GREEN BUSINESS GAZETTE

ISSUE 6

Towards Green Growth

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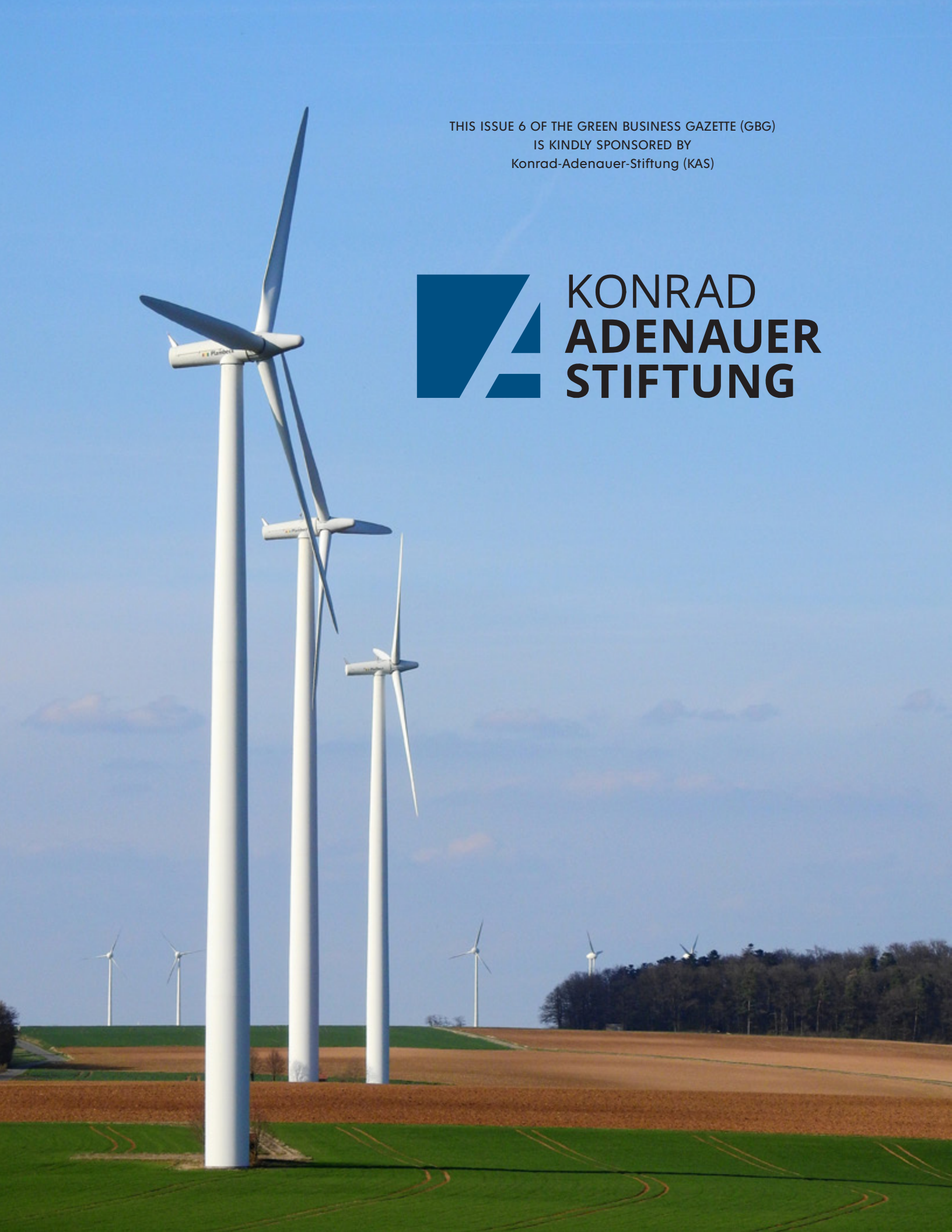
Safe Chemicals Management

Reflecting On World Environment Day

An Uncertain Future With Climate Change



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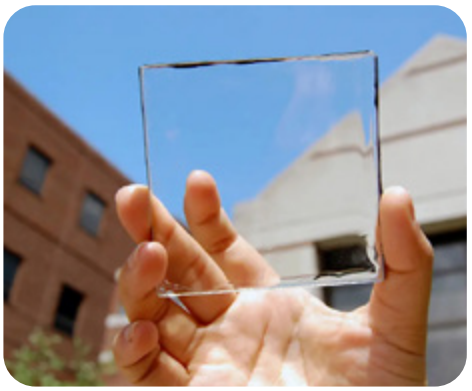

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FROM THE EDITOR'S DESK

Greetings to our readers – both old and new! Welcome to our fresh looking Issue 6 of the Green Business Gazette (GBG). The journey we have travelled so far has been intriguing and enriching. Being the first environmental sustainability magazine in Zimbabwe, has given us a pioneering spirit to lead the way in providing environmental news and information. Special mention to our funding partners, Konrad-Adenauer-Stiftung, who have made Issue 6 a possibility through their kind support. The Green Business Gazette attains its first anniversary in the month of June 2021. It has been through the support of our readers, advertisers, sponsors and subscribers.

In this issue, we continue to explore innovative ways of attaining a Green Economy. Issue 6 is being released in the month of June when we commemorate the World Environment Day which is being celebrated under the theme ecosystem restoration. Ecosystems play a key role in providing natural resources, providing life support functions and facilitating aesthetic enjoyment. However, due to human activities, ecosystems are facing degradation and damage. May all our readers use World Environment Day as a turning point towards environmental sustainability. The issue reports on the launch of the latest books on climate change in Zimbabwe by Konrad-Adenauer-Stiftung (KAS). These books draw experiences of different stakeholders on issues of climate change.

We delve into the issue of hazardous chemicals in food and issue chilling warnings to consumers to watch out for dangerous chemicals in their diet. The reason for this information is to enhance the process of decision-making towards foods which are not heavily laden with chemicals. Mercury is used in many countries and especially in the small scale mining sector. In this Issue of the GBG Magazine we assess the dangers of mercury and how we can prevent the damage to human health and environment.

Have you ever wondered where your hair goes after you visit the barber? In this issue we explore hair waste and some of the developments happening globally in managing hair waste. The current issue also assesses new technologies in the renewable energy sector including invisible solar panels. Yes, you got that right! Invisibly generating energy from the sun.

The Editor in Chief and the Editorial Team would like to thank all those who have accessed copies of the Green Business Gazette in different parts of the world. Your tremendous support cannot go unnoticed. The call for a green economy is with us forever and the world is at a point of no return. Green Growth is the only way out of the crisis.

Tawanda Collins Muzamwese
EDITOR IN CHIEF

THE WORLD STEPS UP **SAFE CHEMICALS MANAGEMENT**

GLOBALLY there are more than 100 000 chemicals in use. Furthermore, new chemicals are at an advanced stage of development. Although beneficial, chemicals also pose significant risks to human health and safety.

