

GREEN BUSINESS

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Energy Efficiency and The Environment



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Can Electric Vehicles
Work in Zimbabwe

Energy Efficiency
and the Environment

Indigenous Knowledge
Systems and the Environment

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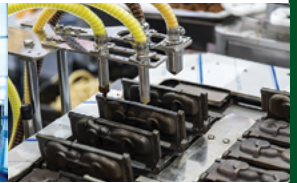
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GREEN BUSINESS

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Welcome to yet another scintillating edition of the inimitable Green Business Gazette (GBG). This is Issue 10 of the ever growing environmental tabloid. Our readership is growing steadily and is getting drawn from different parts of the world. Your feedback, support and ideas have been very encouraging.

We have recently concluded the COP-26 Summit in Glasgow, Scotland. The euphoria is gone and action begins. The analysis by experts from the GBG unravel the fact that Glasgow was another damp squib as far as climate justice is concerned. Pledges of funds without disbursements continue to the biggest let down of climate talks. The contentious deadlock regarding coal usage was swept under the carpet due to disagreements of "phase out" and "phase down". Fossil fuels continue to have more than nine lives. The current issue of the Green Business Gazette assesses the outcomes of the COP-26 conference and its implications for the future of mankind.

We take a deep dive into the world of cosmetics and the beautification of society. Although gaining ground, cosmetics should be analysed from an environmental angle. This should help consumers make informed choices.

Issue 10 unravels how disaster preparedness and response can be aided by Geographic Information Systems. We take a look at the prospects of sustainable socio-economic development through interventions in packaging. The circular economy concept and its relevance

in the waste management sector is assessed, bringing an end to the misguided notion that landfill is the ultimate destination of waste. Many waste streams can be prevented from the landfill by circular economy concepts such as recycling.

Diapers have also become a menace to our society and hence we take a deep dive into this big challenge affecting society. The modern day parents prefer the quicker solution to the call of nature. However, this is associated with environmental challenges of large proportions. Ensuring that we conquer sustainable development challenges affecting our society requires a concrete solution towards diapers.

This current issue of GBG raises a red flag with respect to used computers and their importation in different parts of the world. Bridging the digital age requires both hardware and software but we need to ensure that Africa does not become a dumping ground for toxic materials. Used computers and electronic waste contain toxic materials such as heavy metals, lead, silicon and other components which may prove to be toxic to human health and safety.

Energy efficiency is the new currency. The issue advises on energy efficiency techniques which every household, corporate and industry should consider.

The Green Economy is here to stay. We all need to play our part towards promoting sustainable development in society. At this rate, we are living on borrowed time. Only sustainable development can save. Let's work together for a green transition

Tawanda Collins Muzamwese
EDITOR IN CHIEF

CAN ELECTRIC VEHICLES WORK IN ZIMBABWE?

by Tawanda Collins Muzamwese

The global craze towards electric mobility has gripped many countries around the world. At present more than 10 million vehicles are on the roads in different parts of the world. Zimbabwe is beginning to have discussions along the lines of e-mobility. We delve into some of the realities and enabling conditions for this initiative to work. There are a number of issues which are required if the driving of electric vehicles is to materialise in Zimbabwe.

Firstly, we need to address the power access challenges and ensure that the grid is expanded as well as the generation capacity. Due to the fact that we have not yet managed to generate enough energy, adding electric vehicles will need to be coupled with investments in power generation.

Some electric vehicles use battery technology mainly made from lithium. Zimbabwe should harness lithium resources and produce batteries locally rather than importing them. The range of electric cars is limited with some of the best brands going for distances of around 400km or less on a full charge. This scenario means that there is need to deploy charging stations to cater for the needs of any motorist who chooses electric mobility. It will be unsavoury to drive an electric vehicle and end up being stuck on the road after running out of power without charging stations nearby.

Charging time remains a limiting factor with some electric vehicles taking about an hour to charge. Some advanced quick charging stations can achieve full charge



in 15 to 30 minutes. Choice of technology must ensure that the time factor does not become a bottleneck.

The increased silence due to limited generation of sound, should call for more safety precautions on the roads to minimise accidents. Revamping the road infrastructure is going in earnest and is considered as one of the key strategies towards efficient functioning of these emerging toys. Without effective feasibility analysis of electric mobility, gasoline will be here to stay at least for powering the transport sector.

A robust means of security for the electric charging infrastructure is necessary if at all the electric mobility framework is to achieve significant results. Our people need to be reminded to take care of infrastructure and avoid vandalism of infrastructure meant to benefit them.

The cost of electric cars remains prohibitive to many, with the cheapest

vehicles in the range of USD \$30 000. Without subsidies, electric vehicles will not flourish in Zimbabwe. Prospective electric car owners should be waived from paying expensive duties due to the emission reduction contribution they make. Making electric cars affordable to ordinary people is a key step needed to facilitate their viability at national scale.

A multi-stakeholder approach is also needed in developing frameworks for e-mobility and this will need input from commuters, transporters, government, development partners, power utilities and other key stakeholders with interest. Pilots already exist in the taxi cabs which are deploying e-mobility in Zimbabwe. A demonstration vehicle has also been procured. As we progress as a country, scaling up electric mobility will be essential for it to be viable. Raving ourselves into a green future will need careful planning and consultation. Ladies and Gentlemen – Start your engines but in quieter electric mode.

COP26:

A Failure And A Success In One Sentence

by Innocent Nhire



Climate change conferences are now an oxymoron. There is certainly hope, frenzy, anger, glitz and glamour which is a reflection of how the world politicians look at the whole thing. Fascination and mild concern. Theoretically, world leaders were in Glasgow to negotiate the mechanisms for reducing emissions. However, Real Politics shows that they were more interested in ramping up soft power, while apportioning the blame to someone else. While the outcome of the conference itself is a damp squib, there was positive optimism that climate change is now taken seriously by the masses and slightly by the politicians.

