GREEN BUSINESS GAZETTE

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PERSEVERANCE

LANDING ON "The Red Planet" MARS

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Women And Climate Change

Is There Water On The Moon

Mining And The Environment


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GREEN BUSINESS GAZETTE

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FROM THE EDITOR'S DESK

Greetings to you our esteemed readers! We have dashed so quickly as a fresh magazine on the market to fully establish ourselves as a preferred green choice magazine.

Through your support we have been able to prevail. Welcome to our Issue 5 of the GBG. In this issue we focus on women and climate change. This nexus has intrinsic and complex issues arising from the evidence on the ground as to the effects of climate change on women's livelihoods. The issue explains the disadvantages that women are experiencing due to increased water scarcity, high temperatures and other climate realities. We also focus on the "pink hat initiative" which is gaining ground like fire. The initiative involves women empowerment in the area of Renewable Energy Technologies and their full participation.

Sustainable development is at the core of poverty alleviation and greening the economy. We follow-up on previous editions by advocating for an economy that is free from pollution and degradation of the environment. It is quite clear that continuation with current resource consumption patterns will lead us into a place of no return. The Green Business Gazette Editorial Team continues to thank all those who have advertised with the magazine, accessed copies and have made themselves stakeholders. We are looking for a leaner and fresher look in the magazine that is lightweight. The hard cover print is going away to make way for a thinner and crispy feeling which is less heavy to carry. This is in line with our commitment to a lower carbon footprint.

The Editor-in-Chief hereby invites Letters to the Editor in the next edition. From Issue 6 of the Green Business Gazette, Letters to the Editor will be published from different parts of the world. Feel free to share your insights and new perspectives.

As a parting shot to the present Issue 5, we head into Space, Galaxies and planetary precincts. We delve into the new insights regarding presence of water on the moon. Is this water accessible and can it be harnessed? After the success of the rover Curiosity, another rover called Perseverance has landed on Mars "The Red Planet". The Perseverance Rover will undertake a mission to search for signs of life on Mars. Could this be the next destination of humanity?

As we navigate the COVID-19 pandemic and vaccination programmes gaining momentum in different countries, the world economy is slowly rebounding. There is a high likelihood of an increase in greenhouse gas emissions. The Green Business Gazette wishes all stakeholders an emission free post-covid-19 recovery and a fresher look into the Circular Economy. Continue to stay safe!

Happy Reading!

Tawanda Collins Muzamwese
EDITOR IN CHIEF

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Women and Climate Change

Diana Tapedzanyika

THE IMPACTS OF CLIMATE CHANGE on humanity are becoming more and more evident with the increase in the frequency, occurrence and distribution of climate related catastrophic events. Sadly, these impacts have not been equally distributed across populations in the world as some are more vulnerable and susceptible to these impacts than others. Women and poor communities have been on the receiving end at most due to dependency on natural resources as well as limited adaptive capacity to adapt to climate induced stresses. Women are more at risk as compared to their male counterparts.

Climate change has further increased inequalities and exacerbated gender inequalities due its effects which are not gender sensitive or selective. Societal roles played by women at both household and community levels has placed women at a greater risk of facing larger burdens of the impacts of climate change. This is mostly because they depend more on natural resources and activities which are sensitive to climate variability for their livelihoods. Lack of education of marginalised women has also contributed to women being more vulnerable than men.

Impacts of climate change include droughts, water scarcity, flooding, storms, pests and diseases, increased temperatures among others. Water scarcity is increasingly becoming one of the leading global challenges being faced as a result of climate induced droughts affecting women in both rural and urban areas in Southern Africa. The search for the precious resource has also seen the increase in human rights violations against women and girls who have become more vulnerable to abuse. The dire situation has seen the normalisation of young women and girls going to fetch water late at night and some going as far as selling their bodies just to get their hands on this precious liquid.

Women participating in the decision making process have been very limited when it comes to Climate Change policy planning and formulation. This is why women continue to suffer greatly from climate change impacts because of being left out on policies which affect them on a daily basis. Climate change response should be inclusive to all and the inclusion of women in decision making processes promotes gender equality through gender-based vulnerability assessments. Women understand the impacts of climate change better than men through the interactions of their societal roles to the environment and nature.

The response to the impacts of climate change requires a gender sensitive approach which is inclusive and fair especially to the most vulnerable members of society. A balance between climate change and gender equality should be struck if gender based vulnerability assessments inform policy formulation. Women have practical skills and advanced knowledge in climate change response and therefore they play a crucial role in climate change mitigation and adaptation. This has been observed in the management of natural resources were women have been exemplary and pioneering in the sustainable utilisation and harvesting of these resources. If such an approach is also adopted in the fight against climate change the goal of creating climate resilient communities can be achieved sooner than expected.

The Pink Hat Initiative

WOMEN IN RENEWABLE ENERGY

By Diana Tapedzanyika

THE GREEN ENERGY Revolution has seen the growth and expansion of the renewable energy sector across the world. Countries are accelerating actions to reduce emissions from the energy sector whilst increasing accessibility to clean affordable energy and creating employment for citizens. Renewable energy is a booming industry and jobs in this sector are expected to increase to 29 million by 2050 from 10.3 million jobs in 2017 according to IRENA. This sector has a crucial role to play in the Just Transition and creation of Green jobs.

The participation of women in renewable energy however still remains very low thereby threatening the sustainability of this industry as a result of lack of inclusivity, equity and gender imbalances. 32% of women are employed in the renewable energy sector across the world and of the 32% only 25 % are working in STEM jobs. 45% are mostly carrying out administrative and non-technical work. With the expansion of Renewable energy, it is therefore important to leverage the participation and promotion of women to take up spaces in the renewable energy value chains. This will ensure that they also benefit from the economic opportunities brought about by the energy transition and strengthen livelihoods.

In this special feature of women in renewable energy we take a look at some of the initiatives local companies in renewable energy are doing to promote and accelerate the participation of women in this sector in Zimbabwe. Intermittent Energy Pvt Ltd is one such company pioneering women participation in renewable energy. It is an Engineering, Procurement and Construction Company providing solar PV services and products. Intermittent Energy Pvt Ltd is an EPC perfected for Solar PV energy installations, construction, design, maintenance and upgrades. It directly employs women to do technical work including installations and procedural activities. Currently 45% of the workers contracted in this company are women certified and qualified to do electrical and solar work. This exceeds the total workforce of females in solar in companies across the world.

The Pink Hat Initiative is an initiative that has been started by Intermittent Energy Pvt Ltd to appreciate the contribution of women to the operations in the organisation and to celebrate women in the renewable energy space. The inspiration to come up with such an initiative came from the values of diversity, equality and equal opportunity for all and believing that one's ability is governed by knowledge and skill not gender. The Pink hat Initiative was started in August 2020 which coincided with the women's month. This is a year round Initiative which celebrates the contribution of women in solar and is symbolised by women wearing pink helmets every day. Intermittent Energy also seeks to enhance the participation of women in solar in its Second Initiative known as "Reach and Teach" were both women and men aged between 19-25 years from communities are trained on solar and talented individuals are scouted and developed. Through such an initiative, women are exposed to renewable energy which in turn increases their participation.

"The Pink Hat Initiative is our way of making sure that there's ample opportunity for the most capable to have the opportunity to showcase their skill and talent" Intermittent Energy Pvt Ltd

Gender and societal norms have been one of the barriers hindering the participation of women in renewable energy. The participation of women in the renewable energy space has been very low due to many reasons which range from interpersonal and the workplace environment which is not conducive for females. To enhance the participation of women requires a holistic approach to deal with cultural, societal and behavioural changes. National policies should enable workplaces to be conducive and favourable for women to alleviate some of the barriers faced. Awareness raising especially from companies into renewable energy is key in motivating women and clear misperceptions around the area.

REIMAGINING A WORLD WHERE WOMEN ARE NO LONGER VULNERABLE TO CLIMATE CHANGE

By Wadzanai Manyame

IN A WORLD where a lot of changes are being experienced naturally, technologically, economically, biologically there is a certain aspect of life that has remained stagnant or rather has been dawdling to change. The socio-cultural dynamics of the world especially in the poor, African and Asian and Small Island Developing State communities have remained such that women are still regarded as vulnerable and incapacitated.