We encounter chemicals in everyday life due to their multiple purposes. Chemicals are essential as raw materials of industrial processes, pesticides for fumigating crops, pharmaceuticals, painting and mineral processing. Some chemicals are contained in detergents and household cleaning substances such as bleaches. The transport sector also relies on chemicals from the processing of crude oil. Substances such as gasoline and kerosene are essentially chemicals which can ignite to cause combustion processes and endless fires.

Chemicals have the potential to cause physical injuries if improperly managed as well as causing damage to environmental resources. Pollution of water bodies can arise due to chemical spillages. The effect of chemicals is further worsened by lack of awareness amongst communities on the dangers of chemicals.

Consumers should be educated on the hazards of chemicals and also be able to read chemical labels. This can enable consumer pressure to be exerted on hazardous chemicals. Alternative substances to hazardous chemicals also help to reduce the burden caused by hazardous chemicals.

In agriculture, extensive usage of pesticides is well known to cause water and land pollution. Farmers can adopt new farming methods such as integrated pest management, natural enemies and crop rotations.

Paint manufacturing also presents dangerous chemicals such as lead in paint. Alternative paints should be "lead-free". In order to achieve this milestone, collaboration is necessary amongst key stakeholders including manufacturers, governments and civil society.

Small scale miners "makorokoza" also continue with the use of mercury and cyanide in the gold processing activities. These chemicals have potential to pollute water bodies in and around the world. Through training on safe chemicals management, alternatives should be prioritised.

A chemical intensive economy is resulting in children born with birth defects, hormonal disturbances, illness and fatalities in humans and selected organisms.

FROM THE EDITOR'S DESK

World Environment Day

A Time to Reflect

THE MONTH of June, is a time to reflect every year, due to the symbolic significance of the environment. World Environment Day, which falls on 5 June, provides an opportunity for the whole world to pose and reflect on our dealings with mother nature. In the year 2021, focus is on Ecosystems Restoration.

The world is faced with several challenges ranging from waste generation, climate change, biodiversity loss, energy crises, air pollution and depletion of the ozone layer. An increasing world population also poses serious challenges to the ability of the earth to regenerate resources.

In your country, province or community, take time to spare a thought for the environment. Do something meaningful for the future generations, plant a tree, recycle waste, service your automobile to enhance its efficiency, adopt cleaner fuels, save water at home, cut on unnecessary flights and preserve nature.

The culture of commemorating World Environment Day (WED) should be passed to our future generations. Action against environmental problems should start now and not wait for the future.

The United Nations launched on 5 June 2021 (World Environment Day) the World Decade on Ecosystem Protection. Focusing on ecosystems in the next decade offers opportunity for saving the earth from unsustainable degradation, restoring ecosystem functions, enhancing provisioning functions and upholding aesthetic value.

Although the World Environment Day commemorated on 5 June inspires us to care more for the environment, greater focus should be placed on making the environment an issue on the agenda every day of our lives. The world cannot afford to live on a borrowed future due to lack of environmental stewardship.

From the Editorial Team of the Green Business Gazette, we wish all stakeholders, governments, corporates, civil society, communities and our readers a Happy Environment Day on 5 June and we encourage environmentalism beyond just this day. Our environment needs all of us to take action in order to avoid a crisis of our generation.

KONRAD-ADENAUER-STIFTUNG (KAS) LAUNCHES BOOKS ON CLIMATE CHANGE

Tawanda Collins Muzamwese

The Konrad-Adenauer-Stiftung has launched books on climate change in Zimbabwe. The launch is a culmination of the tireless work undertaken by the Germany headquartered institution in collaboration with local stakeholders. The books provide key insights into the phenomenon of climate change as well as its impacts.

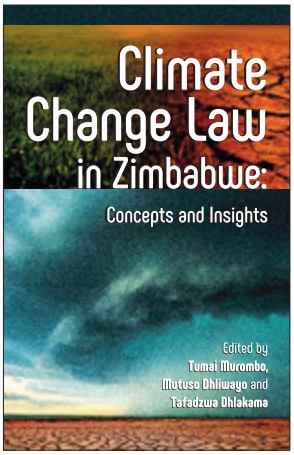
The books were developed in collaboration with cutting edge authors specialised in environmental protection. Speaking at the launch, Ms Anna Hoffman-Kwanga, the Country Director of KAS reiterated the commitment of the institution to help deal with climate change as well as the importance of knowledge generation through publications.

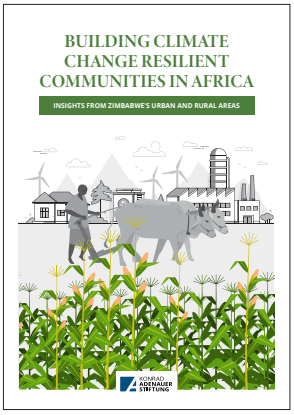
A wide variety of stakeholders from government, civil society, private sector, academia and development banks attended the event. The launch was held at the KAS offices in Alexandra Park Harare.

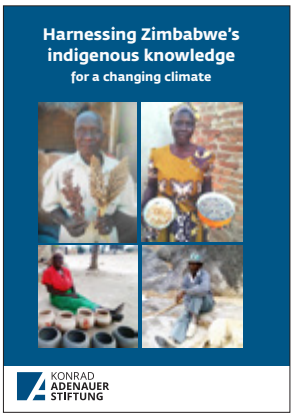
One of the publications "Climate Change and Law - Concepts and Insights" delves into the insights related to policy and legal requirements related to climate change in Zimbabwe. A legal and policy review is undertaken to identify legal platforms and governance of climate change in the context of law. The compendium of publications also includes "Building Climate Change Resilient Communities in Africa: Insights from Zimbabwe's urban and rural areas", which includes insights from both rural and urban perspectives. The launch also consisted of an innovative book earmarked for the media fraternity explaining the role of the media in climate change and sustainability. The book entitled, "The Role of the Media in Environmental Discourses", assists media practitioners to understand fully their role in mainstreaming sustainability. Another publication, "Harnessing Zimbabwe's indigenous knowledge for a changing climate" was launched at the same event celebrating the importance of indigenous knowledge systems in climate change mitigation and adaptation. For a long time, communities have used their traditional and indigenous knowledge to predict weather events as well as point out climate change impacts. This book is also translated into local languages including Shona and IsiNdebele.

The books respond to local needs and emerging disasters such as Cyclone Idai which affected Chimanimani and Chipinge in the Eastern part of Zimbabwe. On the other hand, the books also offer new insights to deal with the rising climate risks. A panel discussion was undertaken by some of the selected authors to provide a rare opportunity for readers to have a close interaction with the creators of the climate knowledge products.

