement with private sector and this approach will boost job creation for youth

A Training Centre on bamboo processing hosted by WDA have been established in Masaka, Kicukiro District under support of Chinese Government.

Timber processing and selling points (UDUKIRIRO) have been established in all districts of the country to improve wood value chain and accessibility.■



NEW PLANT IN NYANZA IS ADDING VALUE TO RWANDA TIMBER

The world-class plant in Nyanza is the first of its kind in East Africa. Its production has an impactful output.



According to Alex Madhinga, the New Forest Company (NFC) Sawmill Business Manager, the company started adding value to timber from the sawmills early this year with over 13,000 cubic metres of timber produced annually; value is added to 4,580 cubic metres at the new facility.

"The current drying capacity is approximately 7,000 m3 annually depending on the demand of value-added lumber locally and outside the country, the company will add more kilns to carter for this demand" notes Madhinga.

Kiln Drying at Nyanza

Madhinga says that practically all wood has to be dried in order for it to be utilised effectively. Dried timber shows improved characteristics in tensile strength and weight reduction, and is therefore highly suitable as a building material.

It is also less likely to suffer from attacks by fungi and other organisms. So, at Nyanza, the very first value addition is kiln drying.

After the timber leaves the NFC sawmills, it comes straight to Nyanza plant where it is dried using an automated hot water drying system. Moisture content is the most important parameter in the wood drying process. It is defined as a percentage of the mass of the water in relation to the dry wood, assuming all water has been removed.

"We then load the timber that is about 55 per cent– 65 per cent moisture content in the kiln drying chambers and it stays there for four days, after which it will have reduced to 15 per cent – 17 per cent moisture content ready to be used for construction and other value additions," says Madhinga.

> "...Our knowledge of drying wood processing is combined with the latest technology, ...

According to the Sawmill Business Manager, the facility has two kilns, and each can accommodate 40 - 50 cubic metres of lumber at a given cycle.

"The timber is dried according to recipes depending on size and in case of timber meant for secondary cuts that are mainly used for furniture mouldings; the standard moisture content is 12 per cent because such furniture requires very dry timber" explains Madhinga

Advanced microprocessors for a total control of the drying processes

"Our knowledge of drying wood processing is combined with the latest technology, in order to achieve the best quality of wood treatment. Here we take great care of mechanics and the technicians as well as installation, electromechanical and electronic management through on-site or remote control software programs" explains Madhinga.

According to Madhinga, the facility has an automatic control device that embodies the beating heart of the wood drying kilns. The effectiveness of the automatism is the most accountable quality factor in wood processing. "Even out my office, I have full vision of the status of the whole kilning process, and if there happens to be an emergency, am alerted immediately, remember this is a 24hr operation process. The same system can also be viewed by the suppliers of this new equipment in South Africa" says Madhinga.

Early this year, the value addition department started making plained all round structural timber and mouldings to produce the best quality timber. This is the second stage of value addition.

Timber value addition starts with proper drying of the timber, this allows for a stable product for use in construction and good quality furniture. "After drying the wood, we stock it here and use it to make furniture and most other wood based products, because it is less likely to 'deform' and 'warp'. It can be shaped accurately with tools such as planes, saws, routers and hand tools. Adhesives can also be used with seasoned woods" explains Madhinga.

The facility has well trained staff who went through in house and external training offered by the manufacturers of the machinery.

The suppliers are also in constant interactions with our day today running of the department making us capable of providing quality and impeccable services that remain the top priorities of the company.

Wood processing

The value addition department has been equipped with a state of the art six head cutter planning molding machine and is used for longitudinal processing of products in solid wood and is generally the centerpiece of the production facility. This is where maximum value creation is applied to the work piece and quality and reliability are essential.

Because there was no large-scale commercial wood processing company in Rwanda, the domestic demand for processed wood products remains high and growing; huge imports for wood and wood processed product as well as poor quality product from local pit saws andwoodshops currently fill this demand.

According to Madhinga, after the wood is planned by passing it through the six head cutting machine, it is then made into many different materials for both home furniture and other building and construction materials like skating, cornice, cover strip, brandering,tang and groove for ceiling and flooring Advantages of Kiln drying.

Kiln dried lumber is a standard in the lumber industry because dried lumber is generally prepared for manufacture into a finished product.

As most valuable lumber is used within a enclosed environment such as a home or place of business - the lumber must be suitably dried to prevent movement in service. For example, lumber dried incompletely and then manufactured into flooring will shrink and deform as it gradually loses moisture to the surrounding environment. As any product, timber becomes more valuable as it progresses towards a finished manufacture.

As manufacturers of furniture, flooring, and moldings all require lumber which is properly dried, there is increased strength, increased nail holding capacity, increased paint ability and increased resistance to both fungi and insect attack. The kiln dried timber market is an extensive one.

Though the market requires huge volumes of timber in various species,thicknesses, lengths, and widths, the one process which often is necessary in the preparation of any lumber prior to a manufacturing process is kiln drying.

> ....The NFC value addition department at Nyanza serves as an opportunity in reducing reliance on imported processed wood product for furniture and construction industry...

Made in Rwanda

The NFC value addition department at Nyanza serves as an opportunity in reducing reliance on imported processed wood product for furniture and construction industry and to improve value chain for extractive industry – significant scale up beyond tree chopping and pits sawing and to improve product quality as well as helping Rwanda's forest products overcome the trade imbalance. The New Forest Company is focusing mainly on two critical issues among others are the production of diversified value added wood products, such as treated timber, kiln dried sawn wood and graded wood which will ensure durability of wooden structure and increased life of wood in the service, hence reducing pressure from forest ecosystem and reduce reliance on expensive imported wood inputs.

The company also plans on utilization of wood residues waste materials into value added products to provide renewable biomass fuel (industrial charcoal) to near resident and commercial markets, reducing the use of fossil fuels for heating purposes, thereby reducing overall energy costs in an environmental responsible manner. ■

NYUNGWE FOREST COMMUNITIES ENGAGE IN BEEKEEPING AND PRIDE IN CONSERVATION

By Joseph Mudingu

Beekeeping has progressively become a very important component of conservation in and around Nyungwe forest, which is billed as the most well preserved rainforest in Central Africa.

In recent years, the Rwanda government has managed to put in place all the key institutional and legal instruments that are necessary for structuring Rwanda's long-term development for the honey industry.

Now, many cooperatives in and around Nyungwe are engaged in different income generating projects, among them, beeping with the support from government, which gives them modern beehives plus harvesting equipment including honey extractors, stores and fencing for the hives.

For instance, KOVUKA cooperative, which situated in Karambi Sector in Nyamasheke district, is one of the beneficiaries. The cooperative, which groups together some 30 members including 12 women, received 50 modern beehives, harvesting gear and honey extractors among equipment. The cooperative has doubled its annual production capacity to 807 kilograms of hone. Last year, they sold all their produce to another cooperative, Ubwiza bwa Nyungwe Cooperative Union.

Emmanuel Bikorimana, the president of KOVUKA cooperative said that, with the financial support from New Forest Company (NFC), they were able to engage in income generating projects while conserving the forest.

BELOW: BeeKeeping in Karambi



> "Honey collected this region that surrounds the Nyungwe forest is rated among the best," Bikorimana said, "Therefore, we are expecting to triple our incomes very soon."

"The Government does not allow us to encroach and destroy the forest yet there are projects like honey harvesting which has market both here in this village and Rwanda in general and yet there were no people producing sufficient quantities for the market," Bikorimana said.

He also says that the more they engage in these activities, the more they become experienced and accept the fact that they can live positively without destroying the environment around them.

Modern beehives raise production by 150%. Therefore, KOVUKA targets 1.5-2 tons of honey, up from the current annual production, which hovers between 500 and 800 kilograms.

"Honey collected this region that surrounds the Nyungwe forest is rated among the best," Bikorimana said, "Therefore, we are expecting to triple our incomes very soon."

The New Forests Company also helped to fencing a new apiary with metal and barbed wires around the Nyungwe buffer zone where it has concession to harvest trees.

KOVUKA is now in the process of moving all their hives to the fenced apiary which is more secure and guarantees improved yields.