Gender equality or should I say gender equity has been a talk for decades and different programs have been employed in and across the world. It remains one of the most pervasive forms of discrimination in the world in all developmental settings, despite it being a human right. The United Nations published the 15 year Millennium Development goals with goal number 3 on "promoting gender equality and women empowerment'. Currently, it is operating under the Sustainable Development Goals (SDGs) set for 2030, with SDG 5 on Gender Equality. Developmental organizations have come on board with different strategies, programmes and projects over the years to ensure gender equality. Slight changes have been noted where in a few cases women have been made vice presidents of countries and managing directors of companies, but the world is not there yet. The change has not been significant as most women are still regarded as the world's poor and this is now being compounded by the effects of climate variability and climate change. Most women dependent on natural resources for survival and livelihood, which are threatened by climate change.

According to the 2019 Global Index no country has achieved gender equality yet and the world is still furthest from achieving this SDG with 40% of women and girls living in counties where efforts to achieve gender equality are not being felt the slightest. This is however not the same for climate change. Effects of climate change are being felt in every part of the world and they are increasingly causing turmoil and loss each year, getting in the way of sustainability, building resilience and adaptive capacity and thus increasing vulnerability especially to women and girls. Women have less access to developed and technologically sound career opportunities and means of survival as well as decision making structures. Instead they rely mostly on small scale agriculture and gardening, selling of firewood, traditional medicine making projects that are climate change sensitive and are most likely to be affected by harsh weather conditions, veld fires, water shortages, drought and attacks from invasive species.

Women especially in the African culture

are said to be the ones that stay home and take care of the children and other family dependents. In case of climate change related disasters, due to limited mobility and knowledge, they are incapacitated to flee to disaster free areas, they cannot leave home to go and find alternative means to support the family instead all that needs to be done should be done within the community vicinity. Women suffer travelling long distances to fetch water and firewood, to look for food and in the end suffer from health ailments that could in the end claim their lives.

In Mozambique, Cyclone Eloise which occurred in January 2021 completely destroyed 1000 homes and damaged close to 3000 homes. It destroyed 18 700 hectares of maize and rice farmland. The inhabitants lost their homes and crops from which their food and money where going to come from. The most affected gender population is women as most men can flee to the cities to find greener pastures but the women will have to remain with the children and face the after math.

According to experts, effective mitigation and adaptation to climate change acknowledges that women and men experience impacts differently depending on how they live and sustain their livelihoods. It also considers the different roles they play in their families and communities and thrives to award both gender equal opportunities at survival and management. Women have unique developmental and management skills. They have a wealth of knowledge and drive that when given a chance are able to contribute greatly to the development of the world and in the fight against phenomenon such as climate variability and climate change. Women have been seen to be pro-environmentalist who have in the past made significant effective strides in climate adaptation and mitigation projects. During Cyclone Eloise which hit Mozambique in January 2021, a women-led evacuation group trained by Action Aid helped more than 600 families from Buzi and Nhamatanda districts evacuate to safe areas.

In the Niger Delta after the region had experienced ecosystem disruptive environmental abuses through oil spillages, gas flaring, a group of Nigerian women mobilized themselves and protected against the companies that were posing these environmental incidents. These protests led to a ruling by the courts to end the gas flaring practice as it violated the constitutional rights of citizens in Nigeria. Women are agents of change and thus should be acknowledged and given the platform to take a stand and have a voice in the fight against climate change.

Failure to address vulnerability of women to climate change impedes sustainable development. It directly affects 10 of the 17 SDGs. It is important to ensure effective implementation of programmes and projects. The UNDP launched a 2018-2021 Gender Equality Strategy which outlines 4 major issues to address. These include:

1. **Structural barriers to women's economic empowerment**
2. **Preventing and responding to Gender Based Violence (GBV)**
3. **Promoting women's participation in all forms of decision making**
4. **Strengthening gender responsive strategies in crisis prevention preparedness and recovery including climate change**

Efforts such as these are recognized as much is being done to ensure gender equity and gender quality which also allows the building of adaptive capacity of women to climate change.

Schiphol International Airport – Amsterdam REACHES CARBON NEUTRALITY

By Freedom Kudakwashe Muranda

SCHIPHOL INTERNATIONAL AIRPORT based in Amsterdam, Netherlands has reached carbon neutrality. The airport invested in electric mobility and ground equipment to cut down on greenhouse gas emissions. Schiphol currently operates Europe's largest electric bus fleet. Using these buses has cut down greenhouse gas emissions by about 1,734 tCO2e in the last three and a half years. The airport relies entirely on Dutch wind turbines for energy. Electric ground power units connect planes on the tarmac offering an alternative to traditional diesel-based units. Solar powered escalators are used for moving around passengers. Additionally, the roof of the airport's new pier will in the near future be covered with solar panels. Schiphol airport is dedicated to making the aviation industry more environmentally friendly and aims to be the most sustainable airport by 2030. The airport recently reached level 3+ in the ACI Airport Carbon Accreditation benchmark which is the highest level attainable.

The Paris agreement aims to achieve net zero emissions by mid-century. Schiphol international airport in Amsterdam is climate neutral and is aiming to archive net zero emissions by 2030. The Netherlands has a target of reducing greenhouse gas emissions by 49% by 2030 and these developments by Schiphol airport are a significant contribution to this goal. Before the Covid -19 pandemic the aviation industry accounted for 2 to 3% of CO2 emissions around the world and these where expected to increase. Currently, Schiphol is investigating new ways to compensate for its remaining emissions. Between 2017 and 2018, the airport's CO2 emissions decreased by 70%.

throughout the group. There are four key areas of focus at Schiphol which are: zero emissions, zero-waste, sustainable aviation and wellbeing. All the airports operated by the Schiphol Group aim to be zero-waste and zero-emission by 2030 since the emission reduction of airports is covered by the Paris Agreement. This goal means that no carbon will be emitted in the use of energy for the airports operations as well as ground operations. Electricity is the largest chunk of the emission footprint at the airport. The draft climate agreement for sustainable aviation and the smart and sustainable action plan signifies the significant steps that have been taken in the Netherlands.

The company CEO believes that 'zero-emission aviation is mission possible'. The CEO acknowledges that even though important steps have been taken, there will need to be increased collaboration between the aviation industry, government and academic institutions to meet the sustainability targets. Solar energy, electric mobility, thermal energy storage and circular construction will play an important role in this respect. Innovation, investment and policy will drive these initiatives.

In the coming years, the airport expects an increase in the production of biofuel. Using clean fuel within the airport vehicles and clean power trains will enable Schiphol to achieve zero emissions. The airports' vision is that clean aviation is possible. Currently, the group has been investing in the development of synthetic kerosene at Rotterdam, the Hague Airport. Schiphol group is also investing in a biokerosene factory in Delfzijl. This factory will be capable of producing sustainable fuel from waste flows. This investment is in conjunction with KLM, SkyNRG and SHVenergy and the Schiphol Group CEO states that Netherlands should play a pioneering role when it comes to more sustainable aviation.

Schiphol international airport intends to become the most sustainable airport in the world. Safety and environmental sustainability are the governing principles for all the aviation actions and activities

The Group plays an important role in driving supply chain responsibility. Normally at airports many activities are operated by third parties. This makes the carbon footprint assessment and management complicated for the group. Many of the emission sources are not under the control of other users of the airports. These include airlines and ground handlers, and they must play an important role in improving overall emissions.

There are various alternatives that the airport aims to pursue to manage aviation demand well. These alternatives include but are not limited to the option of travelling by train for shorter journeys as compared to flying. The other initiative will involve ensuring better organisation of airspace which will make smarter flight paths. The estimation is that these initiatives will drive down greenhouse gas emissions by 15 per cent. In addition to these alternatives improving the energy efficiency of aircraft through regular service, developing more efficient engines and introducing electric planes will significantly contribute to the reduction of greenhouse gas emissions. Potentially a 30–45 per cent reduction in greenhouse gases could be achieved.

Furthermore, making the aircraft's fuel more sustainable through the use of synthetic kerosene, hydrogen and biokerosene will reduce greenhouse gas emissions to as much as 100 per cent. Schiphol wishes to play a proactive role in driving down emissions from transport to and from the airport and in reducing the emissions of the airport itself.