As the climate change discourse proceeds, there is need to have factual information developed by experts in the field. This will help in combating climate change and setting a foundation for resilient communities. The collaboration between KAS and local stakeholders in developing home-grown publications is a key strategy for ensuring that Zimbabwe meets its Nationally Determined Contribution (NDC) targets. Some of the publications help farmers to adopt drought resistant crops in the age of climate change. The support and sponsorship from the Konrad-Adenauer-Stiftung to the people of Zimbabwe is evidence of the commitment of the German community towards scaling up Sustainable Development Goals (SDGs) in developing countries such as Zimbabwe.







SHOULD WE WORRY ABOUT CHEMICALS IN OUR FOOD?

by Bright Beven Chituu

Food is a crucial contributor to human health and well-being. However, the emergence of diseases caused as a result of chemicals in food is beginning to cause concern. Over the last few decades, the number of chemicals supplemented to food and other products we eat has skyrocketed. Nearly 2,500 chemical elements are deliberately added to foods in form of additives, artificial sweeteners, preservatives, anti-oxidants, stabilizing agents and food colours. These chemicals are truly everywhere, and impossible to avoid completely.

The use of chemicals in food has a long history. The first deliberate use of a food additive was in form of salt in order dehydrate foods such as fish and meat, so as to limit bacterial growth. In ancient China, paraffin wax was burnt to ripen fruits and this worked as it caused traces of ethylene and propylene to combine with the food. The Egyptians coloured food with saffron, while the Romans added alum (potassium aluminum sulfate) to bread to make it whiter. In the very early 19th century, a new preservation technology was developed in response to the military need for preserving food during the Napoleonic wars. Concern about the toxicity and carcinogenicity of additives intensified in the middle of the 20th century, as analytic chemistry made detecting and measuring additives easier.

To preserve the taste, freshness, and colour of the foods, even fresh fruits and vegetables are loaded with chemicals and preservatives. Majority of the chemicals occurs through naturally occurring toxins and environmental pollutants or during the processing, packaging, preparing, storage, and transportation of food. When undesirable chemicals are consumed occasionally, they potentially cause health effects, such as allergic reactions and/or adverse effects on organs or physiology (toxic effects). Examples of toxic effects include gastrointestinal symptoms, kidney damage, liver disease and impairment of the nervous system. Some toxic effects are temporary, but the effect may sometimes be permanent. It is in this context that food contamination often breaks into the headlines as a result of its harmful consequences.

Nearly 500 years ago, Swiss physician and chemist

Paracelsus voiced the basic principle of toxicology: "All things are poison and nothing is without poison; only the dose makes a thing not a poison." In other words, any chemical—even water and oxygen—can be toxic if too much is ingested or absorbed into the body.

Phthalates might get into fast food if the food comes into contact with plastic packing or PVC tubing (used in food processing) that contains the chemical.

Considering the adverse effects caused by chemicals in food, it is advisable to pay special attention to what you eat. Avoid junk as much as possible and make sure you wash the fruits and vegetables with care. Although, the government regulates such chemicals in the eatables by prescribing minimum limits that are safe for human consumption yet measures still need to be taken to curb food contamination entirely. Therefore, a variety of food needs to be inspected and analysed for the presence of chemical contaminants. To reduce your toxic chemicals in food, one is recommended to buy organically grown food or organically produced dairy products. The term "organic" means plant crops have been grown without chemical pesticides or fertilizers. Organic also refers to meat, poultry, eggs, and dairy products raised/produced without being fed growth hormones or extra antibiotics when they are healthy. These organic foods come from animals that have been fed organic grain and other feed.

The extensive use of pesticides in agriculture also passes chemicals into the food chain and ultimately to human beings.

ZIMBABWE'S ARTISTS TO ESTABLISH EDUCATIVE ENVIRONMENTAL ART WALL

By Wallace Mawire

LOCAL ENVIRONMENTAL artists in Harare are working on an initiative to establish an environmental art wall at Borrowdale suburban area.

According to Miracle Missions Trust, a picture mosaic is being developed by a group of environmental artists with an aim of communicating environmental messages.

It is reported that the initiative is being led by Miracle Missions Trusts The initiative is also reported to be part of the World Environment Day celebrations.

The picture mosaic will also be made using recycled waste. The World Environment Day is commemorated on the 5th of June each year.

It is reported that the Pomona Dumpsite in Harare has suffered several major fires in 2013, 2016 and 2020, creating both an environmental and health hazard to residents of the city of Harare and its close environs.

It is added that a fire prevention team has been set up and it is believed that the Pomona Mosaic Art wall will create an environmental awareness of the dangers of burning waste and play a part in reducing waste at Pomona. It is also anticipated that the initiative will encourage citizens to adopt a circular economy.

According to Sharon Hook, a Trustee at Miracle Missions Trust in a presentation on practicing waste management in communities to achieve a circular economy, a circular economy is a model of consumption that focuses on the extension of a product's life through reducing, reusing, repairing, recycling existing materials.

"Through this way, the demand of new products and waste production is reduced from our environment. Communities can make a difference by practicing the principles of waste management which are reducing, reusing, recycling, repairing and recovering," Hook said.

Chris Whyte, a Specialist Consultant at Chris Whyte and Associates and Executive Member and Country Leader for South Africa for the African Circular Economy Network in a presentation on transitioning to a circular economy where waste is a resource and not just about recycling, said that there is a need to change communities' thinking to understand the impacts and outcomes of waste as a resource. He said that there is need to change the narrative where waste can be used as a resource that delivers benefits such as social upliftment, skills development, economic development, energy, water and wastewater, infrastructure and housing, manufacturing, food security and climate change mitigation.

The initiative will involve the collaboration of seven artists and three student artists.

It is also expected to be an opportunity for high school environmental and art departments to develop a panel on climate change for the Pomona Art Wall, a garden competition to design and develop a section of the 190 metre pathway, developing a safe bus stop for all going to Hatcliffe, Domboshowa and beyond. It is reported that artists will make recycled dustbins, benches and plant holders, piloting a cycle track inspired to link two cycle tracks.

The goals of the initiative are to use art to inspire and educate communities about the dangers of burning waste and the importance of a circular economy and reducing waste to landfills; bringing communities together in a city project to make a difference in Harare dubbed the Sunshine City; creating an opportunity for artists and students to share their talents; earn some income during the hardships caused by Covid-19 and opening doors for other similar projects; raising public awareness of the principles of waste management and supporting the "Green Initiative" launched in Zimbabwe and sharing the vision of being a world class city.

According to Miracle Missions, the partners in the initiative include the National Gallery of Zimbabwe, Environmental Management Agency (EMA) and the City of Harare.

THE SHINNY SOFT KILLER - MERCURY

Tawanda Collins Muzamwese

Mercury, is a unique metal that exists in liquid form at room temperature. It is the only metal which can flow as a liquid at ambient temperature conditions. Its use in small scale mining operations is on the rise. However, there are associated risks to human health and the environment. These risks include effects on the nervous systems of young children.