The Glasgow pact

The final text of the Glasgow pact is a woeful prayer, begging for forgiveness for the misdemeanours of emissions. The text expresses "alarm and concern",

pointing meekly at the unravelling carnage, while suggesting the need for someone to do something. It stressed that urgent action is needed as well as increased ambition. But more importantly there is no bigger ambition nor any actionable details. More regret is expressed that the current financing mechanisms for climate adaption are insufficient in meeting the worsening climate change impacts in developing countries. This is in reference to the promise made of US\$100 billion dollars annually to developing countries to assist them to cope with the climate crisis. There is an acknowledgement that limiting "global warming to 1.5°C by 2100 requires rapid, deep and sustained reductions in global greenhouse gas emissions" and "invites" governments "to consider further opportunities" to reduce emissions. It "calls upon" them to "accelerate efforts towards the

phase-down of unabated coal power and phase-out of inefficient fossil fuel subsidies," as though this wasn't a document drafted by those very governments; and as though phasing out all subsidies for fossil fuels wasn't what we needed to do a generation ago.

Not much reason to be optimistic Financing for damage and losses incurred by climate change caused by the rich and poor was blocked by some developed countries. Only the low hanging fruit, the Global Methane Pledge, an initiative of the US and the EU went through at COP 26. This is about making faulty fossil fuel structures more efficient, which is a humongous nothing in the grand scheme of things. The pledge to end deforestation by 2030 was as hollow as it sounds, while the voluntary Nationally Determined Contributions will not be enough to meet the 1.5°C target.



blocking the language on fossil fuels is just a tip of the iceberg with respect to the climate crisis the world faces. In the end there was a narrow focus on coal while other fossil fuels barely got a mention. Some countries refused to shut down their oil infrastructure.

Against this backdrop, it is understandable that India and China, the world's biggest coal producers, wanted a more general phasing out of fossil fuel, whilst the US, which the biggest oil producer zeroed firmly on coal. In addition, there were efforts to blame China, though the Asian powerhouse has taken more concrete steps to reduce emissions, than many western countries.

Despite these shenanigans by the, much optimism is to be drawn from COP 26. Even though it was largely a failure, it would appear that the wind is finally blowing in the right direction. This is because politics does not occur at glitzy conferences but it occurs in individual homes and workplaces.

Growing Climate movement

There is a saying which goes, "Wonders shall never end." It would appear that political leaders were on a mission to outdo each other in saying the right things. Brazil's President Jair Bolsonaro had to pretend like he is against deforestation. This is not because these political leaders have been overcome by humanism, nor the fact that they intend to take any concrete action.

For Xi Jinping's China and Narendra Mhodhi's India, the shift in the direction of climate change can be attributed to growing domestic pressure. In many ways, climate activities have ramped up the pressure altering the political agenda. Partly because of these gigantic efforts, governments are just about realising the costs of the crisis, which will just come back to haunt them. Credit has to go to the Biden administration for taking it seriously as far as they have.

A gleamer of hope

Whilst the world can be cynical about promises and pledges, there is room for optimism that the climate movement has grown in leaps and bounds. Real change is possible. After Glasgow it is not careless to say climate justice movements now dominate the discourse on climate change. Much more fundamental is that change does not emanate from senior politicians and conferences. It is a concoction of opposing political forces that brews when humans gather.

Practical action will be realised by radicals, organised and string movements which demand for a shift in how the society is organised. COP 26 does indicate in an emphatic way that, climate justice movement is better when it incorporates the younger generation. With this newly found vigour, the movement can truly change the work in a fundamental way.

There is no reason for optimism about governments actually taking action and sticking to what they signed for, for example the world banned torture in 1987, but most states who signed the convention ignore it to date.

Blame India and China

Notable for COP 26 was the blame game; framing India and China as the villains in the world's bid to reduce emissions. India had insisted in negotiations that all fossil fuels had to be phased out in an equitable manner which was quite reasonable. However, in reality this was framed by some members of the COP-26 process as India's attempt to block text on fossil fuels, with the knowledge that these claims would not be examined critically. Whilst developed counterparts managed to obfuscate the issue, framing India as



Economic Independence Through Waste Management

by Dr. Anthony Phiri

THE INTERNATIONAL current challenges of resource scarcity can only be busted by the implementation of the circular economy concept. Through implementation of the circular economy concept, economic aspirations such as scaling to higher economic status can be achieved. The thread can be in waste management. The implementation of sustainable integrated waste management plans is very vital in resource conservation and generation.

The Harare Institute of Technology is one of the few institutions in Africa which are focused on solving the greatest challenges through innovative science and technology. This includes ensuring that the country has a resilient and valuable environment and are moving towards clean energy and resources as well as supporting the growth of future industries. One of the recent COP 26 conference outcomes was that, developing countries should upscale their climate change mitigation activities. It is estimated that each year, 90 billion tonnes of primary materials are extracted and used globally, with only nine per cent recycled. Evidently, this shows how extravagant we are being with the resources which are meant for future generations.

Worse still, this is commercially unsustainable and there are significant detrimental impacts to human health and the environment that could emanate from such. By leveraging circular economy on waste management, a lot can be achieved such as a cleaner environment, new raw materials, import substitutions as well as up scaling Nationally Determined Contributions (NDC).