> "We will not be worried for the security of our hives anymore"

The fenced land can accommodate up to 500 hives. It is also environmentally appropriate for pollination.

"We will not be worried for the security of our hives anymore," emphasizes Bikorimana.

According to Theophille Nsengumuremye, the President of Development of Apiculture and Environment Protection Cooperative, which is popularly known by its acronym of CODAPE, the government has helped transform the lives of the cooperative members. CODAPE also deals in bee farming activities. The cooperative started its operations in Nyugwe in 2010 and comprises of 125 members.

"Nyungwe forest has been our sole source of income and we as members have managed to positively survive from it and become economically empowered through bee keeping" says Nsengumuremye.

> Modern beehives raise production by 150%. Therefore, KOVUKA targets 1.5-2 tons of honey, up from the current annual production, which hovers between 500 and 800 kilograms.

Rwanda produces mostly honey, beeswax and propolis. Rwanda bee products have a good potential, mostly because of the country's excellent natural ecological factors. Rwanda has healthy wild bees, that are resistant to diseases and the natural forests, with wild plant resources, provide a honey made of special pesticide-free, vegetation and the vast amount of eucalyptus trees also produces a special and popular type of honey.

The demand for honey is high and Rwandan honey producers have been challenged to increase the capacity. Honey also has a high market value, especially in the export market. Health-conscious consumers are more aware of its therapeutic properties. It is used to make a variety of foods confectionery and food preservative. ■

HARVESTING THE NYUNGWE FOREST BUFFER ZONE:

By JOSEPH MUDINGU

SAWMILLS ARE ADDING VALUE TO TIMBER PROCESSING IN THE BUFFER ZONE

The decision by the Rwanda government to harvest the Nyungwe forest buffer zone is yielding substantial benefits to the local communities following the deployment of two sawmills by The New Forest Company (NFC).

In July 2011, the Government signed a 49-year concession agreement with NFC in order to manage, develop and make productive the buffer zone as it stepped up efforts to increase the size of forest cover to 30 per cent of the country's total area by 2020.

NFC has since set up a timber processing industry with two sawmills located in Nyamagabe and Nyamasheke districts.

The Company commenced its sawmilling operations in February 2016 with an annual input capacity of 13,000 cubic metres. It plans to double this capacity.

In what demonstrates the impact on society, the two Sawmills employ some combined 132 workers, of which the majority are people living around the concession zone.

As you drive towards the sawmill, you see a fleet of trucks with capacities of various tons delivering logs. Most of these vehicles are hired to ferry in logs from the buffer zone, which translates into business to business opportunities for truck owners.

After the trucks deliver the logs, large trucks operating with mounted cranes lift the logs, sort and pile them according to size and deliver them to the breakdown sawing machines that cut the logs into different timber sizes.

Here the logs are cut into timber using equipment such as circular saws and band saws, a process known as 'conversion'. The first stage of conversion is a process called 'breaking down', which means rough sawing. The second

"...In what demonstrates the impact on society, the two Sawmills employ some combined 132 workers, of which the majority are people living around the concession zone...

stage is called 're-sawing' and refers to more accurate / precise cutting and finishing such as planning and further machining.

According to Zacky Nshimiyimana, a sawmill supervisor, the sawmill operates six machines three of which are breakdown wood-mizer machines, two pin blade machines as well as multipurpose heavy- duty handling machinery for its material handling.

"Each of the three breakdown machines cuts a minimum of 70 logs per day, meaning over 210 logs are cut and the timber is piled according to size and dried by smoking," says Nshimiyimana.

Moving trees from the forest to the sawmill

According to the Transport Coordinator, Vincent Sindikubwabo, the cutting of the trees is normally carried out during both the wet and dry seasons though more trees are cut during the dry season.

"We have a target to deliver 200 logs per day to the saw mill regardless of the season. So we cut at least 300 trees during the dry season and between 150- 170 trees per day during the wet season and this helps us balance the constant



number of 200 logs that we have to deliver daily" Mature trees are selected by a forestry workers and the felled trees are replaced with saplings.

Consequently, the forest is sustainable (it should not run out of trees). A team of NFC forestry workers fell hundreds of trees being harvested every day, alternatives especially designed 'tractors' with cutters and grabbers, are also used here.

After, the tree trunks (logs) are stored / stacked in a clearing along the road in the forest. Sometimes when more logs have been cut, they are stored in the forest until they are needed at the saw mill.

The logs are then loaded on trucks using vehicles equipped with lifting gear and transported to the saw mill.

The rationale of having NFC wood processing company was because there was no large-scale commercial wood processing company in Rwanda, the domestic demand for processed wood products remains high and growing; huge imports for wood and wood processed product as well as poor quality product from local pit saws and wood-shops currently fill this demand.

Increased demand for energy, emerging environmental challenges with respect to greenhouse gas emissions and increasing use of the convectional energy (fuel, gas, firewood) remains a challenge thus need of alternatives on energy sector in Rwanda.

Thus, the company serves as an opportunity in reducing the use of fossil fuels for heating purposes and reliance on imported processed wood product for furniture and construction industry and to improve value chain for extractive industry – significant scale up beyond tree chopping and pit sawing and to improve product quality as well as helping Rwanda's forest products overcome the trade imbalance.



PLANNING FOR LAND OPTIMIZATION

The Government of Rwanda, through the Environment and Natural Resources Sector has developed the National Land Use and Development Master Plan in 2012 and National Lansd Use Planning portal launched in 2014, to address the challenge of land scarcity and overpopulation.



The approval of the National Land Use and Development Master Plan was followed by the development and approval of District Land Use Master Plan and their implementation strategies both in rural and urban areas to increase productivity.

Laws and regulations

The law No43/2013 governing land in Rwanda and 16 orders enacting it were gazetted and disseminated across the country through the local government and other various channels of communications.

Land registration

bout 12 Million Parcels of land were registered, 8,404,407 leases printed and 7,164,230 titles collected by owners. Land registration was completed in 2012. Since then, an interface linking existing Land Administration System and the mortgage registration system was created to provide access of all banks to the Land Administration and Information System (LAIS) which is operational in all districts. 5 District Land Bureau Offices were constructed for Nyamasheke, Rulindo, Ngororero, Bugesera and Gatsibo Districts.

In a bid to improve service delivery land-related services were decentralised at sector level and since 2014, Sector Land Managers were recruited, trained and all arrangements have been put in place to cover all sector land services at 100%. Today all land transactions are done in 7 days. But when a transaction concerns an investment land, transactions are completed in one day only.

A Land Administration and Information System (LAIS)has been established and reveals that people have accessed this online system 465,753 times. A mobile application available and accessible via *651# followed by UPI codes and the Rwanda Online Platform 'IREMBO' are being used for land transfers to ease access to information.

> Today all land transactions are done in 7 days. But when a transaction concerns an investment land, transactions are completed in one day only.





The whole process is regularly communicated to land owners/ users through the annual citizens' outreach campaign known as "Land Week" where the Staff responsible for land registration meet citizens in their respective sectors for different land services and transactions.

Rational Land use and management: Implementation of the National and Districts land use master plans

Today 2all the 30 Districts have already developed and approved their Land Use Plans and their detailed implementation strategies are being developed. A technical team composed of Members from Environment and Natural Resources, Rwanda Land Management and Use Authority, Rwanda Housing Authority and RDB to monitor land compliance and implementation of land use plans has been put in place.