Historically, mercury has been proven to be toxic since the days of the Minamata Disaster in Minamata, Japan in the year 1956. The disaster was characterised by the Minamata disease consisting of damage to nervous systems, muscle weakness, loss of vision, paralysis and effects on foetuses in gestation.

Fast-forward to Zimbabwe's small scale mining sector, there is a casual use of mercury amongst miners, insecure transportation and disposal in water bodies. Mercury kills if it is not properly handled. It is highly likely that some miners are being exposed to highly toxic levels of mercury in mining communities. Awareness is necessary and provision of Personal Protective Equipment (PPE) should be a pre-requisite.

Not only should society be worried about mercury in mining sector, but also in dental fillings when they are burnt during cremation of human bodies. Some selected skin lightening creams, pulp and paper industry and coal fired plants are considered as sources of mercury emissions. Stakeholders in such sectors should increase their level of monitoring to detect any traces of mercury in their processes, activities and products.

Global attention on mercury has resulted in the promulgation of the Minamata Convention which was signed in 2013 and became effective in the year 2017. It aims to protect human health and the environment from the anthropogenic releases of mercury and mercury products.

MERCURY - A SOLUTION TO OUR ECONOMY AND A THREAT TO OUR ENVIRONMENT?

By Sipho Graham Ndebele

Naturally found in the Earths' crust as a compound, mercury is essential yet toxic, a metal yet liquid, at room temperature. It is formerly known as hydrargyrum (Hg), a Latin word meaning water silver, derived from its shiny liquid metallic form. It has a high density with a high rate of thermal expansion which makes it useful for weather forecast by detecting weather using a barometer and medical examination by testing body temperature using a thermometer.

Mercury easily blends with gold to form amalgam making it suitable for gold mining as it easily recovers fragments of gold from the soil and sediments. About 25 tonnes of mercury per year is being used in Zimbabwe due to the rise of gold mining which is growing in the country and significantly contributing to the economy. The sector contributes between 10% and 60% of the country's Gross Domestic Product and exports respectively. Despite its usefulness, mercury is a heavy metal and persistent. It does not easily degrade in the environment, rather it interacts with other compounds, micro-organisms, plants and animals resulting in negative effects.

The United Nations Environment Programme, Global Mercury Assessment of 2018 revealed that globally, artisanal and small-scale gold mining is the largest source of human activities mercury emissions with a contribution of about 37%, followed by stationary combustion of coal, non-ferrous metals production, and cement production each contributing about 21%, 15% and 11% respectively. This significant release of mercury into our environment is alarming, but time is still on our side to call for action to save our planet before we destroy it to a point of no return.

In Zimbabwe, women have taken a step in the gold mining business as it pays hard cash in USD dollar currency. Due to gender equality being applied in all sectors, women are now actively engaging in gold mining processes where they are concentrating and crushing ore. To make extra cash, women are re-processing the dumped tailings to extract traces of gold left in them. This act is putting women's health at risk as they usually operate without sound control measures and personal protective wear.

Mercury has various sources, naturally it comes from weathering of mineral rocks during soil formation, natural disasters through volcanoes and wild forest fires. As humans, our business-as-usual model contributes to mercury pollution by burning of coal at our power plants and industries for energy and electricity which vapours traces of mercury into the atmosphere. Mining gold to produce jewellery and electronic devices generates waste rock (tailings), and disposing off waste at dump sites and landfills especially electronic waste releases certain amounts of mercury into the soil, surface and ground water.

The high density of the mercury, gives it precedence in weather forecasting purposes that is why we get to watch the weather forecast to stay informed. Doctors use thermometers to test our body temperature before diagnosis, the red liquid which fluctuates in the thermometer is mercury, credit to its high rate of thermal expansion which is fairly constant over a wide range of temperatures. In recent years, digital thermometers are being preferred over mercury thermometers. The sun provides us with natural light but when it is at night, we need alternative sources of light. Batteries and fluorescent lights use mercury to store energy and generate light.

Mercury was known to the ancient Chinese, Egyptians and Hindus and it has been found in Egyptian tombs dating back to about 1500 B.C. The resource application is old as time and so are its impacts, despite being recognised and reported in 1865. Gold is a precious and valuable metal, it is blended with mercury to remove impurities and then boiled to extract pure gold releasing mercury as vapour into the atmosphere. The separation of mercury and gold require physical interaction. Most artisanal miners usually do not make use of applicable personal protective clothing. This behaviour puts them at great risk. Being exposed to mercury for long periods leads to mercury poisoning which has potential damage to key organs such as the eyes, ears and kidneys. Mercury is also known for impairing the health balance of unborn babies harming their developing brains and nervous systems when a pregnant woman is exposed.

On a daily basis, we use tools with mercury such as thermometers or fluorescent bulbs, they are hazards and they need to be handled with care. However, if a fluorescent bulb breaks, it releases mercury as vapour which can be inhaled. Inhaling mercury can damage the nervous system, disrupt kidney functions and cause eye irritation. That's why florescent bulbs are fragile and require cation. Mercury has a number of effects on human health such as; DNA and reproductive system distortion, allergic reaction and brain functions damage just to mention a few. Mercury also has effects upon the environment by accumulating in plants and polluting water and soil.

Mercury in soils and water is transformed by micro-organisms into methyl-mercury, a highly toxic organic molecule. The organic molecule is absorbed by mushrooms, algae or phytoplankton or fish resulting in bioaccumulation. Bioaccumulation is the accumulation of a toxic chemical in the tissue of a particular organism. The contaminated plants and fish are then eaten by animals the same process is done on each level of the food chain which adds up the concentration of mercury on each food chain level resulting in biomagnification. Biomagnification is the increase in concentration of a toxic chemical in the tissue of a particular organism. The higher an organism is on the food chain, the more deadly it is. Acceptable recommended levels of mercury should not exceed 5.0 ug/L in a person's whole blood.

Our business-as-usual model will land us in unfavourable conditions. We need to steer our ways towards sustainable mining and production in order to save our planet. The Minamata Treaty is a legislation body with 128 signatories which provides guidelines on mercury emissions controls. Its implementation drives mercury pollution control by mining sustainably to attain high gold production without damaging the environment. Our planet's fate lies in our hands, think globally, act locally.


“A tree is our most intimate contact with nature.”
– George Nakashima
GREEN BUSINESS
GAZETTE

Waste Human Hair – An Environmental Nuisance Or Resource?

By Tawanda Collins Muzamwese

THE NEXT TIME you go to the barbershop, take interest into how the hair removed from your scalp is managed and disposed. Globally, the issue of human hair has escalated to a level where solutions are now being sought on how to manage this waste stream.

Hair is mainly made up of protein and organic substances but it takes a bit of time to degrade in the environment. When it decomposes anaerobically, it generates Greenhouse Gases which can cause climate change. Global efforts are geared towards innovation to translate hair into organic fertiliser. This is of course associated with ethical and cultural objections in some countries.