As Harare Institute of Technology, the thrust is on design for sustainability which makes each waste material a resource. This supports a circular economy model, which shows that through responsible manufacturing, development of new industries and jobs can be supported, emission reduction can be achieved and increased efficient use of natural resources. Under an appropriate waste management system, a landfill is of very limited importance as it reflects the loss of resources unless it is meant to enable the generation of energy from methane. It is therefore imperative that future disposal sites

be made smaller and tailor made for accommodation of organic material.

Organic material degrades fast and this generates high volumes of compost whilst also generating energy. It is clear that by designing for recyclability, maximization of resource utilization can be achieved. The benefits can be several times larger through the incorporation of the concept of circularity during production and consumption. A circular economy is critical in ensuring future prosperity and economic security. Zimbabwe's economic independence lies within the circular economy concept.



ENVIRONMENTAL IMPACTS Of Abattoirs and Meat Processing

by Tawanda Collins Muzamwese

IN MOST CULTURES, meat is considered a delicacy. Whether cooked, roasted or done through a barbeque – meat has stood the hands of time since the time of nomadic pastoralism, hunting and gathering. With the growth in human civilization, greater focus is being placed on rearing animals at a commercial scale in order to process meat in a sanitary manner.

Several abattoirs have been established at district, town, city and national level. Meat processing giants have been born and continue to flourish immensely. However, beyond the rasher of bacon, T-bone steak and pork chops – there are a number of environmental impacts which need mitigation and control in order to achieve environmental sustainability.

The first environmental impact associated with abattoirs and meat processing firms is the waste fecal matter from the animals. This could be generated upon arrival or when the animals are waiting for slaughter. After evisceration, some material from the stomach of the animals becomes waste. Offensive smells can be generated if no effective odour management system is in place.

In addition, there is high water usage at abattoirs due to the need for cleanliness and very high hygienic requirements. Some water is also used for scalding processes. Associated with high water usage, is the generation of wastewater. Effluent from abattoirs is very high in organic matter and Biological Oxygen Demand (BOD)

Blood remains a key waste generated from abattoirs especially during processes of slaughtering the animals. Many abattoirs have no effective plans of managing blood. This is a significant source of pollution and wastewater.

Other environmental challenges are related to the high consumption of energy especially related to the refrigeration processes for preservation

of the animal carcasses before cutting the meat into specific cuts. Energy is also used for stunning animals.

Hides can easily be channeled to shoe-making and processing of leather. The tanning process is greatly interrelated to abattoir operations.

Nowadays, there is increased pressure over companies which undertake meat processing and abattoir activities to adopt resource efficient and cleaner production measures in order to attain sustainable development. It is possible to make meat processing more sustainable. The work begins now.



ENERGY EFFICIENCY AND THE ENVIRONMENT - A RECIPROCAL NATURE

by Sipho Graham Ndebele

Energy is the ability of doing work. It exists in the following but not limited forms; thermal, electrical, chemical and nuclear. There are two sources of energy, non-renewable energy and renewable energy. Non-renewable energy includes coal, oil and natural gas, while renewable energy includes solar, wind and biomass energy.

Over the past years, the world has heavily depended on non-renewable energy for industrialization and livelihood development. During the past century, our energy

needs have been met by using non-renewable energy. This application has released greenhouse gas (GHG) emissions, which are causing air pollution and related human ill-health such as respiratory diseases. At large, GHG emissions have and are contributing towards global warming and climate change which is one of the planet's critical environmental challenges among water pollution, land degradation and biodiversity loss. The pressing issue is that, climate change enhances the above-mentioned environmental challenges including other ecosystems disfunctions.



The structure of Zimbabwe's energy consumption by source illustrates that 17%, 37% and 45.7% of the country's energy emanates from petroleum, renewables and coal respectively. In 2015, electricity production was 762 ktoe, with 32.9% sourced from fossil fuels and 66.2% obtained from hydro sources. Every citizen has a right to a clean environment as enshrined by the Constitution of Zimbabwe of 2013, under section 73. Hence, pollution must be abated. Production of electricity using coal and fossil fuels release GHG emissions which have both public health and environmental impacts. The extraction of coal releases methane, a toxic gas that directly chokes if inhaled, including clearance of land, vegetation and forests. Clearing of land and vegetation disrupts habitats and causes biodiversity loss. Use of water to produce electricity increases flood risks due to dam construction and water channelling. Water abstraction for power generation competes with water needs for aquatic life. This disturbs the optimal functions of the ecosystem. These environmental effects emanating from energy applications pose hazards and risks on the life, health, habitats and infrastructure of both humans, wildlife and ecosystems at large.

The world including is scaling down fossil fuel usage as an option due to its inefficiency. The environmental impacts that stem from human activities, are now

visible and clearer and the well-being of human nature is at risk. Mother Nature is gradually dying due to pollution coming from energy use required in activities such as agriculture, manufacturing, mining and construction. The chance to better the situation and save the planet is available and requires urgent change of behaviour and policies. All GHG emitting processes and machinery need to be substituted or made more efficient to reduce the amount of gases released. The world is well aware of its contribution to environmental challenges. Hence, it has developed and adopted strategies to phase out the use of coal and fossil fuels. Efficient energy sources are being adopted which offer viable options for the planet's future.

Energy efficiency is the use of less energy to perform a similar task. Availability of technology is related to efficiency of energy. Light emitting diode (LED) lights are a specific type of lights which are designed to produce light using less energy as compared to incandescent light bulbs. Incandescent light bulbs generate heat due to high energy consumption. In summer, this generated heat tends to be a problem in buildings and our homes by increasing room temperature. LEDs curb this problem by using less energy and preventing heat generation from light production. Electrical appliances marked "energy star", are built up of mechanisms that conserve energy.

Solar and wind technologies are clean sources of energy which are on the cards for use compared to coal powered energy. This is well advised by Sustainable Development Goal number 7 on affordable and clean energy.