In 2013, the City of Kigali developed a City Master plan to serve as a guide for all activities in the District of City of Kigali. This master plan is reachable online at **www.masterplan.kigalicity.gov.rw**

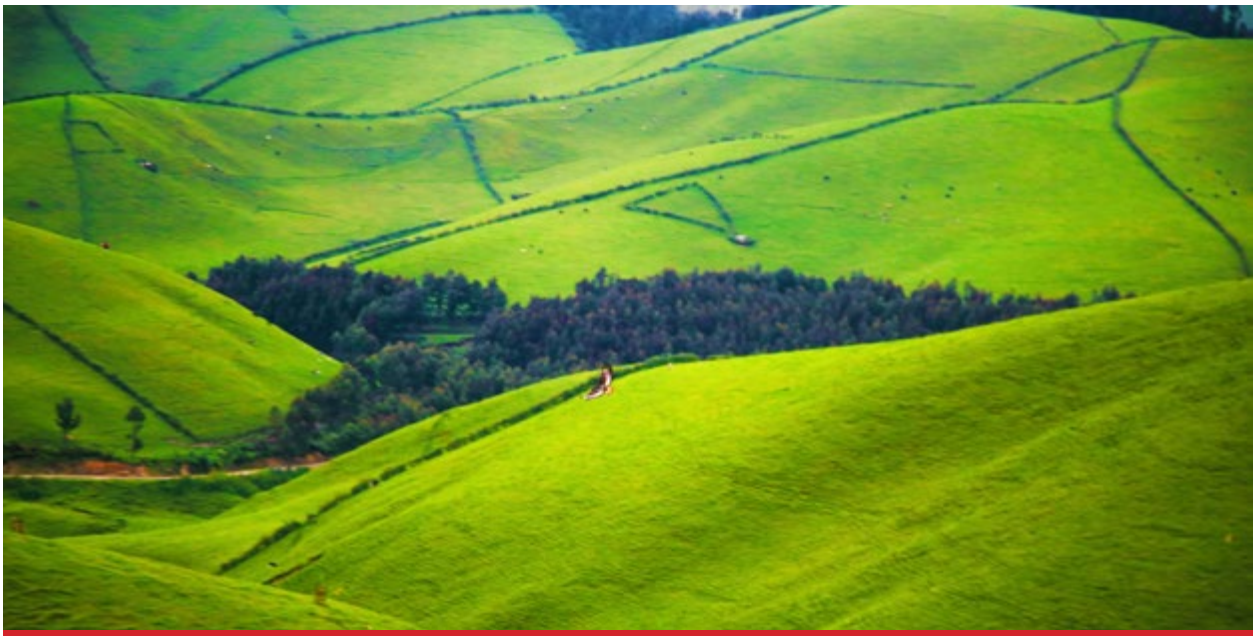
The national land use planning portal which is a web platform where land use plans and related information such as maps are stored, was launched in 2015 with the objectives of disseminating national and district land use plans to the public and facilitating access to information related to land use planning in Rwanda.

Land accounts ware developed under Rwanda Natural Capital Accounting Project supported by the World Bank to ensure rational and sustainable management and use of national lands for the current and the future generation.

In order to keep fighting soil erosion on steep slopes 92, 882 ha of radical terraces have been achieved and 901,752 ha of progressive terraces have been made. The Ministry of Environment and its agencies are implementing long and short term projects supported by FONERWA in districts where major degraded land users are benefiting from restoration through the strategic tree planting and land management best practices. A land protection suitability map, guidelines and standards of land protection are being established. A monitoring and Information system for effective use of terraces is being updated.■

FOR PROPER IMPLEMENTATION OF LAND POLICIES AND ADEQUATE USE OF LAND

Land as a valuable resource is stated as one of the important pillars for sustainable development of Rwanda in the national document, VISION 2020. It is definitely a priority for agricultural development and a springboard in the fight against poverty.



The Land sub-sector is one of the five sub-sectors that constitute the Environment and Natural Resources Sector. The objective of this sub-sector is to develop appropriate policies for land use and to ensure that all land resources are recorded and classified adequately and, that laws and appropriate land tenure systems are implemented correctly.

The implementation of land policies and adequate use of land is the responsibility of Lands Management and Use Authority (RLMUA). It has the mandate to do the following:

- Supervision of all land-related matters and representing the State for supervision and monitoring of land management and use;
- Execution or facilitating the execution of geodetic, topographic, hydrographic and cadastral surveys in relation to land resources;
- Setting principles and guidelines that guide all related stakeholders on the use of land;
- Organising, coordinating and monitoring the collection use and dissemination of geo information in the country under the National Spatial data Infrastructure Framework; etc

Laws and regulations

The law No 43/2013 governing land in Rwanda and 16 implementing orders were gazetted and disseminated across the country through the local government and other various channels of communications.

Investment on land and Conflict Resolution enabled by Land registration

Over the period 2009-2013 the former Rwanda Natural Resources Authority (RNRA) and now RLMUA in partnership with its development partners completed the Land Tenure Regularisation (LTR) programme which covered first land registration through demarcation and titling of approximately 11.3 million parcels across the country, 8,404,407 leases were printed and 7,164,230 titles have been collected by owners. The Land Reform in Rwanda is aiming at sustaining the remarkable achievements up to now and reaches out to local levels. The over-all strategic objective is to put in place and operationalise an efficient system of land administration and land management that secure land ownership, promote investment in land for socio-economic development and poverty reduction. In order to ensure proper land management and land administration and specifically the maintenance of land certificates issued to landholders during land registration, a Land Administration Information System (LAIS) has been developed. LAIS is a web based land registration tool that is developed based on procedures and processes that are provided for by the Ministerial Order Determining Modalities of Land Registration.

Rwanda recognizes open access of land information to all people (Rwandans and foreigners). An interface linking the existing LAIS and the mortgage registration system was created to provide easy access to banks and the RDB/ investment promotion department. With this development, investors can easily seek conclusive information about land.

The Land Administration Information System is also connected to Kigali City Construction Permitting system as well as to the Rwanda revenue Authority and it is operational in all districts.

Starting 2015, citizen has access to land information through a mobile application available and accessible using their mobile phone via an USSD code (*651#). The system reveals that people have accessed this application 600000 times for the period (march 2016-July 2017).

In the process of building the capacity of the Districts, enabling them to give a quick and better service delivery in a suitable

> "An interface linking the existing LAIS and the mortgage registration system was created to provide easy access to banks and the RDB/investment promotion department."



> "Starting 2015, citizen has access to land information through a mobile application available and accessible using their mobile phone via an USSD code (*651#). "

environment, 25 District Land Bureaus were refurbished and 5 District Land Bureaus were constructed for Nyamasheke, Rulindo, Ngororero, Bugesera and Gatsibo Districts.

Since 2014, land-related services were decentralized at the sector level. 416 Sector Land Managers were recruited, trained and all necessary infrastructures were availed to efficiently help the Sector Land Manager to fulfill their responsibilities. Today, the time taken to process land transaction has reduced drastically, where a land transfer used to take 365 days and now it can take only one day with "One step, one day one procedure" for commercial and industrial land uses and less than two weeks for other land uses.

In order to make land services accessible online, the Rwanda Online Ltd has developed a platform "IREMBO" which is linked to LAIS to enable people to apply online. As for now, Irembo platform is being used for four land transactions which are land transfer by sale and donation, land use change, land subdivision and land merging. In addition, the system allows the clients to track the progress of their applications through SMS notification.

With regard to the awareness rising, there is an the annual citizens' outreach campaign known as "Land Week" where the Staff responsible for land registration meet citizens in their respective sectors to share information and experiences on the formal registration of land transactions and the proper land use in respect to land use plans. .

Land conflicts are a common phenomenon in society but the Land Registration has made efforts to curb this in guarantying the security of ownership to all landowners hence the minimisation of intra-family and other land related conflicts.

National Land Use Development Master Plan

Rwanda had been experiencing steady growth in terms of economic development and population. This promptly resulted into the high expectations for the management of natural resources like land, improved living conditions and sub sequentially the government participation in the planning process and rapidly changing technologies in infrastructural development.

The Government of Rwanda initiated a planning procedure that resulted into the preparation and adoption of a National Land Use Development Master Plan. This plan provides national guidelines for better use and management of land in Rwanda and most importantly outlines guidelines for the development of detailed District Land Use Plans.



The approval of the National Land Use and Development Master Plan was followed by the development and approval of District Land Use Master Plan and their implementation strategies both in rural and urban areas to increase productivity.

Implementation progress

Today all 30 Districts have developed and approved their Land Use Plans and their detailed implementation strategies are being developed. An assessment on implementation of 2011 national land use master plan is being carried out in all districts to inform the planned review of the said master plan

In order to keep fighting soil erosion on steep slopes 92, 882 ha of radical terraces have been achieved and 901,752 ha of progressive terraces have been made. The Ministry of Environment and its agencies are implementing long and short term projects supported by FONERWA in districts where major degraded land users are benefiting from restoration through the strategic tree planting and land management best practices. A land protection suitability map, guidelines and standards of land protection are being established. A monitoring and Information system for effective use of terraces is being updated.