Most barber shops dispose human hair into waste that ends up at landfills, whilst in developed countries, waste hair can be recycled. Although it can decompose, hair takes a long time to degrade in ambient air conditions. It can also be a nuisance in water bodies if left to flow together with wastewater.

Burning waste hair releases greenhouse gas emissions which are detrimental to the environment and drive the onset of climate change. Most of the innovative technologies of dealing with hair are resisted due to the cultural and mythical aspects placed on hair in countries which are culture-centric. One 50-year old man interviewed by the Green Business Gazette mentioned that hair is a symbol of strength and life, therefore should not be manipulated after it is cut off.

Managing waste human hair is very essential as a means of promoting a green economy. Developing value added products from waste hair also creates green jobs and income generation. As early as 1300BC recycled wigs were made in the beauty and cosmetics industry. Wigs could be used by those without adequate hair, ageing people, those with hair falling off or as a fashion statement. Use of wigs has become a common phenomenon in many countries, making use of hair from others. In this way, the environment is protected from tonnes of hair waste.

Critics of recycling and manipulating hair in religious circles propose that no one should share their hair with another person as hair symbolised vitality, spirituality and longevity. Those who anchor on scientific beliefs, postulate that hair can be used by another person as long as the previous owner has cut off and disposed the hair.

Other options of using waste hair in some countries include staffing mattresses with waste hair. In other circumstances, hair has been used as an absorbent material for dealing with oil spillages. In the year 2020, Australia collected more than 10 000 tonnes of hair to ship to Mauritius which was dealing with a 4000 tonnes oil spill involving VS Wakashio Ship in Mauritius. The hair was to be used as an absorbent material. "Hair booms" staffed with hair have become a common phenomenon in dealing with oil spillages in many countries. The circumstances vary from country to country and lessons have to be transferred with consideration of context.

Feel free to share with the Green Business Gazette your experiences in waste management related to waste human hair.

GREEN BUSINESS GAZETTE

A transition to clean energy is about making an investment in our future.

AN UNCERTAIN FUTURE. HOW CLIMATE CHANGE IS CHANGING OUR LIVES

by Wadzanai Manyame

Regions around the globe are defined by their climate. Different areas around the globe experience different climatic conditions and these define how different species survive. Species have adapted to the climatic conditions in the area they live and have managed to survive for centuries, reproducing and finding food and water for survival in the environment around them. All this is about to change. In fact, changes have already begun.

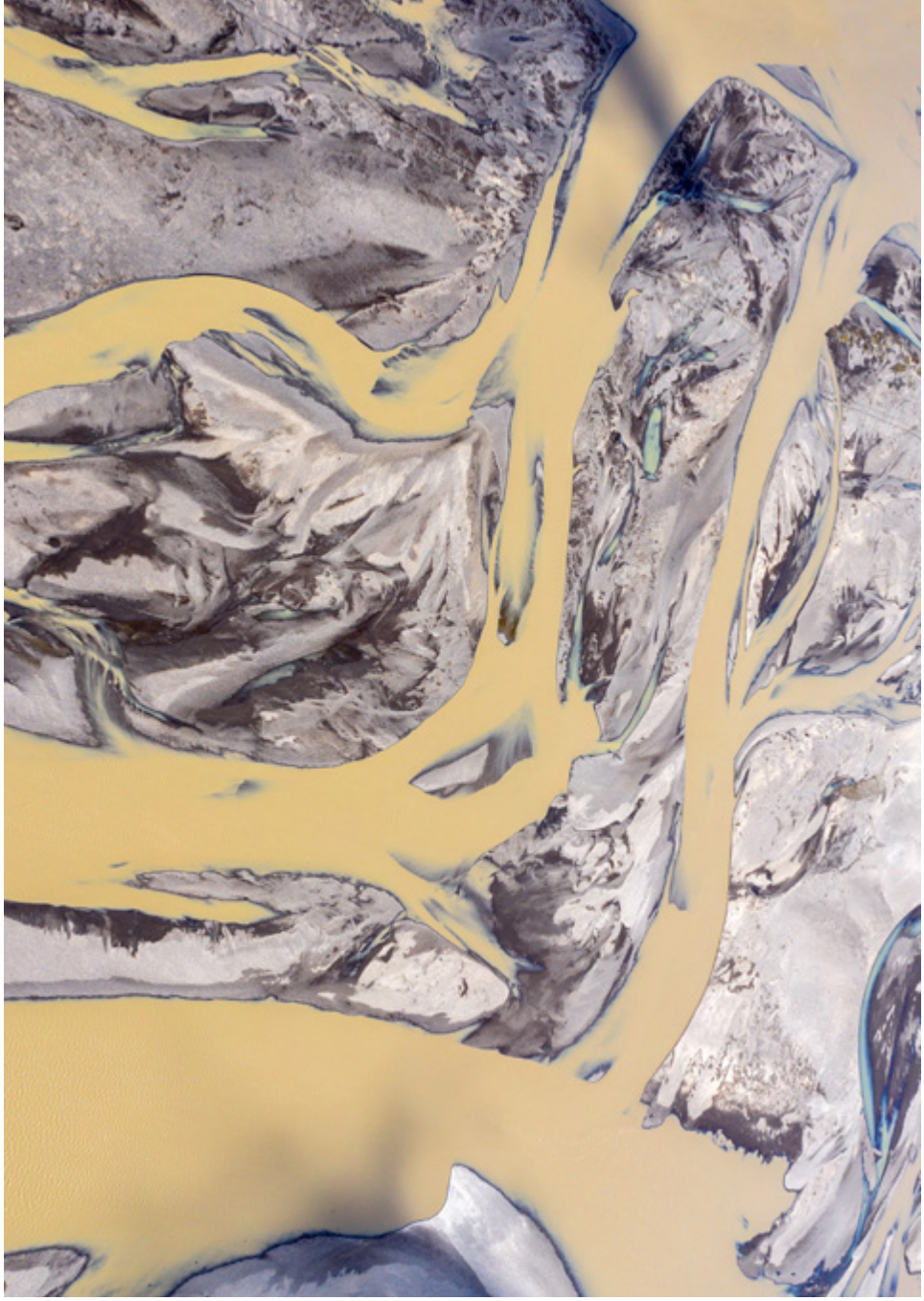
The National Geographic Society defines climate change as the long-term shift in temperature and typical weather patterns which can be identified by changes in the mean and/or the variability of its properties using statistical tests. The Intergovernmental Panel on Climate Change (IPCC) refers to it as any climatic change that occurs over time, whether it is as a result of natural variability or human activity. Whilst the United Nations Framework Convention on Climate Change (UNFCCC) argues that it is change attributed directly or indirectly to anthropogenic activities which have brought change to the global atmospheric conditions adding on to the natural climate variability over a long period of time. The climate is an important aspect of the environment. It defines the temperature patterns, precipitation patterns, wind direction and force which further affect different aspects of the environment tempering with life supporting elements such as water, forests and land for produce. Climate change has a ripple effect on the environment and is proving to be a life threatening phenomenon if it continues unabated. Climate change related events are on the rise and this is changing peoples' lives and way of living. Changes in land cover and land use attributed to climate change are being noted, lives are being lost, disease outbreaks are being experienced, infrastructure is getting destroyed, farm lands are being swept away in floods and some burnt in veld fires.