The technology uses electromagnetic waves which are absorbed by solar panels (electrochemical-photo cells) to generate electricity. No gas or waste substance is generated from this process. Automobiles need petrol and diesel to power their engines. The combustion of fuel releases GHG emissions. To prevent this case, electrical and hybrid automobiles are being adopted. Electrical automobiles absolutely depend on electricity to function based on a rechargeable battery. Hybrid automobiles apply two or more distinct types of power (battery and fuel). The hybrid mechanism alternates power source based on speed. When speed is low, it uses a battery and when speed is high, it uses fuel. Either stopping on a traffic light or in congestion, the hybrid engine hibernates. The goal of these technologies is to cut down and, in the latter, eliminate GHG emissions attributed to human activity, while conserving natural resources and the environment. Not only do these new technologies conserve the environment, they also boost economic activities through job creation and eliminating environmental incidents.





Diapers Have Become A Menace

by Wadzanai Diana Manyame

Since their introduction in the 1950s production, demand and use of diapers globally has increased, feeding directly into the increase of solid waste. In the first 2 years of a child's life, approximately 3796 diapers are used on them. This creates 391.4kg to 537.6kg of excrement waste and 3kg of packaging waste, that is plastics and boxes per child. Diapers contribute 4% of the total solid waste globally and they are the third largest single use product which can be found dominating landfills and dumpsites. Diapers are made of mainly from wood pulp and polyethylene plastics and polyethylene plastic is non-biodegradable, therefore it remains in the environment unless if burnt. The continued use of diapers has over the years led to the accumulation of diaper waste in the environment. Heaps of used diapers populate road sides and dumpsites in communities and towns around the world especially in less economically developed countries where robust waste management principles have not yet been fully implemented. Zimbabwe is one country to mention where diaper waste has become a menace. There is relatively a poor waste collection and disposal system in the country and in most cases waste is dumped on any open space available.

Indiscriminate disposal of diapers being

done by mothers and caregivers in different communities across the world contributes to waste generation and pollution. The aesthetics and outlook of the environment are also affected. Most communities are an eye sore.

Flies and other disease carrying vectors find themselves a playground and contribute to the spread of diseases such as cholera and typhoid. Some residents with access to latrine toilets tend to dump their diapers in the pit. According to them, they would have done justice to the environment. However, dumping it somewhere one cannot see it does not make it the best option, though it might seem so temporality. The fact still remains, diapers are non-biodegradable and will still remain in the environment.

Exposure to chemicals and toxins is also a cause for concern. As mentioned above diapers are made from wood pulp and polyethylene plastics. The plastics are made from crude oil whilst the wood pulp comes from trees. The processing into diapers utilizes gasoline, chemicals such as chlorine, lime, polyacrylic acid and this leads to release of toxins and air emissions with special mention to greenhouse gases. Dioxins are formed during paper bleaching and diapers contain traces of dioxins. Dioxins are

highly toxic and carcinogenic as listed by the Environmental Protection Agency (EPA). Diapers also contain traces of Phthalates, an Endocrine Disrupting Compound (EDC) and Tributyl Tin, a heavy metal which impairs the immune system as well as the hormonal system. TBT has been reported to cause sterility in boys and men after exposure. Constant exposure to these chemicals can be dire to those at risk.

The lifecycle of disposable diapers has also been seen to contribute to climate change. The cutting of trees to make wood pulp contributes immensely to climate change through reduction of carbon sinks. The production process release greenhouse gases which contribute to climate change through global warming and lastly the burning of diaper waste in areas where it has largely accumulated contribute as well to the release of greenhouse gases. The environmental quality and health of humans are therefore being compromised by diaper production and indiscriminate diaper waste disposal. There is increased waste generation and pollution and populations run the risk of exposure to chemicals and disease-causing pathogens. As the world is working towards a circular economy, deliberations need to be made on the fate of disposable diapers.



Titaku/ Envirosmat Consultancy is a growing firm in the line of business and environmental sustainability running under the Titaku Environmental Engineers (Pvt) Ltd group. The firm specialises in environmental impact assessments (EIAs), industrial hygiene surveys, environmental monitoring exercises, environmental engineering designs, pegging of mine claim boundaries, siting of works plans drawings, mapping and most recently NORM radiological surveys.

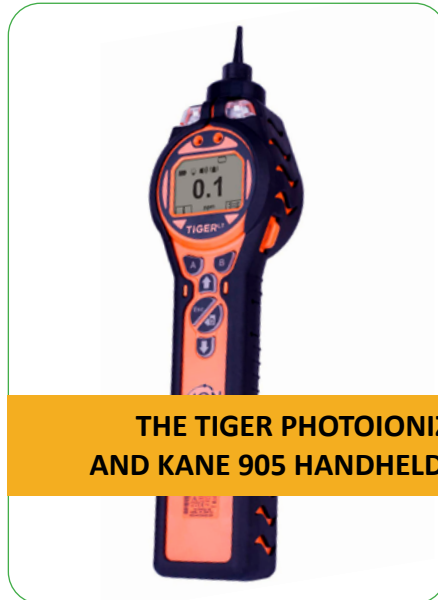
The consultancy is made up of a team of experts in environmental science, safety and health, environmental health, geology, hydrology, social sciences, engineering and cartography. Through its pool of professionals, the consultancy has managed to diversify its field and has integrated information and results for the best of the clients to which it offers its services to.

The consultancy focuses on quality service delivery in a professional and timely manner to aid in the smooth flowing of business and investment. It offers its services in the mining, manufacturing, construction, energy and fuels, recreation, agriculture and services sectors. The Envirosmat Consultancy – Titaku brand has a wide client base of over 200 organisations within the private and public sector, large corporates, SMEs as well as individuals.