Addressing challenges

Even with the leaps Rwanda has taken in land mapping and registration there have been a few challenges

First, the implementation of the National Land use plan is still challenging and not well understood by all. More efforts in ensuring the enforcement of National Land Use Planning Guidelines and Land Use Indicators are needed in order to optimize land use, citizens should be educated to enable them to participate in land use planning process.

Also, some people have been adamant to provide required information for land registration and in response, the lands management and use authority has ensured that land related services are decentralized at sector level for better service delivery.■

> "Today all 30 Districts have developed and approved their Land Use Plans and their detailed implementation strategies are being developed."

BELOW: drama sensitizing people on land conflict resolution



TITLE DEEDS GIVE FARMERS NEW FUTURE

BY EDDIE NSABIMANA

When the government started to implement land reforms and allowing people to own title deeds, Marcel Mutijima was one of the beneficiaries. After years of farming on the land that was not officially his, Mutijima, who owns three-hectares of land in Rwamagana district says that government made positive gesture when it started issuing land titles. The move, he says, has gone a long way to resolve land related disputes, mainly common in rural Rwanda

In addition, he is now able to easily secure bank loan because he can use his land as collateral.

"I now feel safe because I have had my land registered. I can now get a loan easily whenever I want to because the management of the bank can trust me with the proof they find in my land title. And this is helping me doing my business through using the bank loan," Mutijima said.

Mutijima is among hundreds of thousands of Rwandans who have benefited from the land reforms.



Amina Nyirangamije, too, possesses a land in Nyarugenge District. She says she had previously fought enough to remain with the land from people who wanted to dispossess it from her after back to back court sessions. She testifies it would never have been easy to have her land if it were not registered to her name, saying conflict with people would no longer be a case as long as she has registered her land.

"I was always confident to keep my land the day I appeared before the court against people who wanted to take away my land and my house from me. It is now my property, in accordance to the land title that I have, which is the only proof that the land belongs to me," she said.

"I now feel safe because I have had my land registered. I can now get a loan easily whenever I want to because the management of the bank can trust me with the proof they find in my land title."



BELOW: Electrical poles produced by the New Forest Company

NATURAL CAPITAL ACCOUNTING PROCESS EASING POLICY PLANNING

BY JOSEPH MUDINGU

Rwanda has began planning for its National Strategy for Transformation (NST1) while using the Natural Capital Accounting (NCA), a tool that measures and integrates natural resources and assets into the national development planning process.

The government presented the first results of its Natural Capital Accounting process on February 16, 2017 during a national workshop that was held in Kigali.

The results from the first accounts, which covered topics on land and water, come after about 18 months of work.

The results from the two accounts (land and water) helped to inform the national planning process, especially when it comes to including natural resources in economic development and poverty reduction.

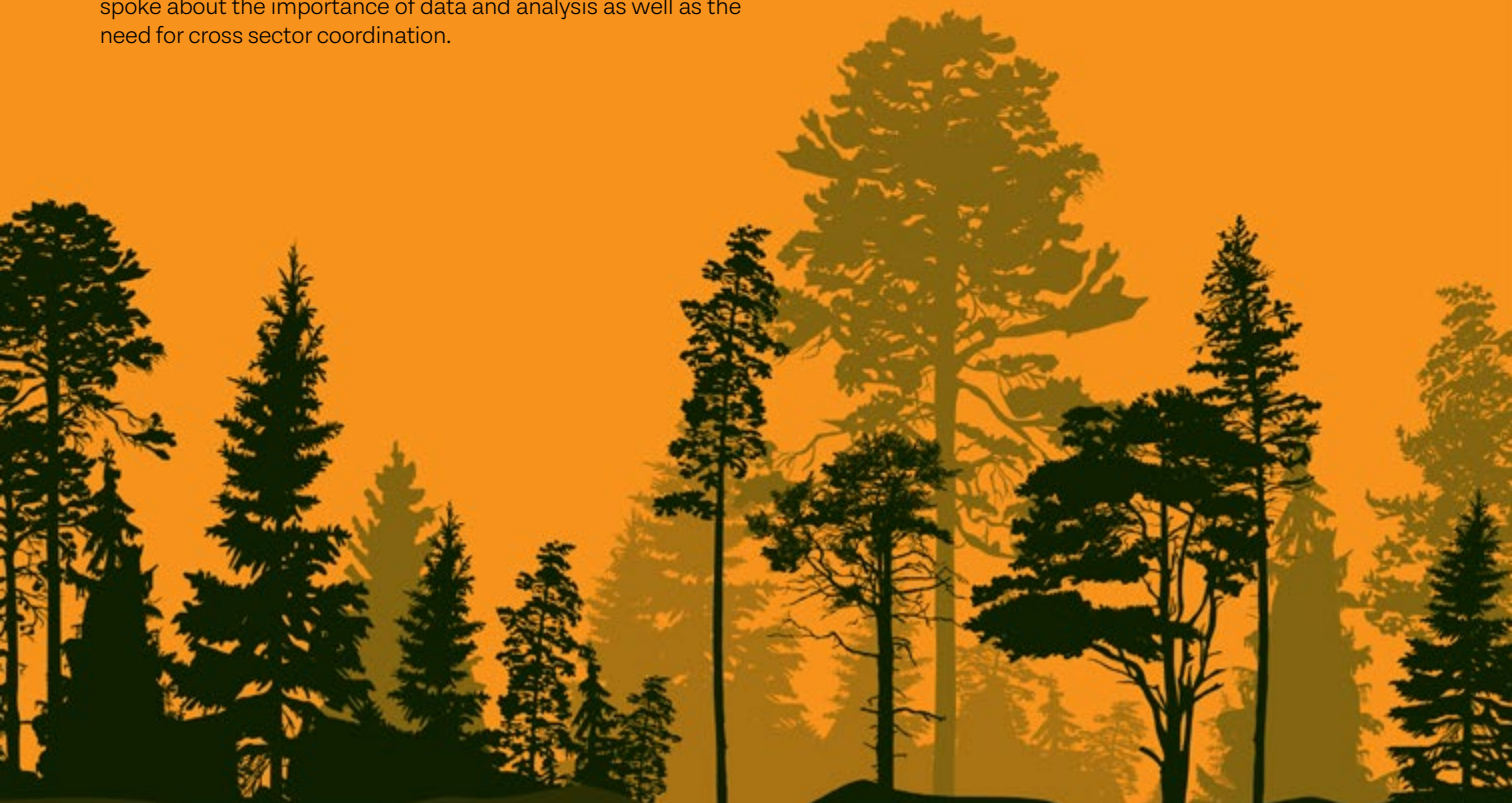
On May 6, 2018, the Minister of Lands and Forestry and the Director General of the National Institute for Statistics Rwanda launched Rwanda's first Natural Capital Account for Land.

At the launch event, the Minister of Environment, Vincent Biruta, spoke about the importance of data and analysis as well as the need for cross sector coordination.

He promised to continue developing and publishing natural capital accounts for land, water and minerals, in addition to working closely with the Ministry of Finance and Economic Planning, the National Institute for Statistics Rwanda, and other agencies in order to utilise the information in the document.

The Director General of the National Institute for Statistics Rwanda, Yusuf Murangwa, recognised NCA as an important, well-organised, consistent, nationally relevant source of data for analysis.

For instance, land accounts provide indicators and trend analysis to track targets for sustainability, land allocation, service delivery, and productivity. Policymakers can use this information to clarify and compare economic values generated by land in competing uses and how changes in land use may affect land asset value.



The report provides land use and cover information that can inform land-use planning from the local to national level. Land use and cover accounts can also inform Rwanda's efforts to build climate resilience, reduce deforestation, and increase forest cover.

Today, there is growing consensus questioning the sustainability of standard economic growth strategies. This is especially true for Africa, a region where the environment-economy nexus is at the heart of the policy challenges facing Governments.