The main focus of the airports' mobility and transport policies is clean travel. Currently airports from around the world are planning on examining leveraging innovations, adopting contactless technologies, changing the passenger experience, reorganising airport operations, utilising rapid testing and promoting business sustainability. These measures are being arranged in an effort to help pave the way for a return to pre-pandemic passenger traffic levels.

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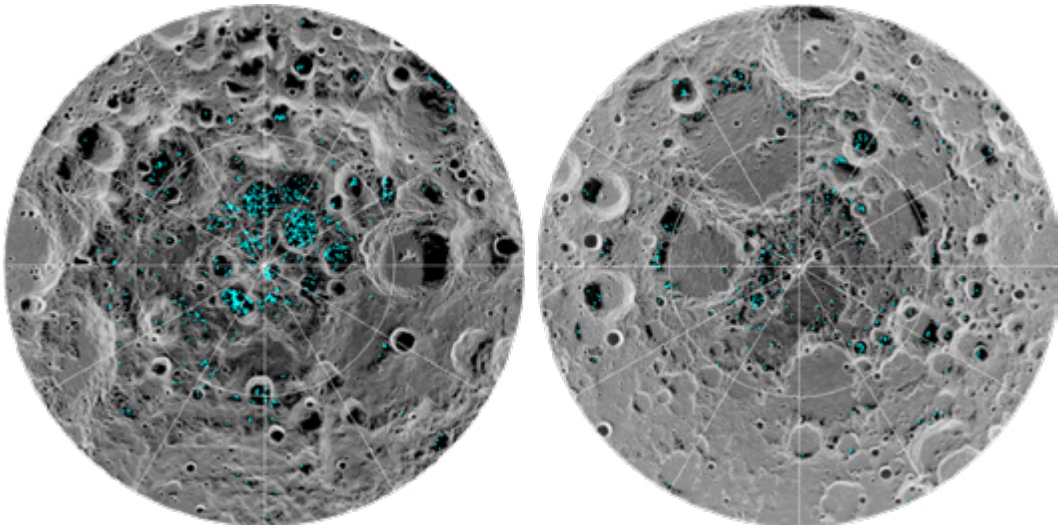


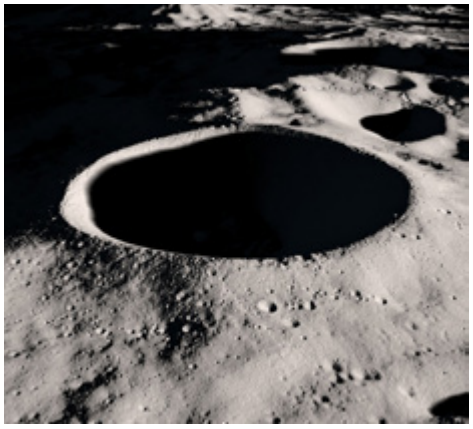
Is there water on the Moon? -Space-X and NASA step up plans to return humans to the moon and then head to Mars

By Bright Chituu

Having insight of whether the space outside the Earth can sustain life has been an ultimate question for mankind over the past centuries. Today, the National Aeronautics and Space Administration (NASA) and Space-X has already set its sights on Earth's nearest celestial planets as an effort to return humans to the moon. Through the Artemis program, which builds upon the Apollo missions which were done in the 1960s and 1970s, the space agency intends to put women first and then men next on the lunar surface by 2024 and establish a permanent human presence there within the next decade. However, in contrast with the Apollo mission, which aims on migrating people to the Moon, the Artemis plan targets the planet Mars with the Moon as a waypoint. The mission to the Moon is seen as a chance to test new tools, instruments and equipment that will possibly be used on Mars. This includes human habitats, life support systems, technologies and practices that could benefit in establishing self-sustaining outposts away from the Earth.

On the 21st of September in 2020, NASA produced a USD28 billion five-year plan to return astronauts to the surface of the Moon before the end of 2024. NASA plans to make use of the Moon's unique perspective as a podium to look back at the Earth, observe the Sun, and view the vast universe. However there have been intense disputes since 1996 as to whether water exists on the Moon or not. The existence of water on the Moon cannot be agreed without debate. This is because water evaporates very easily on the Moon unlike on Earth where evaporating water is mostly caught and suspended in the atmosphere, which in turn is protected from the Sun by the Earth's magnetic field. Since the Moon doesn't have the magnetic field as well as the atmosphere, there is no way of catching water which evaporates under the heat of the light from the Sun. Explorations by Casey Honniball of NASA's Goddard Space Flight Center however confirmed the presence of water molecules on the Moon. How did that water get there? That is a difficult question to answer.

Scientists predict that water reached the moon through numerous ways. The easiest, given the cratered nature of the moon, is that it arrived with an impacting object, like a comet or water-laden asteroid. Some Astronauts are of the view that deep craters which exist on the Moon's poles have received no sunlight for 2 billion years or more, thus scientists have suggested water ice to have survived. The presence of water on the Moon and possible deposits of rare Earth mineral deposits also hold promise for both scientific and human exploration.



In light of the Artemis Plan any water molecule/ice existing at the Moon is significant to the future of humanity in the Universe. Not only shall the water used to supply the colonist to drink or grow food, it will be essential for processing fuel to be used by the rockets.

Not forgetting the final destination Mars, the planet is seen as an exceptional place because it is the closest planet in comparison to the Earth in the Solar System. The Planetary Science suggest that Mars was once full of water, warmer and had a thicker atmosphere, offering a potentially habitable environment. Today, Mars is believed to have a maximum temperature of 30 , which sounds quite pleasant, but its minimum temperature is -140 , and its average temperature is -63 . The earth's Polar Regions record an average temperature of about -49 in winter. NASA and Space-X are expected to decide on whether people will stay on Mars and cope with the extreme temperatures especially at the night. The surface of Mars is characterized with reduced gravity, which will range from zero-g to 0.38 g and the effects are not yet well understood for long term habitation.

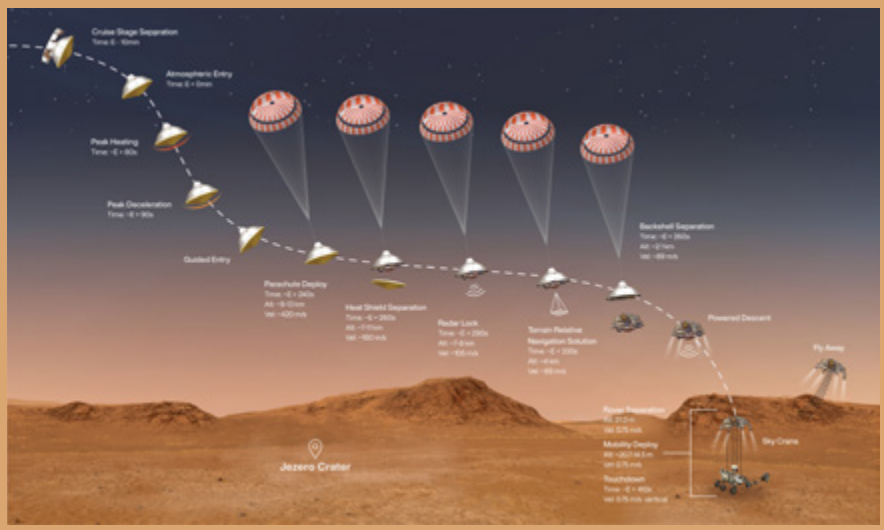
NASA and Space-X agencies have sent Astronauts and Robots to Mars in order to better understand the martian environment. Three missions just launched in July 2020 including the Perseverance rover mission from the U.S., which comprises the Ingenuity helicopter; the Hope orbiter developed by the United Arab Emirates (UAE) and launched by Japan; and the Chinese Tianwen-1, comprising an orbiter, lander, and rover. Out of 55 robotic missions have been sent to Mars by eight countries, 28 of them have been successful. As of those successful robotic missions, a lot has been learned about Mars planet. The survival of humans on martian environment is probable and numerous simulation attempts have already been done on Earth to understand how humans would cope with such an existence.

Perseverance Rover Lands On MARS

Is MARS the Next Planet for Human Habitation?