Extreme weather events are a critical element of climate change. An increase in the frequency of extreme weather events such as cyclones, tornadoes and floods is being recorded. These events destroy the land by causing land degradation through gulley formation, infrastructural destruction and farm land destruction. It leaves a population homeless, stranded with no safe and sufficient food or water to drink. No workplaces to go back to and no hospitals to seek medical attention from. Cyclone Idai which hit Zimbabwe and Mozambique in 2019 is one such event that left people exposed to such devastating and life changing scenarios. Road networks were destroyed and so were homes and schools.

Veld fires cripple ecosystems, biodiversity in forests and open land is lost, animals die and valuable native plants are burnt, some which might never be able to sprout again. Veld fires affect soil fertility and can trigger the proliferation of invasive species especially those which favour harsh conditions such as the Opuntia fulgida in Gwanda. The released carbon dioxide and other greenhouse gases from the burning contribute further to global warming and also pose a risk to the humans in the surrounding areas especially those with pre-existing

health conditions such as asthma. Millions worth of property is lost and the environment is degraded. The destruction of forests and farmlands by these fires threaten the food security of a population leading to cases of malnutrition being recorded. Natural tree, herbs and plant medicines get burnt in the fires leaving the humans exposed and vulnerable to different health ailments which can threaten their lives without the medicinal herbs to treat them.

The proliferation of invasive species attributed to climate change threatens agriculture and food security. The changes in temperature, precipitation and frequency of extreme events influence specie distribution and growth. Invasive alien species favor harsh conditions and survive better outgrowing the native plants. Once fertile land or grazing lands are invaded and their productivity levels are reduced. People are then forced to change their way of survival. Most small-scale farmers are being forced to neglect farming to venture into small scale mining or migrate to the big towns in search of a means for survival. Hunger and malnutrition is becoming a norm in the agriculture depended rural areas of countries in the Sub-Saharan Africa.



Another climate change phenomenon that is tempering with the agricultural production is drought. Droughts are being experienced more often and these are attributed to climate change. Temperatures have warmed over the past century and the prevalence and duration of droughts have increased especially in the dry and relatively dry areas. It has been envisaged to become drier with the continual increase in temperatures and atmospheric warming. Zimbabwe one such country which is on rain fed agriculture and in 2018-2019 it was hit by one of the worst droughts in decades, leaving over 7.7 million people living with food insecurity. According to UNICEF, nearly 1 in 3 children in Zimbabwe under five are suffering from malnutrition, while 93 per cent of children between 6 months and 2 years of age are not consuming the minimum acceptable diet. The incidence of Pellagra, a deadly disease linked to micro-nutrient deficiency is also on the rise.

According to the National Geographic Society, research confirms that climate change is altering the structure and function of aquatic and terrestrial ecosystems. The rise in temperature, changes in seasonality, increased frequency and magnitude of extreme events, as well as the acceleration of the hydrologic cycle will shift ecosystem types, process rates, and connections to other ecosystems. A noted example is that of Lake Tanganyika which has been known to support a highly productive pelagic fishery that is currently producing 25–40% of the animal protein supply for the people in the surrounding countries. A rise in surface-water temperature has increased the stability of the water column due to the regional warming patterns since the beginning of the century. A regional decrease in wind velocity has contributed to reduced mixing, decreasing deep-water nutrient upwelling and entrainment into surface waters. Findings show that the carbon isotope records in sediment cores suggest that primary productivity may have decreased by about 20%, implying an estimate of 30% decrease in fish yields. If overall fish yields decrease it means fish availability on the market will be reduced, thus food shortages.

The community that survives on fishing will be affected as it will no longer have a source of income for the sustenance of their lives leading to increased cases of poverty and food insecurity. The economies will also suffer.

Climate change is influencing disease patterns, with the increase in temperature and occurrence of flash floods and cyclones, environmental conditions suitable for vector breeding are formed. Studies have shown a positive correlation between climate change and increase in mosquitoes and malaria cases in Africa, in the Eastern Highlands and the sub-Saharan Africa. In some areas where temperatures have lowered, cases of malaria have decreased but unfortunately in Africa malaria is still a threat to human health. Cases of communicable diseases have also been recorded after experiencing climate change related weather events such as a cyclones and droughts. The destruction of water and sanitation infrastructure and water shortages respectively leading to poor sanitation contribute to the rise and spread of diseases such as cholera and typhoid.

Climate change is also accelerating sea level rise as a result of oceans warming and expanding, and glacial melting. This change in the aquatic environment results in saltwater intrusion into fresh water increasing salinity of groundwater basins and well water, as sea levels rise. The rise in salt levels in fresh water systems reduces crop yields and the availability of safe drinking water. It also increases the risk of hypertension, as well as vector borne and diarrheal disease.

Indigenous communities that practice subsistence farming and fishing are particularly vulnerable to the impacts of sea level rise on freshwater ecosystems. Low-income communities face greater challenges from food security as saline intrusion disrupts agriculture and availability of safe, reliable drinking water whilst low-income individuals disproportionately lack disaster insurance and often lack access to resources to recuperate from property loss, placing them at greater risk for destabilization and displacement from floods or submergence related to sea level rise.

Climate change tempers with a number of factors that are key to the survival of human beings. If it continues unabated, chances are the situations will worsen and the survival of humans will be threatened. Mitigation and adaptation measures should be employed to safeguard human life and the future. If climate change continues at this rate; agriculture and business will be threatened, whereas the health sector will be threatened, leading to survival becoming unbearable for people on this planet.