The consultancy firm has taken strides by offering professional services to big corporates such as ALROSA Zimbabwe, Prospect Lithium Zimbabwe, ZUVA Energy, PRObrands, ZIMPARKS, POTRAZ to mention just but a few and also pioneering EIA studies for medicinal cannabis projects in Zimbabwe.

The firm is open to navigating new ground and projects within the field of business and environmental sustainability.

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THE TIGER PHOTOIONIZATION DETECTOR (PID) (left) AND KANE 905 HANDHELD COMBUSTION ANALYSER (right)

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Indigenous Knowledge Systems And The Environment

by Bright Chituu

The word 'indigenous' can be traced back to French (indigène) and Latin (indigena). In both languages, the word means 'sprung from the land', a native or literally 'in-born'. Thus, it can be comprehended that indigenous knowledge refers to the way of knowing and application of the resultant knowledge connected with a particular group of people in their native socio-geographical location. Indigenous knowledge can be referred to in several terms such as indigenous knowledge of knowing, traditional knowledge, rural knowledge as well as ethno science. Indigenous knowledge is generated by a particular society within a geographical area and transmitted from one generation to another in order to have history of an area or phenomenon, understand the background and offer solutions to the existing problems of that time.

Indigenous knowledge is part of Africa's heritage, which

dates back to the pre-colonial era. It's a knowledge system that was designed to keep the people knowledgeable of what happened in and around them. The system was also developed in order to address various survival challenges. Unfortunately, the knowledge system has suffered a great deal from colonial racism. When the natives were removed from their indigenous communities, this resulted in the detachment from their familiar ecology and a loss of environmentally linked indigenous knowledge.

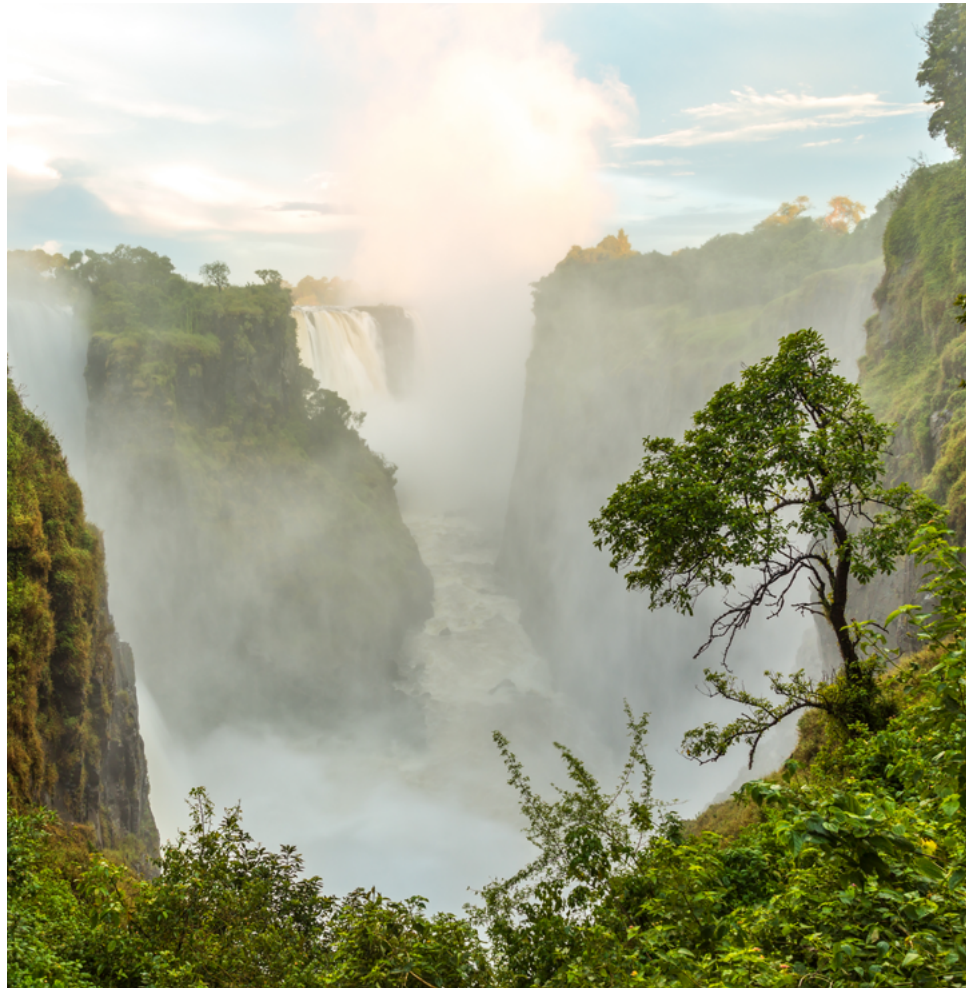
Indigenous knowledge systems manifest themselves through different dimensions. Among these are agriculture, medicine, security, botany, zoology, craft skills and linguistics. In Zimbabwe indigenous knowledge such as taboos, use of totems and respecting sacred places have been used to protect and preserve the environment.

One of the most popular traditions in Zimbabwe is totemism, which has been described as the practice of symbolically classifying people with non-human objects such as animals or plants. The classic case of totemism is when a clan claims an animal as a mythological ancestor. From an ecological point of view, this practice can be cherished for its role in the conservation of biodiversity in a given area.