By Freedom Kudakwashe Muranda

On 18 February 2021 Perseverance rover a car sized rover landed inside Mars' Jezero Crater. NASA released an amazing, high-definition video and pictures that perseverance rover took on this planet. This amazing footage shows Perseverance's epic ride, even showing the moment the rover still attached via cables. Landing on Mars is quiet difficult. According to acting NASA Administrator Steve Jurczyk said in a statement today 22 February 2021, "Perseverance is just getting started and already has provided some of the most iconic visuals in space exploration history," Jurczyk added. Perseverance has an EDL camera system which has special microphones built to capture rushing Martian winds and other EDL sounds.



Before Perseverance there has been other robots that where launched to MARS. In August 2012 NASA sent Curiosity rover, which captured imagery of its own. Perseverance and Curiosity employed the same basic landing strategy, relying on a supersonic parachute and a rocket-powered sky crane and other mechanisms to get down safely. Curiosity rover's EDL footage was not as clear, sharp and complete as the one NASA posted on February 2021 after being captured by Perseverance rover. We got to see Curiosity's imagery stopped long before the rover touched down. And we didn't get the range of viewpoints that the Perseverance video provides.

The newer mission put multiple EDL cameras on the rover's protective backshell, one on the bottom of the sky crane and two on Perseverance itself one that looked up and another that looked down. The arrival of perseverance rover on Mars brings back to mind questions that scientists have attempted to answer about the possibility of humans migrating to inhabit the planet Mars. The intent is to bring back perseverance with samples from Mars for further research about the planet.

CAN WE PLANT TREES ON MARS TO PRODUCE OXYGEN THERE BECAUSE IT ALREADY HAS SOIL?

Scientists claim that MARS is the most possible habitable environment after the EARTH. Mars has a thin atmosphere, with a surface pressure less than a hundredth of the Earth's. It is 96% carbon dioxide (CO_2) and only about 0.1% oxygen (O_2). Mars has no organisms in the soil, no anchors to hold the soil down, no existing organisms, no real atmospheric protection, and no stable temperature range for supporting life that exists on Earth, half the sunlight that reaches Earth and a solid core so no means of holding the atmosphere down. Earth's atmosphere is 21% oxygen (O_2). A complex set of organisms similar to the ones we have in organic soil would have to be introduced so that our plant life and from that our animal life can survive.

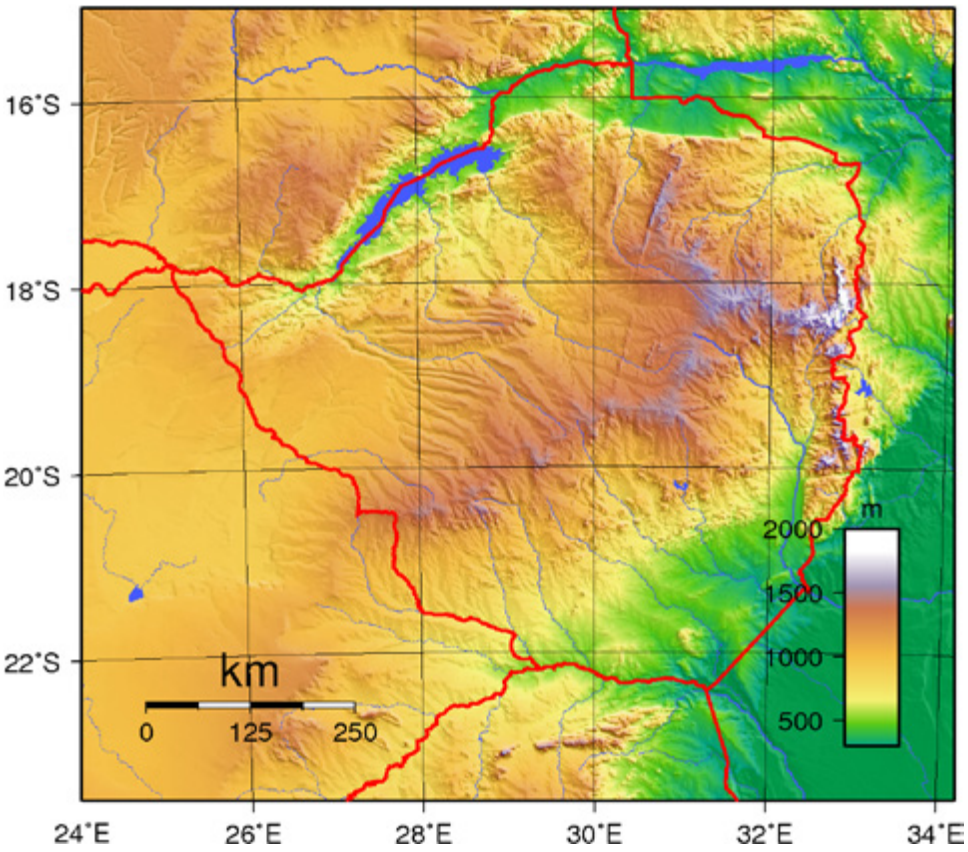
There are various factors needed to make the environment conducive on planet Mars. Planting trees on MARS is not possible in accordance with the existing technology and existent scientific knowledge. Plants are multicellular eukaryotic organism of Kingdom Plantae. Plants are characterized by sexual and asexual reproduction, modular and an alternation of generations, indeterminate growth. Several factors make the growth of plants conducive on Earth and not on MARS. Plants absorb specific wavelength (680 nm and 700 nm) of sunlight and any light of wavelength above outside this range will be damaging for growth. Temperature plays a very important role in the growth of plants. Enzymes responsible for the metabolic activities in plants are denatured at high temperatures and hence, affect the metabolism in plants.

Water availability is crucial for plant growth through photosynthesis. Water is the most essential reactant used by the plant to prepare starch. Carbon Dioxide (CO_2) is also important for the preparation of food by green plants. Humidity plays a very important factor as it controls the transpiration rate. Soil plays an important role as it provides macro and micro nutrients and anchors the plants. Chlorophylls and Carotenoids are the pigments used in plants and they are proteinaceous in nature. At higher temperature the pigments are denatured and this affects the growth. As these conditions are not available on the MARS for the growth of plants, we will not be able to grow plants. The procedure is so cumbersome it may lead to unnecessary loss of money and precious time. This amplifies the question why is MARS not suitable for plant growth and as compared to the EARTH?

ZIMBABWE TO DEVELOP EFFECTIVE CLIMATE DATABASE MANAGEMENT SYSTEM

By Wallace Mawire

INADEQUATE quality and capacity in climate data management has been identified as one of the remaining gaps as Zimbabwe intensifies interventions to scale up climate change mitigation projects. According to the Ministry of Environment, Climate, Tourism and Hospitality Industry, climate change is increasingly manifesting itself in the form of erratic rainfall patterns, increased frequency of droughts and intense rainfall activity leading to flooding, in Zimbabwe. In response to the challenge, the country ratified the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). The ministry says that there is need for enhancing the country's climate response, enabling environment, reviewing policy frameworks and strengthening institutional capacities to access climate action enablers such as climate finance, technology transfer and skills development.



In response to overcome the challenges, the government of Zimbabwe has nominated the Climate Change Management Department as the Green Climate Fund (GCF) National Designated Authority (NDA) to access readiness funds from the GCF. The Ministry of Energy said that stakeholders being targeted to redress the situation of inadequate quality data and capacity in climate data management include the Meteorological Services department, the Climate Change Management Department, Research Council of Zimbabwe (RCZ), including universities and research institutions in the country. The stakeholders will collaborate to support the development of an effective climate database management system to support climate action and decision-making.

According to a report on assessment and description of the environment sector statistics system prepared by the Zimbabwe Central Statistical Office (CSO) with support from the United Nations Development Programme (UNDP) in 2009, the Meteorological Services department has faced problems with respect to instruments for measuring certain data. The report says that an example is rain gauges, particularly located among the newly resettled farms which were vandalized. It says that some of the problems identified include transmission of data from the field to the data collection centres. It is also reported that the data produced by the meteorological office has gaps at certain geographical locations, since data is not captured due to malfunctioning equipment. The MET department says that there are gaps in data on greenhouse gas emissions and air pollution.