Current levels of environmental degradation are hampering growth and job creation, as well as lowering welfare, notably through threats to public health.

Increasingly, since the 2008 global economic crisis, demand is growing for a new paradigm of development, taking into account scarce and valuable natural resources.

> One of the conclusions of the recent studies is that implementing green growth policy requires adapting the tools used to monitor economic activity.

In Rwanda, land is the foundation for all socio-economic activities and livelihoods. But today our land faces pressures from population growth, rapid urbanization, and vulnerability to changes in the climate and rainfall patterns that result into weather extremes like droughts and floods.

Natural Capital Accounts for land provide information about land assets, changes in land use and land cover, land availability and its productivity to help manage these challenges and support sustainable development planning.

Studies present a set of policies that can make growth processes more resource-efficient, clean, and resilient without necessarily slowing economic activity.

One of the conclusions of the recent studies is that implementing green growth policy requires adapting the tools used to monitor economic activity. While natural assets and the services they provide are fundamental to the wellbeing of our businesses and society, they are not well represented within Governments' economic accounting systems.

GDP aggregates for instance provide an indication of growth rates without factoring in their environmentally sustainability. But like other forms of capital, natural capital requires investment, maintenance, and good management if it is to contribute fully to increasing output and prosperity.

Natural Capital Accounting (NCA) is a tool that can help measure and manage the value of domestic natural assets (such as land, water, fisheries, and forests). It is in that line that Rwanda has embraced the Natural Capital Accounting (NCA) process, which it has been committed to since the Gaborone Environmental Sustainability Summit in May 2012, and the Rio+20 Conference. The World Bank, under the Wealth Accounting and Valuation for Ecosystem Services (WAVES), a global partnership, has committed to provide support to our country for the implementation of NCA.

The first meeting of the National Steering Committee for NCA took place 15th October 2013 this marks the first step to devise a work plan for Rwanda to implement NCA.

Rwanda joined the WAVES Partnership (Wealth Accounting and the Valuation of Ecosystem Services) – a global initiative established to promote the inclusion of natural capital accounting into existing national accounts.

WAVES is a partnership of Governments, private sector actors, NGOs and academic institutions to mainstream use of natural accounts in economic decision-making.

The other core implementing countries with the WAVES partnership include Botswana, Costa Rica, Colombia, Madagascar and the Philippines. The meeting today began the process of presenting ways and milestones to develop national framework and strengthen the institutionalization of natural capital accounting, which are essential elements within the WAVES-Rwanda programme■

> Rwanda joined the WAVES Partnership (Wealth Accounting and the Valuation of Ecosystem Services) – a global initiative established to promote the inclusion of natural capital accounting into existing national accounts.



FRANCIS GATARE

CEO of Rwanda Mines, Petroleum and Gas Board

The mining sector in Rwanda has, in the recent past, gained a high level of importance in terms of contributing to national development; through export revenues and contributing to the creation of off-farm jobs, upwards of 30,000 jobs, supporting, in the process, the attainment of Vision 2020 ideals and international commitment to Sustainable Development Goals.

The recent mineral export earnings show an upward trend; making it the second highest foreign exchange earner of the country (after tourism). It thus also plays an essential role in decreasing Rwanda's negative external trade balance. The government targets to earn $800 million from the sector by 2020 and $1.6 billion in 2024.

The government has therefore committed to strengthening the sector through a number of initiatives, including building structural, organizational and individual capacities with special emphasis on establishing a competitive legal framework and operating in tandem with international mineral trade obligations.

The Government of Rwanda recognizes that the mining sector has the potential to become one of the drivers of long-term sustainable growth through economic transformation, industrialization and inclusive growth taking into account environmental and social considerations and using green mining techniques. It can provide revenues to contribute towards rapid economic growth, a positive trade balance, foreign exchange, opportunities for employment, backwards and forward linkages that will overall generate substantial social and economic benefits to the Rwandan society.

With recent changes in management of the mining sector, the newly created Board of Mines, Petroleum and Gas is now being restructured to adopt a new approach to deliver higher-level results from the

mining industry. These changes put emphasis on the use of minerals as one of the growth drivers for the economy with the vision to transform the mining sector into a vibrant, dynamic and efficient sector through promoting adequate geological knowledge of the country's natural endowment, investments in mining, value addition and linkages, and responsible mining to spur economic transformation, industrialization, growth and development. To boost production key interventions are being implemented.

Increase of knowledge of the available minerals in the country by conducting detailed mineral exploration in existing and new potential areas ranks high on the government agenda which has prompted local investments in exploration and attracting foreign interests in the potential sites. Increase of production will be based on the geo data as guide to investment and opening of new strategic mining areas.

The exploration will help to determine the mining methods and capital equipment and defining criteria for the various kinds of licenses. The best practices and modern processing machines such as jigs at all mines sites, are to be introduced together with consolidation of artisanal and small miners.

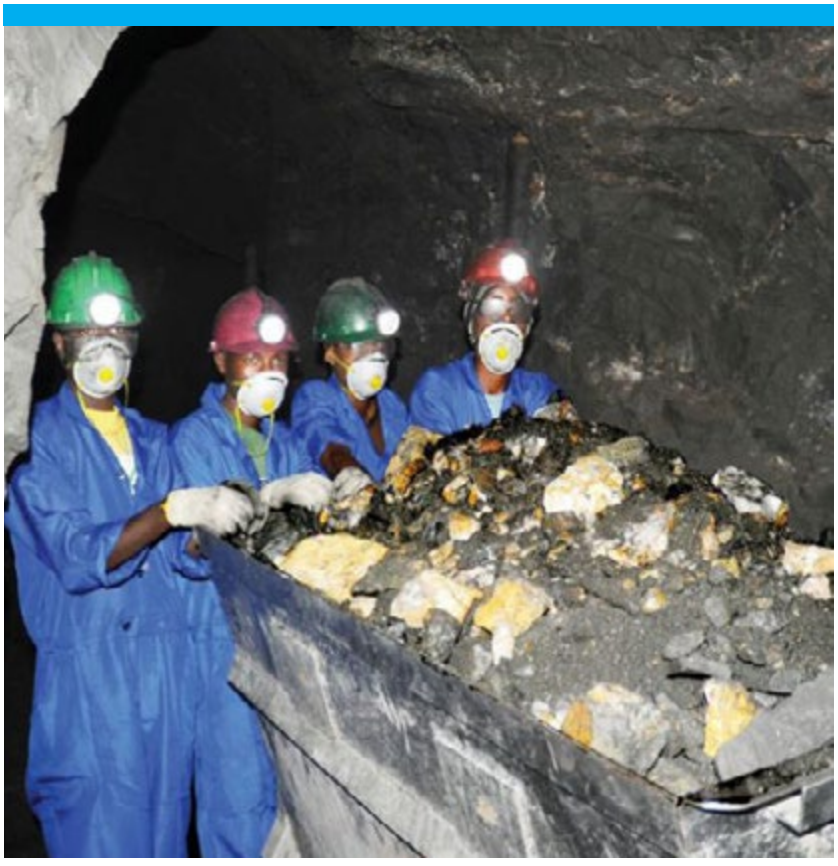
Strategic investment will be promoted by attracting foreign and local investors in exploration and mineral exploitation in potential mining areas with comprehensive data and well organized miners. This will be accompanied by enforcement of legal and regulatory requirements as well as training of miners.

Efforts are underway to conduct feasibility study for processing plants (refineries and smelters) in an effort to promote value addition with purpose to increase mineral revenues as a first phase .With recent discoveries, it has been found that Rwanda is rich in other minerals rather than only 3Ts such as gemstones, lithium, iron.



The government is building capacities to transform from artisanal to industrial level mining

EXPLORING AND EXPLOITING MINERAL RESOURCES FOR BETTER EXPORT EARNINGS



About ten years ago, the Government of Rwanda privatised the mining sector. In recent years, the Rwanda mining industry has made significant progress with a steady increase of mineral production and export on the world market contributing about 2 per cent of Rwanda's GDP. Rwanda's mining sector has improved in terms of production, exports and contribution to the national economy.