In the case of hunting and gathering societies, it moderates competition for some edible animals, birds, reptiles, insects or plants. This is for the reason that it is considered a taboo for one to eat his or her totem animal; one risked losing teeth or some catastrophe would happen to him or her for violating this taboo. An example is that, during hunting, members of the zebra clan would not kill zebras as they were considered as sacred to them. The same applied to those who valued the buffalo, eland, lion, elephant, baboon, kudu, birds, snakes and ants. Therefore, totemism reinvigorated selective rather than indiscriminate hunting, in this manner preserving any endangered species from extinction.

Some of the misfortunes, which were believed to befall transgressors included: bad luck, tooth decay or loss, madness, sickness and disease, infertility, death and the loss of ancestral protection. Offenders would also be disciplined through the payment of fines to the head of the clan or chief. In some cases, they would be expelled from their communities. Punishments such as these were effective in the conservation of various natural resources and species.

Indigenous knowledge has also been associated with maintaining clean surroundings. In an attempt to maintain clean surroundings, human waste was disposed in bushes or else buried in the grounds adjacent to homesteads. This reduced the spread of diseases through vectors such as flies. Burial places for human corpses were situated either close to homes or far away while strict rules on safeguarding sources of drinking water such as wells and springs were prescribed. Wooden fences were developed around them in order to prevent water pollution from children and livestock.



Water bodies were considered as sacred in that way preventing swimming, bathing and other activities, which could contaminate them. Fishing was forbidden in some rivers whereas veld fires were controlled using water or tree branches. Even if veld fire was intermittently used during hunting missions, it was controlled in order to safeguard pastures and the environment as a whole.

Respect for the natural environment and its conservation was reflected by some practices. Overstocking and overgrazing were managed through strategies such as loaning some cattle to friends and relatives, transhumance and swapping out surplus cattle. Woodlands were conserved in several ways including designating some as sacred places thereby protecting them from human activities like deforestation, settlement erection and cultivation.


Other pieces of traditional knowledge in Zimbabwe were geared at stimulating environmentally friendly ways of life.

Examples include land management practices, natural resource conservation methods and environmentally sustainable traditions such as totemism, which protected and preserved biological diversity. However, colonialism, which brought capitalism and materialism, encourages greed thereby undermining sustainable development at both local and national levels. Today, Zimbabwe like any other African country is plagued with several environmental problems such as overpopulation, land degradation, deforestation, overgrazing, massive biodiversity loss, increased air and water pollution, and waste disposal problems in towns and cities. There are no easy solutions to most of these problems, but one thing is certain is that, there is need for societies to change their lifestyles from consumerism to environmentally friendly habits that are more sustainable. Zimbabweans can benefit from the combination of indigenous knowledge and modern methods in the country's quest for environmental sustainability.

Wildlife Feature: *Southern Ground-Hornbill*

by Jairos Nzvimba

Bucorvus Leadbeateri
Southern Ground-Hornbill (English Name)
DENDERA (Shona name)

A photograph of a Southern Ground-Hornbill and its chick. The adult bird is in the foreground, facing right, with its characteristic black feathers and bright red wattle. The chick is perched on a dead tree branch in the background, also facing right. The background is a clear, light blue sky.

International Union for Conservation of Nature (IUCN) classifies the Southern Ground Hornbill as vulnerable to extinction. Their distribution range has hugely decreased recently, due to persecution and habitat alteration through extensive farming, pollution, deforestation as it often results in the destruction of nesting habitats. Flooding and severe weather due to climate change has wreaked further damage. Mostly common in Southern and Northern Zimbabwe, it generally prefers grassland and savanna woodland habitats, ranging from montane grassland to extensive, tall stands of Zambezi teak (*Baikiaea plurijaga*), Mopane (*Colospermum mopane*) and Musasa (*Brachystegia spiciformis*) woodlands with sparse understorey. It is recognizable by its jet-black feathers, yellow eyes, and bright red throat. The fleshy part of the bird's throat, called a wattle, identifies its sex: The throat of a male hornbill is completely red, whereas in females, a patch of violet blue. It feeds on a wide range of food, including small animals, locusts, frogs, snakes, lizards, chameleons, tortoises, squirrels, hares, snails, plants and birds. It forages in groups so that when one bird locates a prey it can signal the rest of the flock with a low bark. It often finds prey by digging, especially in dung heaps. The birds move in pairs, sing together and hunt together. When the sun is about to rise, they are heard making the booming call that is loud and roaring like a lion's roar "Hu Hu Hu Huhuhuhuhu; Hu Hu Hu Huhuhuhuhu" and the elderly would say "Today the sun will be hotter, hear the Dendera singing". The song signals a sunny scorching day. The group roosts in trees on rock faces, descending to the ground just before dawn and foraging for a lot of the day. The bird can fly up to 18 miles an hour and has an impressive wingspan that reaches about four feet across.. It is a monogamous, cooperative breeder, with a group consisting of a dominant breeding pair and 0-9 helpers, who are usually either adult males, or juveniles from previous breeding seasons. It lays 1-2 eggs, which hatch in the sequence laid, meaning that the one chick is 3-14 days older than the other chick. The younger chick is unable to compete for food with its older sibling, and dies of starvation when it is barely 3-4 weeks old.



BIODEGRADABLE PACKAGING To Prevent Pollution From Plastic Waste

by Tendai Kaneta

Individuals feel good and comfortable when handling packed commodities but are not ready to solve the problems of plastic waste. Packaging is more than just material used to carry products. It is the art and technology of enclosing and protecting products for distribution, use and storage. Packaging is meant to contain, protect and preserve a product. It also meant to inform the consumer about the product and thereby attracting the customer. It can also be used to reduce security risks on transportation by deterring manipulation of the product.