Zimbabwe's National Energy Efficiency Policy Zero Draft To Undergo Validation

By Wallace Mawire

Zimbabwe's Ministry of Energy and Power Development Energy Conservation and Renewable Energy department has produced the country's national energy efficiency policy zero draft which is expected to undergo stakeholder validation soon. This is according to communication released by Mr Isaac Chiridza, the Principal Energy Development Officer in the ministry.

According to the ministry, the main goal of the National Energy Efficiency Policy is to encourage the adoption of energy efficiency strategies to support Zimbabwe to achieve an upper middle-class Income economic status by 2030. It is reported that the energy efficiency policy is a sub policy developed under the overall framework laid out by the National Energy Policy of 2012. The other subsidiary policies under the same are the National Renewable Energy Policy (NREP) of 2019 and the Biofuels Policy of 2020.

The National Energy Efficiency Policy (NEEP) has been prepared through broad consultation with key stakeholder groups covering the entire energy value chain. These stakeholders are the energy regulator (ZERA), the national utility (ZESA), various ministries and government departments, development partners, subject matter experts, civil society, individuals, academia, researchers and various organisations and institutions with direct and indirect interest in energy issues. Stakeholder consultations were carried out across the country's provinces.

Reports claim that the policy intends to stimulate energy efficiency in fulfilment of the following broad policy objectives to promote energy efficiency. This will ensure that a comprehensive, integrated and well informed energy efficiency strategy is put in place for effective socio-economic development. Roles and responsibilities for implementing various energy efficiency initiatives and interventions in the country will be established. There will be provision for the framework to set targets relating to various energy efficiency interventions in the domestic and residential, commercial, mining, transport, agriculture and industrial sectors. This will stimulate sustainable economic growth by promoting competition, efficiency and investment in clean energy, improving access to affordable, competitive, and reliable energy services. An environment conducive for the development and provision of energy services will be established whilst prioritising and promoting the development of local technologies in development. There will be delivery of energy efficiency, promotion of capacity building, standards, and codes of practice and energy efficiency specifications for equipment, systems and processes, ensuring the inclusion of gender, economic, environmental, social, health and safety considerations. Climate change issues shall be factored in for electricity, petroleum, biomass and waste energy sector developments, fostering international co-operation in energy efficiency, investments and development whilst supporting and complimenting the provisions in the

energy policy, renewable energy policy, biofuel policy, climate change policy and other policies in Zimbabwe.

As per country overview, it is reported that the energy balance for Zimbabwe consists of coal, oil, hydro as well as biofuels and waste. The energy balance shows that the country predominantly uses bioenergy and waste as a primary energy source accounting for up to 63% of total energy consumption. The consumption can be explained by the country's demographics which according to the 2012 census, 68 % of the 13.1 million people live in rural areas.

On the fuel side, the biofuels policy of 2020 estimates that the country uses three million three hundred thousand (3 300 000) and four million three hundred thousand (4 300 000) litres of petrol and diesel per day respectively. On the electricity front Zimbabwe currently

has a national electrification rate of 42%. The National Energy Policy of 2012 states that the urban electrification rate has reached 83% of the households, as compared to a rural electrification rate of just 13%. At present Zimbabwe has an achievable capacity generation of one thousand one hundred (1100MW) against peak power supply needed of one thousand four hundred megawatts the (1400MW). Zimbabwe therefore imports between one hundred and fifty megawatts (150MW) to four hundred megawatts (400MW) from neighbouring countries, mainly South Africa and Mozambique. In dire situations the country resorts to load shedding.

Previous studies done notes that the country can save 377MW of electricity usage if energy efficiency is carried out. It is added that Zimbabwe has vast opportunities for saving energy both on the supply and demand side and the efforts being made are not sufficient to realize large benefits in the form of offset investments in new plant capacity and improvement in supply situation. Reports state that there is lack of sufficient data to establish energy savings through the use of more efficient technologies, switch in fuels, change of habits and processes hence the potential energy savings are underestimated. Energy efficiency in industry and commercial sectors is hampered by a combination of lack of awareness and capacity to establish the potential energy savings and difficulties in accessing finance to implement the measures.

The country is characterised with old equipment in residential, industrial and mining sectors resulting in low energy efficient levels. Zimbabwe's energy intensity was reported as 16 MJ per USD of PPP GDP in 2018 (SACREE 2018) making it one of the top 3 worst performers in the SADC region after Mozambique and DRC. "The country has a long way to go if it intends to reach the global best practice figures of 3-5NJ per USD of PPP GDP. Thus the country presents vast opportunities not only for energy efficiency but energy productivity in its economic sectors. The country is committed to the continued development of successful energy efficiency policy that will also support strategies for energy, emissions reduction and economic growth. Energy efficiency plays a critical role in addressing energy security, environmental and economic challenges. Ensuring energy sufficiency and availability for future generations, and reducing the growth in Zimbabwe's CO2 emissions, requires that energy resources are consumed in an efficient manner," the ministry said.

Zimbabwe has taken a number of critical steps to shift the country towards more efficient consumption of energy albeit mostly in the electricity subsector only. The Energy Efficiency Policy builds on already made achievements and proposes a comprehensive set of initiatives to further unlock energy efficiency potential in the country. The National Energy Efficiency Target Energy Efficiency policy has set the EE targets as 70% by 2030 below the projected "Business as Usual (BAU)" approach. The proposed and earmarked National Energy Efficiency Strategy and Action plan shall be informed by detailed and comprehensive EE Indicators shall break down and revise these targets as appropriate. It is further added that the government of Zimbabwe encourages the integration of energy efficiency measures across all the energy subsectors. It targets to address energy intensity across all the primary energy balance mix of the country including a mix of efficient electricity, biofuels and renewable energy solutions to achieve universal energy efficiency in the country.

CARBON OFFSETTING SUPPORTS EMISSION REDUCTION IN ZAMBIA

By Wallace Mawire

THROUGH ITS CARBON OFFSETTING programme BP Target Neutral, BP has supported emission reduction projects around the world. One such project includes the Reducing Emissions from Deforestation and Forest Degradation (REDD)+ Forest protection project in Zambia. This project is helping to conserve over 40 000 hectares of pristine forest from destruction as a result of charcoal production and the expansion of farmlands. It is reported that BP Target Neutral's carbon finance supports forest wardens, sustainable charcoal production, education and alternative income sources like bee-keeping and honey production. The project has resulted in 943,469 tCO2e credits issued to date which is an average 137,000 tCO2e per year.

Air BP's Anthony Leon, general manager, Southern Africa said, "We are pleased to be sharing our lower carbon solutions and sustainability agenda with our customers. With the African continent anticipated to experience phenomenal growth, it is vital that we work together with our partners, suppliers, customers and operations teams to continue to develop innovative solutions to reduce our carbon footprint and neutralize emissions."

BP plc, formerly the British Petroleum Company plc is a British multinational oil and gas company headquartered in London, England. The company is one of the world's seven oil and gas super-majors. BP plc is a vertically integrated company operating in all areas of the oil and gas industry. These areas include exploration and production, refining, distribution and marketing, power generation and trading. It also has renewable energy interests in biofuels, wind power, smart grid and solar technology.

According to the UN-REDD programme, deforestation and forest degradation account for approximately 11% of carbon emissions, more than the entire global transportation sector and second only to the energy sector. They says that it is now clear that in order to constrain the impacts of climate change within limits that society will reasonably be able to tolerate, global average temperatures must be stabilized within two degrees celsius. "This will be practically impossible to achieve without reducing emissions from the forest sector, in addition to other mitigation actions," according to the programme.

REDD+ is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). REDD+ creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Developing countries would receive results-based payments for results-based actions. REDD+ goes beyond simply deforestation and forest degradation and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

MINING AND THE ENVIRONMENT
Emerging Threats

By Freedom Kudakwashe Muranda

Globally economies are beginning to integrate. The rise in urbanisation, economic and population growth has resulted in increased exposure of the rural community to more investments in mining operations. There is an increased demand for raw materials and commodities which has in turn increased the mining environmental footprint. Mining operations require intensive water usage, vegetation clearance and land usage which result in significant environmental impacts. These environmental externalities can be soil erosion, acid mine drainage, deforestation, leakage of chemicals and sedimentation to mention a few. Poor communities in developing countries often interact with large investors because the arrival of external investments often provides a way out of poverty due to employment opportunities and infrastructural development. These opportunities are often temporary if the mining operations are detrimental to the once uncontaminated and preserved environments that the communities once depended on.