Today, mining in Rwanda presents opportunities in ores, processing and diversification. The main mineral exports are; tin, tantalum, tungsten, gold and gemstones. Exploration works to identify and delineate more mineral deposits are underway.

Reforms for better productivity and safety

There are a number of reforms that have been undertaken to build capacities of the National Mining and Geological Authority to ensure value addition of mine and quarry products.

Through the Strengthening Capacity Building Initiative Project, at least 25 staff have been trained in different areas abroad to acquire skills in different mining activities at Masters level in; Australia, South Africa, USA, France, Rwanda among others. Seven experts in mining were hired for a short period to transfer skills and knowledge to the young professionals as well as the line staff in the institution. A Mining School was also opened in 2012 at IPRC Kigali. It has 178 students today.

There has been further detailed exploration, development and updating mining investment promotional tools and training small scale miners in resources evaluation and in management of mines, and a re-interpretation in already explored 5 Prospected Targeted Areas (PTAs).

A report on geological surveys and exploration in three selected Potential Target Areas (PTAs) (Bugesera II, III and Rulindo II) has been completed and has recommended further and deeper exploration in thirteen Future Priority Areas on key minerals like Tin, Tungsten, Tantalum, Gold, Lithium, Rare Earth Elements, Nickel, Platinum Group Minerals and Base metal. Stream sediment, soil and rock sampling and ground geophysical work in all the three PTAs have been completed.



ABOVE: Washing and grinding. Picture courtesy of Fairphone.
CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=50253748

Strategy for value addition

The Karuruma Tin Smelter, Phonix Metals smelting activities were launched in January 2015 at a test phase (90t of cassiterite/day), and the process of obtaining a Conflict-Free Smelter certificate is ongoing. Smelting tests have been done by Phoenix Metals with 23 tonnes of cassiterite (9.2% Casseterite) locally.

Model Mine Concept

Implementation of the Model Mine Concept consists of a set of standards for good practices in mining sector in the areas of technology, environmental protection standards, employees' safety and security standards, mine facilities, implementation of Environmental Management Plans, noise survey and management standards, waste water management and corporate social responsibilities. The Model Mines was launched in December 2016.

Mineral explorations have been done in seven mineral Prospective Target Areas (PTAs):
Nyagatare, Kirehe, Nyabisindu and Nyanza; completed and exploration in 3 PTAs: Rulindo, Bugesera and Mwogo and ongoing with further exploration works in delineated potential areas with PTAs. The 15 minerals being explored are; tin, tungsten, tantalum, niobium, gold, nickel and copper.

A National mining cadastre system has been developed and is being connected to all Districts.

Contribution to the National Economy

In recent years, mineral export earnings have considerably increased such that mining is now Rwanda's second highest foreign exchange earner and the highest in exports with 30 to 40% of total Rwanda exports. This sector thus plays an essential role in bridging the balance of trade deficit.

Petroleum exploration activities

A cooperation agreement has been signed between the Government of Rwanda and the Government of DRC for the joint exploration of petroleum in Lake Kivu■

In recent years, mineral export earnings have considerably increased such that mining is now Rwanda's second highest foreign exchange earner and the highest in exports with 30 to 40% of total Rwanda exports.

EXPLORING THE POTENTIALS

Mining in Rwanda has gained importance in terms of revenues generation,, and job creation. The mining industry has always had a strong positive impact on the Rwandan economy. It strengthens sustainable economic growth perspectives at the national level including employment (especially to reduce poverty for low-income sections of the population; also with a focus to develop SMEs in rural areas and, as such, it further contributes to reducing the disparity between rural areas and Kigali), skills development and export earnings (EDPRS-2 targets). Here is an insight of how the sub sector is performing

BELOW: A mining site where individuals are admiring some gemstones



Performance

The Mining sub sector plays an important role in terms of supporting private sector development (industry) as indicated in the Vision 2020. In recent years, mineral export earnings (2013 U$226.2 million, 2014 US$ 210.7 Million, 2015 $149.1 Million, 2016 US$ 166 million) have surpassed coffee and tea earnings such that mining is now the second highest foreign exchange earner of the country (after tourism). It thus also plays an essential role in decreasing Rwanda's negative external trade balance.

Over 80% of the mining sector in Rwanda is operated by artisanal and Small Scale Miners. Today there are at least 548 operational mine sites and 130 mining companies and 30 mining cooperatives. The sector is currently employing at least 30,000 excluding those that work in quarry mines. Livelihoods of nearby communities have been improved through salaries of the employees, appropriate, medical insurance etc

Progress

Rwandan Government through RBM is currently setting a major focus on mineral exploration and resource evaluation, as a critical base to ensure and grow the mining sector's contribution to the national economy.

In addition to past exploration explorations works , Air-borne surveys have been recently conducted in the whole country and came up with some important Strategic Targeted Areas (STAs). Detailed exploration in 6 STAs is planned to come up with resources estimation which will be commercialised.

Building capacities

A key challenge in mining sector is the limited capacity (skills, technology) of artisanal and small-scale miners (ASM), who represent the dominant contribution to the national miners' workforce, with regards to mineral exploration and resource evaluation.

So far, the Government has repeatedly contracted international consultants to train miners on best practices and improving mineral processing; however, such kinds of interventions are relatively short-term. Continuous engagement strategy which was done by the government required for sustained long-term capacity development included:

- Training of professionals in mining related subject abroad and quickly
- Established degree and diploma courses on mining related subjects at the University of Rwanda and IPRC Kigali.
- The establishment of mining related technical courses through apprenticeship and VTCs

Sustainable extraction

If mining is not carried out sustainably, what is earned from the sub-sector can be neutralised by the high cost that could be required in restoring what has been negatively affected. It is from this background that we work with REMA to strictly enforce environmental standards in the mining sub-sector. For example, all large mining projects will require an approved EIA/environmental auditing plan approved by REMA; and all small miners will require an approved EMP before exploration license is issued.

Alongside enforcement, joint awareness campaigns with REMA among the miners are carried out for them to understand and appreciate the positive relationship between good environment management and development.

> The sector is currently employing at least 30,000 excluding those that work in quarry mines. Livelihoods of nearby communities have been improved through salaries of the employees, appropriate, medical insurance etc

Processes and procedures of leasing out mining concessions

Any person who applies for a mineral or quarry license shall fill appropriate forms provided by the Institution. These forms contain the requirements to get mining concession at least the following information:

1. Identification of the applicant;
2. Proposed location of activities;
3. A document describing the action plan, its implementation and costs;
4. Strategies and timeframe for the execution of each activity;
5. Planned investment and proof of its source;
6. Employees and the level of their qualifications;
7. Proof of tax clearance;
8. Environment impact assessment (EIA) or Environment management plan (EMP)

Currently we have about 537 licenses

Major achievements in the Mining Sub Sector

1. **Value addition to mining and quarry products.**
2. **The new Mining law, Mineral royalty tax law and related ministerial decrees were published.**
3. **Research aimed at mapping out the country's mineral natural resources.**

With the aim of strengthening research aimed at mapping out the country's potential minerals such as gold, nickel, copper, platinum, tin, wolfram, Colombo tantalite and increase the mining products at least threefold.

Over the ending 7 years, researches in different areas have been conducted and the following findings were made:

1. Sediment, soil and rock sampling has been completed.



2. Mineral exploration in seven 7 mineral Prospective Target Areas (PTAs): Nyagatare, Kirehe, Nyabisindu, Nyanza completed and exploration in 3 PTAs: Rulindo, Bugesera and Mwogo ongoing with further exploration works in delineated potential areas with PTAs. 15 minerals are being explored for, they include tin, tungsten, tantalum, niobium, gold, and nickel, copper.

3. Works are ongoing to update the mineral inventory of Rwanda and the National mineral map through airborne survey.

4. A national mining cadastre system for efficient and effective management of mineral and quarry titles has been developed and is now operational at central level with current connectivity to all Districts and other third parties dealing with mining such as RRA, NIDA and RDB.

5. Data are being collected in order to produce an update on the national estimated mineral resources and reserves

6. The holders of the mineral exploration licenses conduct mineral research works with a focus on tin, tungsten, tantalum, gold and gemstones.