Plastic is one of the most commonly used packaging material in the world. High Density Polyethylene is the most widely used plastic type. It makes many types of bottles and containers as well as shopping bags. This is mainly because of its stable form, chemical resistant properties, non-interactive abilities and also the fact that it is of light weight and is cheaper to manufacture. In Africa, plastic packaging has reported high growth rates as demands for its uses increases. Despite the fact that plastics are useful in packaging of goods, they have a negative impact on the environment.

Statistics show that in the period between

1950 to 2018, about 6.3 billion tonnes of plastics have been produced worldwide. One can imagine how much has been produced to date considering the increased demand in cheaper packaging material. Of the billions of tonnes produced only 9% has been recycled and 12% incinerated. Zimbabwe alone produces about 300 million tonnes of plastic waste every year. This is mainly attributed to the increase in human population and consistent demand for cheaper packaging thereby resulting in continuous generation of plastic waste and its accompanied environmental pollution.

Indiscriminate disposal of waste from plastics can pose detrimental effects to the environment as well as human health. The evidence of the effects of environmental pollution due to plastic waste is manifesting itself in several ways. These include reduction in the aesthetic value of the environment, entanglement and death of aquatic organisms, sewage system blockages in towns and cities of most developing countries, creation of a habitable and conducive environment for breeding mosquitoes and other disease causing vectors, production of foul smells as well as reduction in water percolation and normal agricultural soils aeration.

In today's world, biodegradable plastic is becoming the best and an integral part of the solution to plastic waste pollution. Biodegradable plastics are plastics that can be decomposed by the action of living organisms, usually microbes, into water, carbon dioxide, and biomass. These are being made by extracting sugar from plants like corn and sugarcane to convert into polylactic acids (PLAs), or can be made from polyhydroxyalkanoates (PHAs) engineered from microorganisms. Biodegradable plastics are considered to be eco-friendly, because they are commonly produced with renewable raw materials, micro-organisms, petrochemicals, or combinations of all three. The acquisition of knowledge of biodegradable plastics is a noble idea as it plays an important component in the implementation of the circular economy model in Zimbabwe.

Important environmental value of biodegradable plastics is in the areas of packaging, single-use items, and agricultural plastic mulches. Biodegradable plastics are gaining popularity worldwide, however, attention needs to be paid to additives used in biodegradable plastics to ensure that the additives do not pose an environmental hazard.