Mining companies have been becoming more aware of the need to build and improve relations with their surrounding communities in which they operate. Ernst and Young consulting company classified the 'Social Licence to Operate' SLO as the greatest business risk facing mining companies in 2019 up to 2020. Scientific research in mining has proven that there is an increased need of knowledge surrounding socioenvironmental sustainability dynamics linked to increased mining activities in developing countries.

The surface of the earth is changing rapidly, we are living in a time of extensive global change which is being driven by human development. These rapid changes have opened the earth up to new risks which are present in multiple systems. The greater challenge lies in predicting these threats to the environment and to human health. Current risks exist on multiple scales from mutating microbial pathogens, chemical pollutants, altered climate and ecosystems and they need to be identified and monitored. According to the European Commission there is support for environmental monitoring programmes, natural disasters and hazards, survey of environmental pollutants, shortage of food and water supplies, climate change, improved detection of emerging environmental issues.

When we assess the issue of emerging threats in the mining sector, there is a phenomenon of the 'Known unknowns' and it depicts the risks we know exist but do not fully understand neither can we accurately predict them. Threats can arise from entirely unknown hazards. Unknown hazards cannot be predicted because there has been no prior experience for their occurrence. These types of threats or risks are difficult to identify because of their speculative nature and potential impact beyond the normal everyday experience and if undetected can cause catastrophic incidents. The 'unknown unknown' concept has become widely used in risk assessments.

Different types of environmental hazards exist in mining:

Open Pit Mining

Open pit mining is damaging to the environment because minerals are often available in small concentrations only and this increases the quantities of minerals that need to be mined. There are environmental hazards present in every stage of the open pit mining process. Open pit exposes hardrock that has been unexposed for many years and when crashed they produce toxic radioactive material, metallic dust and asbestos like minerals.

Underground Mining

Underground mining releases toxic chemicals into groundwater and the soil. These toxic chemicals contaminate the water which in turn pollutes the surrounding environment. These chemicals are heavy metals such as mercury (Hg), cyanide (Cd), arsenic (As), cadmium (Cd), chromium (Cr) and lead (Pb). Underground mining operations causes sedimentation in nearby rivers because of hydraulic pumps and suction dredges. Ecologically valuable topsoil is removed by blasting with hydraulic pumps and makes it difficult for vegetation to recover. Deforestation leads to the disintegration of biomes and contributes to the effects of soil erosion.

In situ leach (ISL) mining

This type of mining releases significant amounts of radon. The fluids remaining after the leaching process usually have elevated concentrations of metals and radioactive isotopes, posing a significant risk to ground and surface water sources. Alkaline ISL can be an alternative to acid In Situ Leaching to extract uranium. Alkaline ISL will result in lower extractions of uranium but will offer advantages for the quality of groundwater after when the mining operations stop. Alkaline ISL therefore has reduced impacts on groundwater quality.

Heap Leaching

Ecosystems and the human health of populations within the vicinity of heap leaching mining operations can be affected by heap leaching fluids released into the environment. Failure to keep the process solutions within the heap leaching circuits causes a lot of environmental pollution.

Brine Mining

Existing ecosystems are disrupted by drilling and transport of brine solutions. Well casings and storage tanks can also corrode due to high salinity of the solutions that they are exposed to. This will cause leaks and pollution of groundwater water and other nearby water sources.

In conclusion, the United Nations member states set 17 Sustainable development goals. Mining Companies can contribute to global environmental sustainability by taking a front role in driving these SDGs. This will in turn help the companies in addressing emerging threats in the environment and other sectors as well.

MERCURY USAGE

A THREAT TO HUMAN HEALTH AND THE ENVIRONMENT - Women Join The Gold Rush

By Bright Chituu

Gold is a precious mineral commonly used in making coins, jewellery, electronic devices and in art. As valuable and shiny as it may appear, this mineral has a dark side. Artisanal or small scale gold miners put their lives at risk when extracting gold using toxic chemicals especially mercury. These chemicals pose a danger to the environment and the health of surrounding communities. In gold mining, mercury is a chemical used to recover minute fragments of the mineral that is mixed in soil and sediments. The gold and mercury settle and combine together to create amalgam. Gold is then extracted by evaporating the mercury. The process of extracting gold in artisanal mining uses rudimentary technology, which requires physically demanding and dangerous labour that is why it is male dominated.

In Zimbabwe the percentage of women working in gold mines is however increasing progressively. The visibility is being noticed as gender and women are gradually referenced in mining reform initiatives. In addition of being solely in charge for the home based chores, women have joined the gold rash where they are involved in activities such as crushing ore, collecting water as well as ore concentration. Like in any other developing countries women in Zimbabwe don't enjoy the same opportunities in terms of access to, control as well as benefits from the small scale mining activities. Apart from that they are not involved in making decisions when it comes to mining plans. Women participating in mining activities are mainly involved in traditional sluice washing for which they are not well paid. Rather they are remunerated with the unwanted tailings washing which they vend or re-process to extract the residual gold using mercury amalgamation. Harsh economic circumstances in Zimbabwe have forced women to begin to step down from supportive roles and take a more prominent and direct role in gold mining which has been a predominantly male environment. Their visibility in gold mining has been accompanied with gender based violence (GBV) at the workplace.

In developing countries artisanal and small scale mining not only contributes to the Gross Domestic Product (GDP) but also provides a source of income for tens of thousands of people. In Zimbabwe gold mining is considered a key driver to sustainable economic development as it contributes to exports as well as its interlinkages with other sectors of the economy. The Mining Industry contributes about 10% of the GDP and 60% of exports. However, mining this precious mineral comes with a price as it brings environmental and health risks to people. Since most miners are not skilled, underequipped and un-educated, they have little appreciation of the environmental impacts and health effects of mining activities.

Inhaling mercury vapour causes serious harm to the nervous, digestive, and immune system. Those using mercury directly in gold extraction, specifically by burning mercury, are therefore mostly prone to fall victim to its adverse effects. Prolonged exposure to mercury results in mercury poisoning and has potential to damage kidneys, impair hearing and cause eyesight problems. In addition to the adverse effects of mercury in humans, prolonged exposure to mercury vapour causes tremor, erythrism, gingivitis, sleep disorders and periodic contractile movements of legs. In extreme circumstances, this toxic chemical can cause people to become comatose and even cause fatality. Mercury usage in gold mining contaminates water sources and soil for livestock and crops leading to bioaccumulation. This mercury ends up being up taken into the food chain causing biomagnification. People residing close to artisanal mining activities can then gradually accumulate mercury in their bodies, which is particularly toxic for children, pregnant women and the elderly. Human bio-monitoring studies have indicated that early diagnosis of the chronic mercury intoxication is difficult to make because of its slow onset and diffuse symptoms.

According to the United Nations Environment Program (UNEP) artisanal gold mining accounts for the largest percentage of global greenhouse gas emissions with a contribution of about 37%. From 2005 up to 2010, greenhouse gas emissions from small scale mining doubled. Zimbabwe is among the top ten nations utilizing huge quantities of mercury in gold mining with an average of 25 tonnes per year being used.

Impending mercury pollution which is escalating as a worldwide problem requires global action. Mercury can be emitted into the air and travel via water, cross national boundaries and can travel thousands of miles via wind in the earth's atmosphere. The Minamata Convention on Mercury is an opportunity for nations to jointly address the problems relating to efforts put in place to minimize the use of mercury. Implementing the Minamata Convention will help in minimizing mercury contamination from human activities and take into account the release of mercury into the environment whilst maintaining and increasing gold production.


GREEN RECORDS COMAPNY
CLIMATE
CHANGE
IS REAL
GREEN
BUSINESS
GAZETTE

CITY OF HARARE AWAITS PROCLAMATION OF WETLAND CITY ACCREDITATION STATUS TO ENHANCE SUSTAINABLE DEVELOPMENT

By Wallace Mawire

HARARE CITY COUNCIL is intensifying stakeholder collaboration to combat the problem of wetlands invasion and destruction in the urban and peri-urban jurisdictions of the city. The city has been facing challenges of illegal land developments by land barons on wetlands and is working on mechanisms to stop the unwanted developments and destruction to the environment.