7. The former Government concessions have been divided into small manageable mining perimters and tendered and many of them have got new investors who are currently in operations for development.

4. Increasing mineral production and environmental protection

The target was the production of 7,200 tons/ annually worth 96 Million USD, although the production declined since 2014 due to international mineral price fluctuations.

Mining sector in the next 10 years

It is envisaged that the mining sector in the not so distant future will have moved from artisanal to semi-mechanised mining with about 60,000 jobs created and processing and refineries of minerals available with at least more than 50% of minerals exported from Rwanda processed.

Efforts are also being scaled up to ensure that geological information on mineral resources is available while the mining sector contribution to GDP will have increased from 1.6% to 5.27%. At least export revenues generated from mining will have tripled up to US$ 600 million. ■

It is envisaged that the mining sector in the not so distant future will have moved from artisanal to semi-mechanised mining with about 60,000 jobs created and processing and refineries of minerals available with at least more than 50% of minerals exported from Rwanda processed.

A CLEAN GREEN ENVIRONMENT IS EVERYONE'S RESPONSIBILITY

Rwanda has taken good strides towards Green Growth; mainstreaming climate resilience and low carbon development into key sectors of the economy for sustainable growth.

From banning polythene bags 10 years ago, introducing mandatory vehicle emissions testing, to restoring marshlands as well as adopting the comprehensive Green Growth and Climate Resilience Strategy-a framework for mainstreaming climate change and the green growth approach in national socio-economic planning, the government has continued to register eloquent results in adapting to climate change.

The New Times engaged several people from different sectors on what Rwanda needs more of to sustainably ensure green growth with testimonies of how climate change mitigation efforts have put bread on the table for some through providing "green jobs."



Louise Musabyimana, 21, Casual work at Nyandungu Eco-Tourism Park Project

Environmental protection projects have not only safeguarded our climate but provided jobs for so many people as you can see (pointing to dozens of her fellow workers).

Some people might not see it but seasons have changed with longer sunshine spells and dangerous heavy rain pours which is indeed a signal that climate change is real. It is good that our country is doing all it can to mitigate climate change and protect our environment. I am happy to play my part too.



Thomas Nzamwita, 35, Casual work at Nyandungu Eco-Tourism Park Project

Environmental protection projects like this one of creating Nyandungu Eco-Tourism Park is benefiting in so many ways. It creates jobs, improves the beauty of our city and mitigates climate change.

I have been working here for the last 6 months. I get a daily wage which has helped me take care of my family.



Egidia Nyirahitimana, Mother of 4 and Street Cleaner

I take pride in doing my job because I know it speaks volumes about the beauty of our city and the image of our nation at large. To me, a clean street is like having clean home; safe and suitable for the users. I know we don't have polythene papers in the country but there are some litters that could be hazardous to our environment and therefore cleaning streets is another way of ensuring safe environment. Ensuring safe environment is everyone's responsibility and so I hope we can work together towards that cause.



Isma Shyaka, Auto Spare parts dealer

Motorists have a role to play to ensure that our environment is safe from dangerous vehicle emissions. The government has put up regulations and I think it is important we all cooperate to ensure a safe environment for generations to come. I think it is good that everyone takes responsibility for safe environment.



Savio Viateure, Automotive mechanic

With the consistent and mandatory vehicle emissions testing campaigns launched by the government, we have also been compelled to advise our clients to take precautions on safeguarding environment through carrying out thorough checks on motor emissions as well as advising them on how best they can keep their engines cleaner and safe not to destroy the environment. We all know that a cleaner environment means healthy lives. It is everyone's responsibility to play their part in that regard.

We understand that the government is in talks with some South African Company (Volkswagen) to introduce environmental-friendly cars. I think such technology will help in mitigating climate change too.

MINERALS SUPPLY AFRICA LTD (MSA)



Minerals Supply Africa (MSA) is a Rwanda-based company owned by CRONIMET Central Africa AG (CCA). It deals in Procurement, Processing & Exporting of Coltan, Cassiterite and Wolfram minerals.

Established in 2008, The Company trade with local miners, mining cooperatives and mining companies as well as financially support miners in order to increase the mining production of Rwanda.

Our Vision:

- To become the leader in minerals processing and trading industry in the region
- To provide quality Minerals that exceed the expectation of our esteemed customers

Our Mission:

- To understand the need of our customers and match that need with the right production of the Rwandan mining Industry
- To build a long term relationship with customers and suppliers based on mutual trust and respect
- To offer geological advices for an efficient and environmental friendly mining sector
- To Advocate and implement the mineral traceability for responsible mineral supply chain

P.O. Box 6509 Kigali, Gikondo - Industrial Area, Tel (office): +250 783900555,
Email:contact@msaltd.net / www.msaltd.net

A PROFILE OF RWANDA'S MINERAL GEMS







CASSITERITE

Cassiterite also called tin stone. It is the only commercial tin ore and is a tin dioxide, Sno2, containing theoretically 78.6%tin. It is widely distributed in RWANDA in places including Rutongo, Gatumba and many other mining places.

COLTAN

A metallic ore from which the very similar elements niobium, also known as columbium, and tantalum are extracted. Alloys made from these elements have a variety of uses, including communications technology, superconductors, and doping of steel, Due to niobium and tantalum versatility and the recent technology boom, the coltan industry has skyrocketed. Coltan has become a necessity for modern communications and therefore an indispensable and lucrative industry. Tantalum from coltan is used to manufacture tantalum capacitors, used in electronic products. Coltan is found in various parts of the country including Gatumba and many other places.

WOLFRAMITE

(Fe,Mn)W04, is an iron manganese tungstate mineral that is the intermediate between ferberite (fe2+rich) and huebernite (Mn2+ rich). Along with scheelite, the wolframite series are the most important tungsten ore minerals . Wolframite is found in quartz veins and pegmatite associated with granitic intrusives . Associated minerals include cassiterite, scheelite, bismuth, quartz, pyrite, galena, sphalerite, and arsenopyrite.

In Rwanda wolframite is found in several places including gifurwe and nyakabingo among other places. Wolframite is the main source of the metal tungsten , a strong and quite dense material with a high melting temperature used for electric filaments and armorpiercing ammunition, as well as hard tungsten carbide machine tools.