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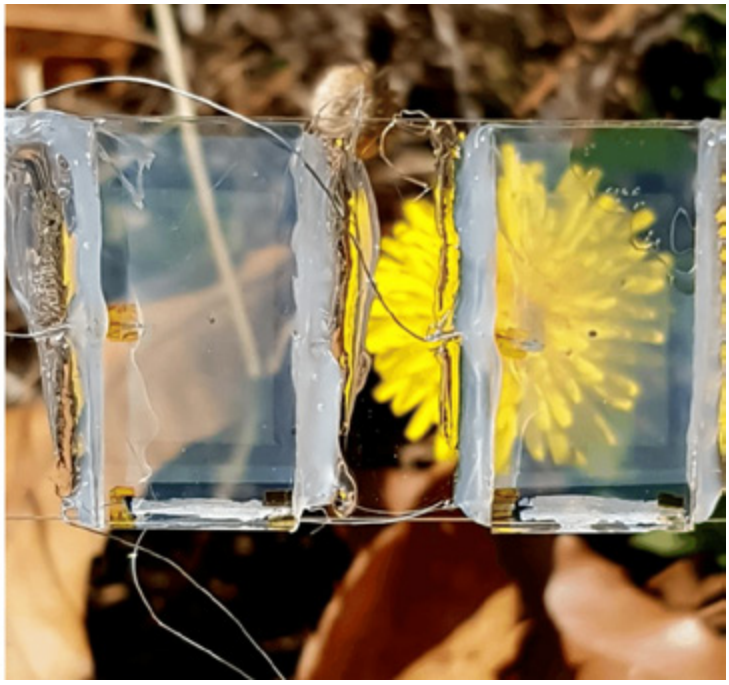
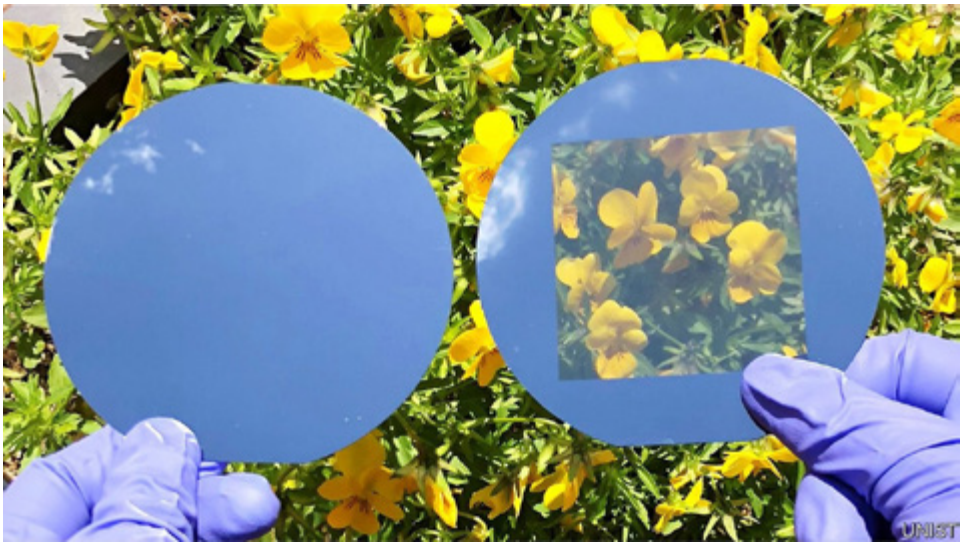


Korean Scientists Create First **Invisible Solar Panels.**

by Bright Beven Chituu

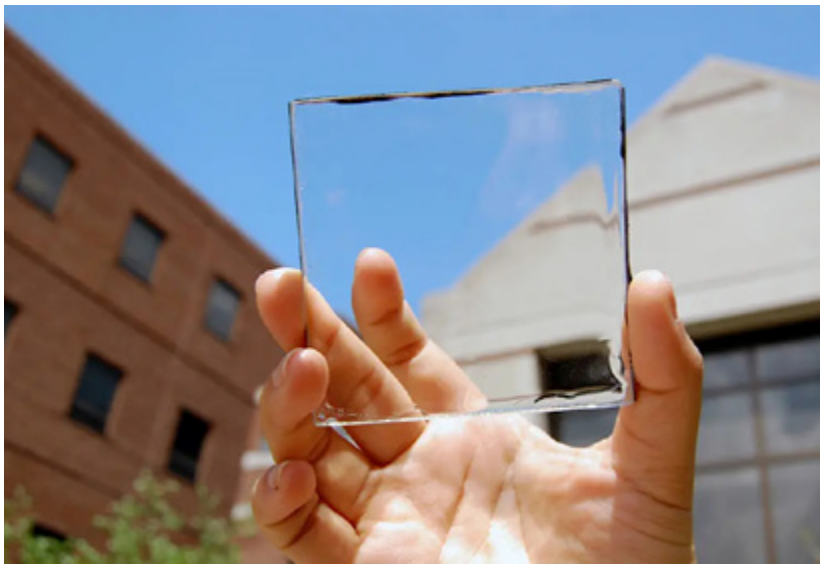
Resource scarcity, environmental degradation and climate change are the most obvious calamities the world is facing today as a result of the use of oil, natural gas, coal and other petrochemicals. These fossil fuels often pollute the environment and cause other damage, making the switch to renewable energy even more important. An ecological and socially just energy supply can only be ensured by using renewable energy. Solar energy always had the highest hopes of making a reliable and sufficient energy source among other renewable sources such as biomass, wind, water, waves and geothermal. In recent decades, solar cells have become cheaper, more efficient, and environment friendly. However, current solar cells tend to be opaque, which prevents their wider use and integration into everyday materials, constrained to being lined up on roofs and in remote solar farms.



Imagine a world where we could generate electricity using the surface of our windows, displays, smartphones, our car's sun roof or the glass roof of our office building. That is the hope of Professor Joondong Kim from the Department of Electrical Engineering at Incheon National University, Korea. Professor Kim and his colleagues have managed to put their theory into practice by creating a fully transparent solar cell. In the history of solar energy this is the first time a fully transparent solar cell has been tried. A transparent solar panel is basically a counterintuitive concept since solar cells must absorb sunlight (photons) and convert them into power (electrons). When a solar glass is transparent, the sunlight will pass via the medium and defeat the purpose of utilizing sunlight. However, this new solar panel technology is changing the way solar cells absorb light. The cell selectively joins a portion of the solar spectrum that is invisible to the human eye, while tolerating the normal visible light to pass through. To achieve this, the researchers have developed the transparent luminescent solar concentrator rather than trying to do the impossible by creating a transparent photovoltaic glass cell. These cells are composed of organic salts that are designed to absorb specific invisible UV and infrared light wavelengths, which then glow as another invisible wavelength. This new wavelength is then guided to the edge of the window plastic, which thin PV solar cell strips convert it into electricity. The technology uses organic molecules which absorb wavelengths of light that are invisible to the human eye, like infrared and ultraviolet light.

According to him transparent photovoltaic cell (TPC) will have various application in the human technology. His aim was to devise a high-power producing transparent solar cell, by implanting an ultra-thin film of amorphous Silicon between zinc oxide and nickel oxide. The effectiveness of this innovative design comprising of the Silicon film include its ability to utilize longer-wavelength light, efficient photon collection and the fact that it permits fast transport of charged particles to the electrodes. Apart from that, this novel design can potentially generate electricity even under low-light situations (for instance, on cloudy or rainy days). Unlike the traditional dark, opaque solar cells (which absorb visible light), Transparent Photovoltaic Cells make use of the "invisible" light that falls in the ultraviolet (UV) range. The visible solar cells can also be tailored for local latitudes, taking advantage of the fact that they are most efficient when the sun's rays are hitting them at a perpendicular angle. Based on these discoveries, Professor Kim and his team is optimistic that the real-life applicability of these transparent cells will soon be possible. With these novelties, solar is no longer going to require extensive land parcels or unsightly roof spaces.