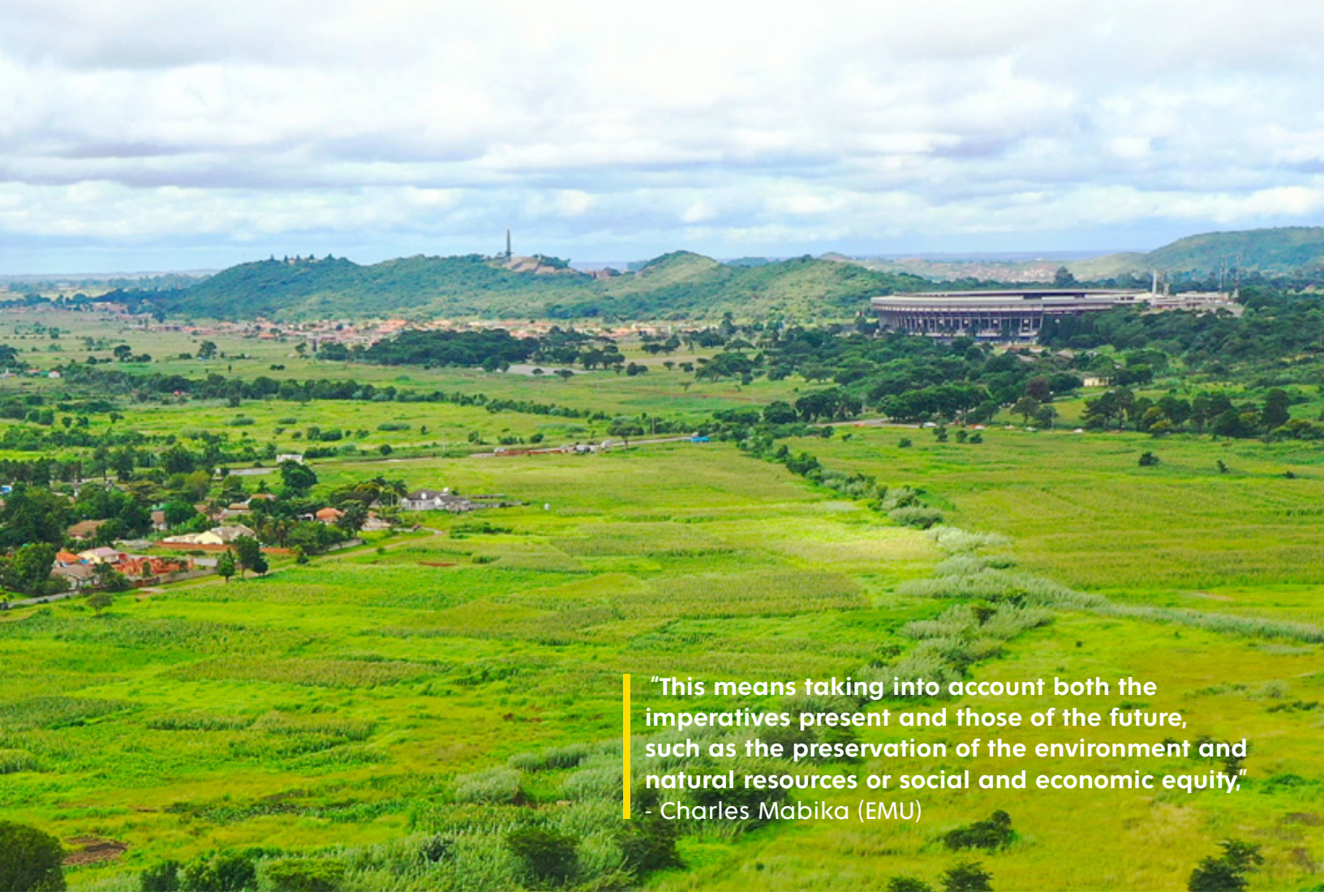
Charles Mabika, City of Harare representative under the Environment Management Unit (EMU) said at a Journalists Sustainability Reporting Workshop held by Lafarge and Practical Action on 27 November 2020 in Harare that some of the measures being implemented by the local authority include introduction of a climate desk at town house to deal with issues of environment, water and climate change including safeguarding of wetlands. Mabika said that the local authority is working with other government agencies like the Environmental Management Agency (EMA) on preservation of wetlands and the environment.

In a presentation on sustainable development in Harare, Mabika said that it is the idea that human societies must live and meet their needs without compromising the ability of future generations to meet their own needs. He added that it was now very imperative to strongly focus on the sustainable development model.

"This means taking into account both the imperatives present and those of the future, such as the preservation of the environment and natural resources or social and economic equity," Mabika said.

He added that although wetlands are crucial for providing important ecosystem services such as food provisions, protecting humans from flooding, providing clean water and storing carbon, they have traditionally been undervalued, which has resulted in widespread loss and degradation. Mabika said that this has led to a loss in the services that maintain people's health and wellbeing and also a loss in biodiversity. He added that 64% of the world's wetlands have disappeared since 1900 and 43% in Harare over the past 20 years.

Main threats to urban wetlands outlined by Mabika include draining and infilling for housing or other developments, loss of biodiversity by conversion to open public parks and recreational lakes. In addition, solid waste and water pollution, channelization of rivers and streams and hydrological disconnection of the wetlands from watercourses. The other threats involve the use of hard infrastructure solutions rather than green infrastructure and the occurrence



"This means taking into account both the imperatives present and those of the future, such as the preservation of the environment and natural resources or social and economic equity,"
- Charles Mabika (EMU)

of invasive alien species which are resulting in the loss of native species.

According to Mabika, when conserved and sustainably used, urban wetlands can provide cities like Harare with multiple, economic, social and cultural benefits. "They are prize land, not wasteland and should be integrated into the development and management plans of cities," Mabika said. Some of the benefits of urban wetlands outlined by Mabika include water supply, flood regulation, climate moderation, and wastewater treatment, habitat for biodiversity, agriculture and aquaculture. Additional benefits also include tourism, recreation and leisure, education, culture and heritage, research and human wellbeing.

According to Mabika, as a deliberate measure to enhance sustainable development, the City of Harare applied for the Wetland City Accreditation. He said that the Wetland City Accreditation scheme encourages cities in close proximity to and dependent on wetlands, especially designated Ramsar Convention wetlands such as Monavale, Manapools, Cleveland Dam, Lake Chivero, Victoria Falls, Chinhoyi Caves and rural Driefontein of international importance to promote the conservation and wise use of urban and peri-urban wetlands, as well as affording sustainable socio-economic benefits for local people. It is also reported that the initiative also represents a direct link between Sustainable Development Goal 11 to "Make cities and human settlements inclusive, safe, resilient and sustainable" and SDG6 "Ensure availability and sustainable management of water and sanitation for all".

It is added that 18 cities from seven countries such as in China for example Changde, Changshu, Dongying, Haerbin, Haikou, Yinchuan), France for example Amiens, Courteranges, Pont Audemer, Saint Omer, Hungary for example Lakes by Tata, Madagascar for example Mitsinjo, South Korea for example Changnyeong, Inje, Jeju, Suncheon, Sri Lanka and Tunisia for example Gharel Melh received the prestigious accreditation.The city of Harare is aiming to follow suit.

Mabika said that the City of Harare is located in the Upper Manyame Catchment Basin, which is a wetland ecosystem that provides a plethora of essential and valuable services to the residents and rate payers of Harare. The wetland ecosystem is an extensive single natural ecological system that forms the primary water catchment area for the Upper Manyame Catchment Basin that feed into the major raw water sources for the City of Harare and its environs (i.e. Harava Dam, Seke Dam, Lake Chivero and Lake Manyame) and ground waters in the catchment.