GOLD

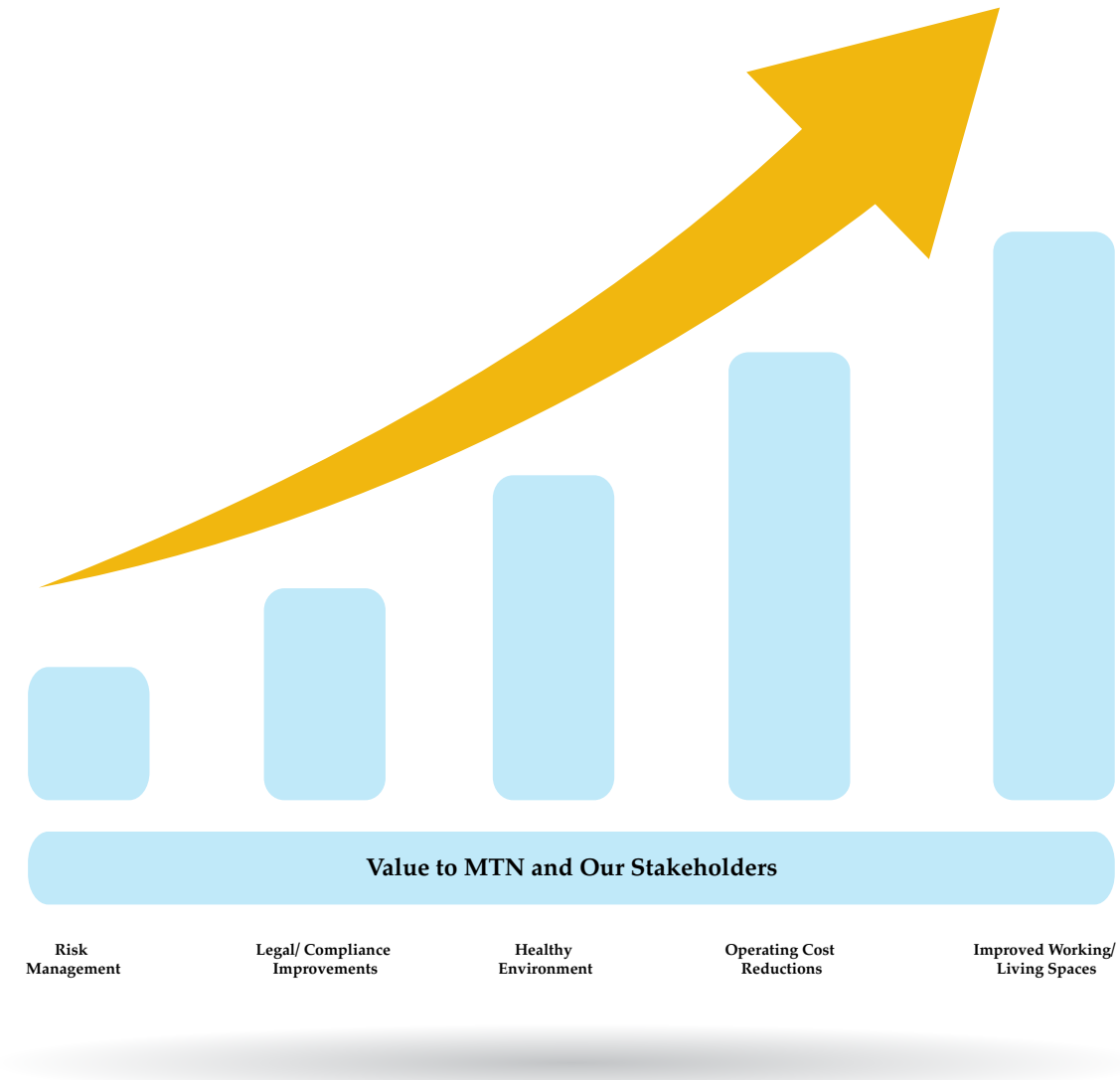
Gold is dense, soft, shiny, malleable and ductile metal. It is a chemical element with the symbol Au and atomic number 79. Gold in Rwanda is found in kivu, Miyove among other places.

This precious metal has seen many uses over the centuries. While the most common usages have traditionally been the creation of coins, bullion and jewelry, gold has also seen a variety of less typical uses.

ENVIRONMENT SUSTAINABILITY PROGRAMME

What is sustainability and MTN commitment?

Business sustainability is a process by which MTN manage financial, social and environmental risks, obligations and opportunities. These three impacts are referred to as profits, people and planet.



To continue incorporate the principles into MTN strategies, policies, procedures and practices to establish a culture of integrity while upholding our key responsibilities to our planet(Environment),
share holders, our customers(People& Profit) for long-term and sustainable business success.

Environment Business Sustainability Programme

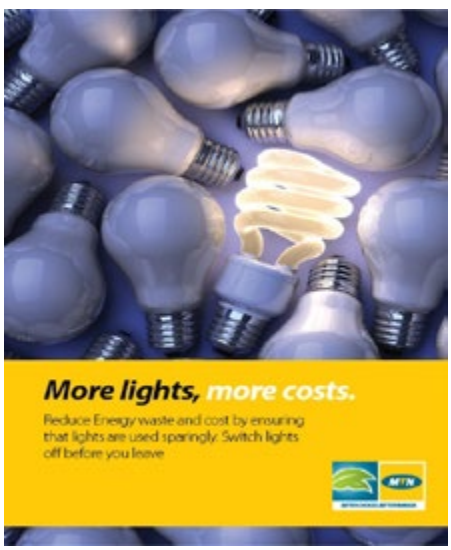
Intervention /Risk area	Detailed Description
Environmental Sustainability (Planet)	Energy - Energy being one of the most significant office consumption and negatively impacting our current & future environment, we tried to save energy by turning off lights, replacing energy saving lamps with none economic ones. We created awareness among staff to use natural light & air and switch off Air conditioners, Coffee Makers, Computers, Printers, Photocopiers when not in use. We also reduced their numbers in departments & replaced them with multipurpose double page printing in common central positions. Paper & Toner- to minimize its use we encouraged digital way use of e-mails, tablets, laptops, desktops during /presentations and the implementation of E- payroll. Waste – waste separation and re-use/ recycle to recover other value before disposal and proper disposal as per REMA standards; Recycling of marketing materials into 2 life products Water – we created awareness for water conservation, stopping unnecessary water leakage in Wash rooms & Kitchen whether at work or outside office. Travel & Carbon emission- we encouraged efficient use of MTN's Fleet to reduce on fuel consumption & minimize gas emissions by traveling together, driving smaller cars, no travel where conference bridging, video conference facilities. Procurement – ensured no plastics are procured and where not possible minimize the quantities and e-sourcing to minimize environmental impact through the supply chain,. Products packaging- all new purchase orders were eco-friendly , stopped purchasing vouchers with plastics Digital solutions- Virtual Top Up, Mobile Money, e-learning, e-sourcing, e-conferencing Green events - Conducted events, conferences, meetings and conventions in a way that minimises environmental impacts such as energy use, waste generation, location impact, transport management & carbon emissions. Had MTN Staff support and participate in Quarterly Green Day and Community work on a monthly basis. Specifically MTN Staff have put in place 1 million nursey trees in Rulindo District. Environment sustainability internal Campaign: Awareness on environment issues and Climate change

BUSINESS SUSTAINABILITY : Environment projects status

Target	Initiatives
Waste MANAGEMENT	
50% eco friendly packaging	New eco friendly packaging for airtime card(Adopted by other MTN OPCO)
100% Marketing materials recycled	Recycling flexis in partnership with local companies producing fashion materials with flexis(Billboard materials)
Effective Waste Management	1. Increase VTU Penetration(90%) 2. Airtime sales on MoMo (25%) 3. Engage suppliers to use bio-degradable materials for products packaging/ airtime, promo materials

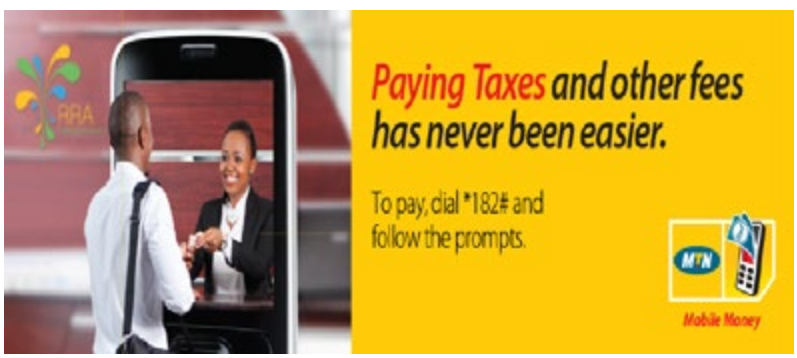
BUSINESS SUSTAINABILITY : Environment projects status

Target	Initiatives
Reduce energy consumption by 10%	• Implementation of car/travel policy and system tracking to reduce our carbon footprint • Connect remotes sites on Solar panels • R 22 Gaz replaced in all MTN offices.
Reduce paper and toner usage by 10% & 90% of printers to be set for double side printing	• Implementation of electronic pay slips • Configure printers for double sided printing to avoid paper waste and environmental harm
Participate in every Month's Community Work and Green events & Day every end of a Quarterly	• Conducting events, conferences, meetings and conventions in a way that minimises environmental impacts such as energy use, waste generation, location impact, transport management & carbon emissions. • Participate in monthly Community work and Green Day on a Quarterly basis to create awareness on environmental issues and contribute to mitigation strategies. • In order to contribute to reforestation MTN Staff have put in place 1 million nursey trees in Rulindo and trees planting and maintenance of a dedicated site in Nyandungu.











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Food and Agriculture Organisation

International Union for Conservation of Nature

UNFCCC Adaptation Fund

The World Bank

African Development Bank

Global Climate Fund (GCF)

KOICA

DFID

Water for people

Living Water International

SNV

Wildlife Conservation Society

Water Aid

Arcos Network

Vi Agroforestry

Trocaire

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