One of the applications of transparent solar cells is in automobile and electronic devices. If these applications used visible solar cells in their glass surfaces, the society possibly will have cars that do not need fuel or devices that can be self-charged from the sun. Solar-powered vehicles are a desired application of transparent solar, with cars, air planes, trains, and boats potentially being powered by solar energy. Visible solar cells have the potential to power all the electronic devices that we use in our daily lives including tablets, MP3 players, cell phones, e-readers, laptops and other portable devices. Nevertheless, the efficiency rate of the transparent solar panel is only at 8 per cent at the moment. The challenge is how far Professor Kim and his team can push the efficiency to actually get a useful amount of electricity out the process. Despite the limitation on energy efficiency of these transparent solar panels, this does not rule out the potential it may have in new ways that have not been thought of before.



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HARARE WASTE MANAGEMENT SITUATIONAL ANALYSIS

By Sipho Graham Ndebele

Waste is unwanted material, discarded after primary use. Our daily lives require resources obtained from our environment. The mother nature provides us with ecosystem services such as oxygen and waste sinks. In return, we dispose-off our waste into the environment either in our backyards or landfills. Economic growth and population increase has cultivated waste generation rates. Waste is harmful to our environment if mishandled because as it decomposes it accommodates vectors which can cause diseases like cholera and it releases menthane emissions contributing to climate change and global warming. Due to diseases caused by improper waste management, over 100 people die every year in Zimbabwe as found by Tevera's study.

To protect our well-being and environment, collectively starting at grassroot level going up, we need to play our role by applying an integrated waste management system or hierarchy. Integrated waste management is a strategic approach to sustainable waste management covering all sources and aspects such as; waste generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner, with an emphasis on maximizing resource use efficiency through use of the 7Rs of waste management (reduce, re-use, recycle, refuse, repair, recruit and re-design) before disposal.

Sources of waste have different generation rates and types due to demographics, location, and economy. Our industries, residential areas and commercials for instance are some of the sources of waste. Based on each sector activities, the type and quantities of waste differ. The Harare waste stream mainly is domestic, market, commercial, industrial and institutional as revealed by Pawandiwa. The residential areas of Harare generate about 4.4 kg per capita per day, most of it being primarily organic (biodegradable). Composting our organic waste at household level would reduce the average daily waste generation rate by about 70%.

Waste is classified as either organic or inorganic, hazardous or non-hazardous. Waste types include; paper, glass, metal, food, chemicals and concrete. Residential areas and flea markets such as Mbare vegetable market mostly generate organic waste, industries mostly generate metal, plastics and chemical waste which is both organic or inorganic and mostly hazardous. Harare waste is being dumped irrespective of its origin, nature and potential impact to our well-being and environment without following proper processes of sustainable waste handling.

Urbanization, population growth and improved living standards drive waste generation rates. Harares' population is about 2.1 million people with an annual urbanization rate of 1.1% as revealed by ZIMSTATS. Migration of people from rural settlements to urban areas in search of better living standards is the catalyst of urbanization. Today when you move around town you will see heaps of waste in various locations. More waste is being generated at source than the collected amount for processing and disposal hence the imbalance. The other factor is that, the waste management hierarchy is not being practiced at grassroot level. Thus, the steps taken towards sustainable waste management by our City Fathers are diluted.

Vendors have increased especially downtown in order for them to earn a living due to unemployment that the country is facing. Our industry is dominated by the informal sector which has bred vendors into our streets selling any marketable commodity from fruits, clothes to groceries for instance. The Sunshine City is slowly eroding its beauty and glory through vending which is cultivating littering due to lack of awareness, negligence and also lack of proper waste handling systems. Dominance from the informal sector which does not have a traceable culture makes it difficult to control and join it with an integrated waste management system.

Waste is associated with various health and environmental problems. It decreases the aesthetic value of our environment and contaminates our soil and water resources. When you pass through a dump site, the view is not pleasing and so is the foul smell that arises. Mishandled waste accommodates organisms which cause diseases posing public health at risk. In 2018, Harare experienced a cholera outbreak which ended in 2019. The outbreak was associated with water contamination linked with poor sewage and waste management. Waste also contaminates water resources which increases the treatment efforts and resources to purify water to acceptable levels for human consumption.

The Harare City Council is obliged to collect waste from its citizens, though there are other private players such as Clean City. The City Council uses either a compactor truck or skip bin collector truck for door-to-door waste collection for residential areas, hospitals and institutions and skip points waste collection for markets and commercials. The set waste collection schedule is facing challenges due to inadequate equipment and lack of fuel just like any other urban council in Zimbabwe due to existing economic recession and Covid-19 effects. The City Council is expected to collect waste from residential areas, hospitals and institutions once a week and on a daily basis from commercial operators. Residential areas go for weeks without waste collection which has cultivated illegal dump sites and burning, hazardous alternatives that damage our health and environment.

About 10% of the collected waste is recycled due to inadequate recycling facilities and poor waste segregation at source which implicates recycling efforts as waste contamination alters recycling quality requirements and 90% of it is disposed at Pomona and Golden Quarry dump site. The dump sites have exceeded their carrying capacities and now they are public health and environmental hazards. The EMA Act SI 6 of 2007 ruled out the use of Pomona and Golden Quarry dump site by December 31st, 2012. Three major fire incidents have occurred at Pomona dated in 2016, 2018 and 2020. The recent fire incident occurred on the 18th of August 2020 released dense smog above the Standards Association of Zimbabwe and World Health Organization air pollution prescribed levels.

Sustainable waste management is a collective and inclusive goal. Raising environmental awareness is key towards capacitating everyone. Practice of the waste management hierarchy at individual and household level going upwards can transform the situation. The call is upon establishing recycling initiatives at all levels such as composting organic waste into manure to apply it in our gardens or yards at household level. Everyone's effort is of great value as poor waste management effects spare no one.

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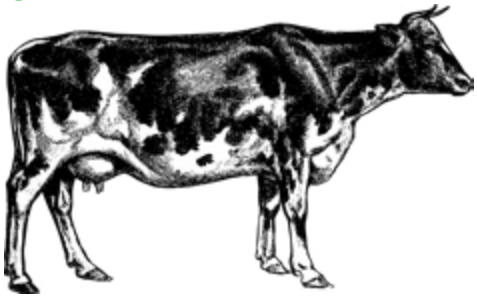

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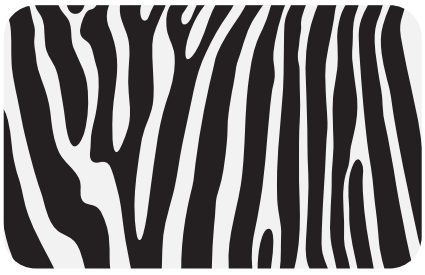

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Climate change will cause sea level to rise by 90cm by the year 2099 to the detriment of the world and cause flooding in certain countries.

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