SAY NO
TO WASTE
REDUCE
REUSE -
RECYCLE
GREEN
BUSINESS
GAZETTE

MV WAKSHIO Captain Says Search For Internet Connection Led To Mauritius Environmental Incident

By Freedom Muranda and Wallace Mawire

THE WAKASHIO SHIP CAPTAIN who was arrested in August 2020 confirmed that he allowed the ship to get close to shore to search for an internet connection so that hIs crew would connect with their families and maintain a high morale. He made this admission whilst appearing in court. Captain Sunil Kumar Nandeshwar is being charged with endangering safe navigation, and environmental pollution. Local police deny that the ship sailed close to land seeking a Wi-Fi signal. They mentioned that looking for a phone signal did not require sailing so close to land. The ship's vessel operator Mitsui OSK Lines states that their Ships had access to free and unlimited internet access. The ship then failed to respond to warnings of the errant course Early in the evening of 25 July 2020 in Mauritius, East Africa, MV Wakashio ran aground and split into two causing oil to leak. This incident brought attention from international media organisations for several months. Captain Nandeshwar acknowledged that he allowed the ship to about 5 nautical miles to shore, whiles sailing to 15 nautical miles from the shore. According to Mauritius local media, crew members admitted to having been given permission to celebrate a birthday party and they had got intoxicated by the time the accident happened. The Japanese MOL released an internal investigation report on the incident. This report identified the crew member's unsafe behaviour which contributed to the incident and it also had a number of safety measures to prevent such occurrences from happening in the future.

It is estimated that approximately 1,000 tonnes of oil spilled into the Indian Ocean in what scientists term the worst environmental disaster to ever occur in Mauritius, East Africa. The Mauritian government declared the MV Wakashio oil spill incident a national emergency. MV Wakashio grounding happened at an area listed under the Ramsar convention on wetlands of international importance. The area is near the marine park of Blue Bay. Prime Minister Pravind Kumar Jugnauth, who is the Prime Minister of Mauritius declared a "state of environmental emergency" and requested French help on 7 August. "When biodiversity is in peril, there is urgency to act," French President Emmanuel Macron tweeted. You can count on our support dear Jugnauth." The French government sent military and civilian equipment and personnel from its overseas territory of Reunion to offer support in the incident.

The Maritime Executive reported they during the court case an audio recording from the ship's Voyage Data Recorder (VDR) that captured the conversation about steering close to shore was played. The captain testified that he had done similar manoeuvres in the past. Captain Nandeshwar admitted having left the bridge to go to the previously reported birthday party taking place in the crew mess. The captain confessed for the first time that he had been drinking at the party so he did not want to intervene in the navigation when he returned to the bridge. According to the chief officer the captain was seated in the pilot's chair using his phone whilst trying to get a signal when the MV Wakashio vessel went aground. The captain then issued commands trying to back the vessel off the reef after grounding.

Local media reports some fresh details that emerged in court that two of the vessel's ballast pumps were not working due to a short circuit preventing the ship from fully deballasting after the grounding. Engineers also said they were concerned about causing an environmental issue if they deballasted polluted water to which the investigators highlighted that the regulations permitted the ship to dump mixed water in an emergency that was endangering the ship. The Japanese shipowner and the ship manager are took responsibility for the failures of the crew and they presented new policies and procedures that were designed to address the deficiencies and improve the safety and operation of their ships.

DEALING WITH WASTEWATER IN INDUSTRY

By Wadzanai Manyame

DEALING with wastewater in industry is one of the most controversial issues in industry as practitioners continue to bash their heads on how best to manage their wastewater in order to draw less fines and pose less harm to the environment. Manyame River, lake Chivero, Umguza Dam are some of the water bodies that have been heavily affected due to poor management of industrial wastewater in Zimbabwe. There are more far reaching implications that stem off from the poor management of industrial water and these go from destruction of water bodies and aquatic life, shortage of fresh water resources, acute and chronic health effects on humans and animals, to contributing to the global threat which is climate change.

Each year companies in the Zimbabwean industry apply for licensing under the Environmental Management Act Statutory Instrument 6 on Effluent and Solid Waste disposal Regulations 2007, which operates on the polluter pays principles. A principle that allows companies to discharge their waste into the environment at a cost. In times where industrialization has taken over the world as a main driver of the economy, the value of the environment in sustaining the process should be acknowledged. The fate of critical industrial outputs such as wastewater should be considered before releasing it into the environment no matter how much fine will be paid to compensate it. The truth is the money will never be able to compensate the damage caused and all its ripple effects. Instead human lives can be lost, livestock can be lost, fertile agricultural land can be made barren and more money could be required for cleaning up in the event of hazardous contamination.

Industrial waste water which can also be termed effluent is water that has been used for different processes during manufacturing of different products in industry and is now being regarded as useless, unclean, unwanted, and contaminated and has to be discarded. The wastewater comes from cooling processes, washing activities, and the actual product processing as well as contaminated storm water. This effluent based on the different processes it would have gone through is no longer in its pristine state as it constitutes foreign physical, chemical or biological

components and even heavy metal elements such as lead and zinc which cause detrimental environmental and health impacts on the environment and its inhabitants.

It is always key to ensure that wastewater treatment is done before releasing it into the environment. Different methods can be employed in the management of wastewater before its discharge and the industrial symbiosis concept can also be applied when dealing with wastewater. Chemical buffers can be used to neutralize acidic or alkaline components of wastewater to ensure that it remains neutral, a favorable pH for the environment. These can also be used to stabilize other chemicals in the waste water or coagulate metals to allow them for their removal before discharge into the environment. More natural processes can also be used which include the use of bacteria (bioremediation) and plants (phytoremediation) for nutrient and metals uptake thereby reducing the biological oxygen demand, chemical oxygen demand, nitrogen, phosphorous, potassium components and other nutrients that could be an environmental nuisance as well as up taking harmful metals such as cadmium, zinc and lead.

Chemical treatment of wastewater is done in a mechanized plant and can be done in a matter of hours. The method does not require a lot of space and time but can be expensive as it requires constant purchasing of chemicals and maintenance of the treatment plant. It is also not the most effective treatment method because it constitutes adding a chemical to the wastewater which could in turn accumulate in the environment overtime and pose harm. Waste stabilization ponds and constructed wetlands can also be used as treatment methods where bioremediation and phytoremediation can be incorporated. The use of natural methods allows to bring a balance in the ecosystem as there will be no foreign chemicals involved. This method however is time consuming and requires a lot of land for the ponds to be set up. A luxury which cannot be afforded by most of the industrial companies in our country.

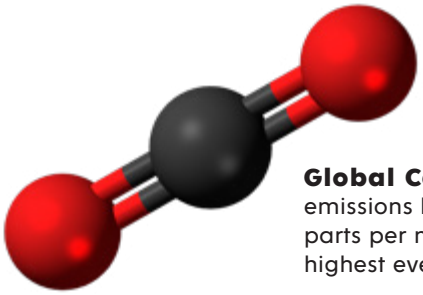
A circular economy is the new trend and phenomenon sustainability practitioners are trying to push for. This concept is an economic system aimed at eliminating waste and allowing for the continual use of resources. Circular economy embraces industrial symbiosis a concept that can also be adopted in dealing with wastewater in industry. With resource scarcity and water shortages instead of discharging waste water into the environment, the wastewater can be treated and used for other developmentally beneficial processes such as in the agricultural sector. Through industrial symbiosis wastewater discharge can be reduced by 90%, fresh water bodies can be saved from contamination by about 40%, 95% of the nutrients contained in the wastewater can be recovered and can be used to produce up to 4.19% of total chemical nitrogen-based fertilisers. This practice is already being implemented BIOAZUL in Spain, funded under Horizon 2020 a European Commission's Research and Innovation Programme.

Wastewater treatment as old fashioned and dirty as it might sound, is a process that is key in the management of the environment and should be done to ensure sustainable practices.

GREEN BUSINESS GAZETTE

DID YOU KNOW?

There are over 30 000 known species of fish in the world

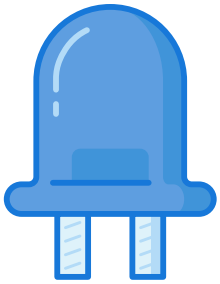


Global Carbon Dioxide emissions have risen to 416 parts per million (ppm) – the highest ever in human history

2019

is the second hottest year in the history of mankind

EVERY ZEBRA HAS A UNIQUE PATTERN OF BLACK AND WHITE STRIPES.



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