Used Computers – Blessing Or Curse In Electronic Waste

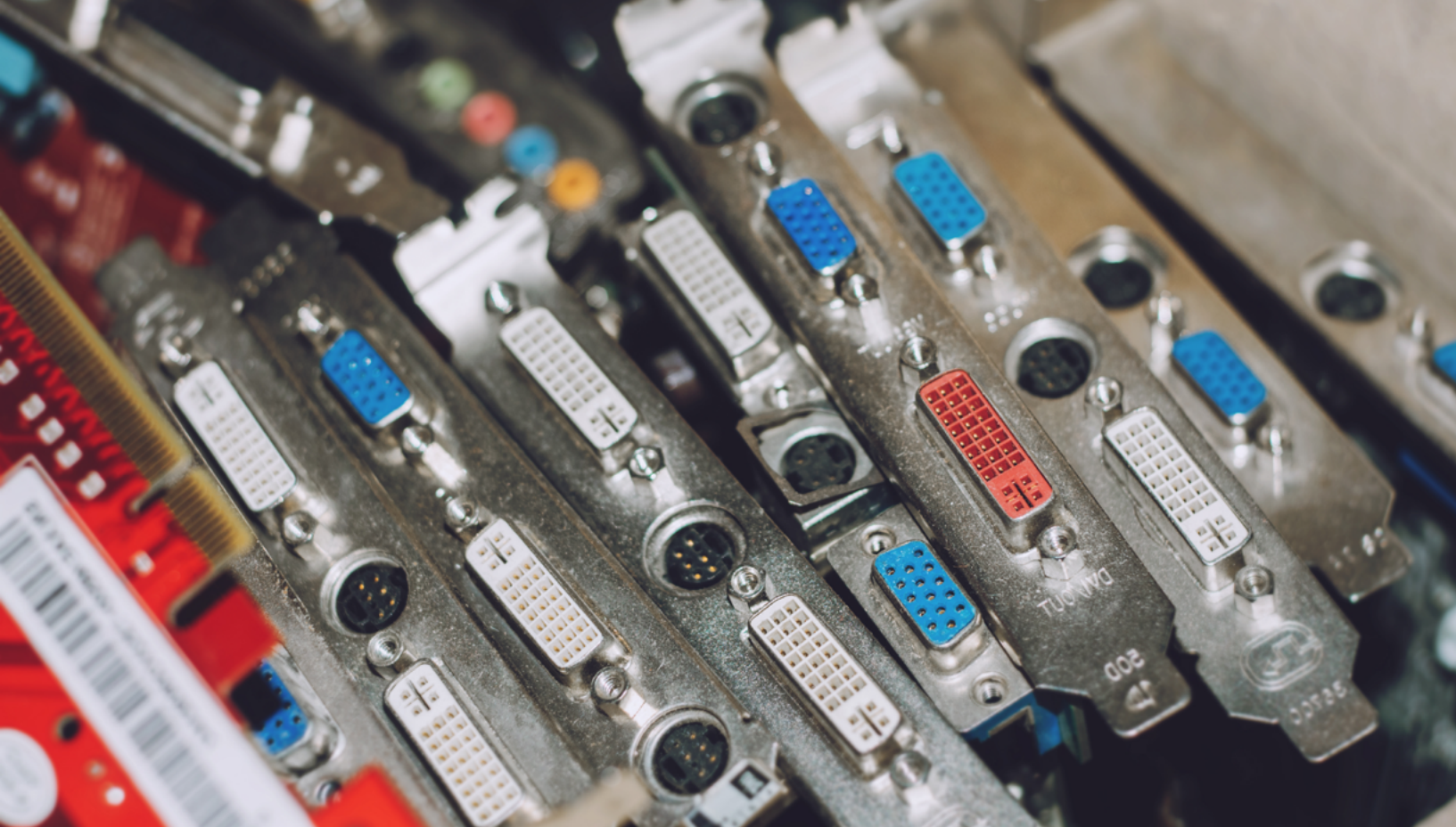
by Wadzanai Diana Manyame

The first computing or rather calculating machine was invented in the 1820s by a man called Charles Babbage. In 1936, Alan Turing developed an idea that influenced computers, a universal machine which could compute anything computable. Fast forward to 1976, Steve Jobs and Steve Wozniak introduced the first single circuit board computer, Apple 1. IBM, in 1981 released the Arcon characterized by an intel chip, a colour monitor and an intel chip. The Apple 1 had a system monitor and its Central Processing Unit (CPU) was a MOS 6502 at 1MHz with a memory of 4KB of RAM, 256B of ROM and a storage of 456KB. 45 years later, I am writing this article from a MacBook Air laptop running on a 2.2GHz Intel Core i7, a memory of 8GB 1600MHz DDR3 and a flash storage of 500GB. One can imagine what has happened to all the machines dating back to the 1800s.

Each year computers are being produced in masses from different companies. It has ceased to be a process of simplifying tasks but a profit-

making business, where key players such as Apple, Hewlett-Packard, Dell and many other need to remain relevant and bringing forth the latest technology and most advanced machines. The consumers themselves especially those with rich backgrounds wait anxiously for the latest laptop release, so as to acquire it and get rid of the one they had been using even though it is still new and is in perfect condition. Software engineers on the other side are playing the devil's advocate. There are constant upgrades in operating software as well as applications. There comes a time where the old laptop or computer can no longer host the updated and latest software and applications. Thereby forcing people to move on with the times. These processes have led to the accumulation or rather generation of used computers.

The used computers are either redundant and dead machines where nothing can be salvaged from them or functional computers which are still usable. Africa has found itself being the dumping ground for such computers.



Due to the fact that 90% of the African population cannot afford brand new electrical gadgets including computers, used computers have found their way into the shops of most African men. Demand for these is high because they are affordable and one can still say, "I am using the latest Apple laptop, and I am no different from someone who bought it brand new right out of Apple Incorporation." There is more to consider than just the hype of being in touch with technology at a lesser cost. It could seem like a blessing, it might be to some extent but there are repercussions that come with that. As some would say, "Cheap is expensive."

Importation of used electronic gadgets such as computer for sale, as much beneficial as it might seem has made Africa to become one the dumping sites for electronic waste. This is being done with the knowledge of the perpetrators and sometimes of those receiving. However, some have been duped where a whole cargo will

only be possessing a few machines that work. The rest becomes waste with nothing to salvage from it. By the mere fact that electronic material is non-biodegradable countries in the most developed world protect their environment by sending off used gadgets to Africa and other less economically developed areas. This has led to the accumulation of electronic waste in countries that do not have the capacity to reprocess the material into upgraded laptop versions or any other usable products. Waste collectors and crafts man have found themselves picking pieces of these computers to use for other crafting ideas, running the risk of exposure to chemical toxins. It is important to note that E-waste has both environmental and health effects.

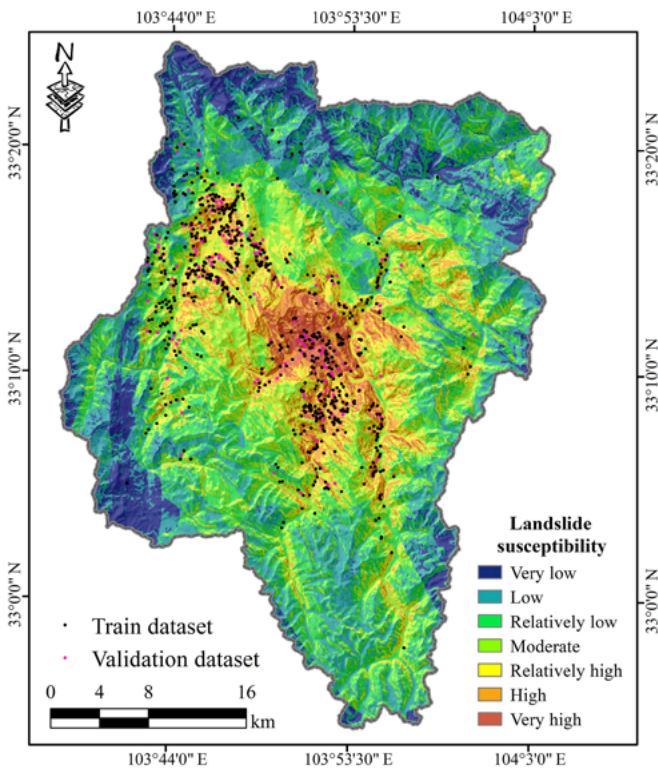
Computers contain heavy metals such as lead, zinc, barium, lithium and nickel. When left lying on dumpsites and landfills the chemical toxins seep out into the ground and find their way into the underground water bodies. The

chemicals can also be washed away into nearby water bodies leading to contamination of surface water. Fruits and vegetables also get contaminated if exposed to contaminated water. The chemicals especially lead bioaccumulate and when ingested by human beings, it accumulates in the human body and pose damage to key body parts and systems such as the kidneys and the central nervous system.

Electronic waste also releases toxins such as dioxins, a carcinogenic. This release is exacerbated by the burning of computers that also takes place when waste pickers are trying to retrieve valuable metals such as copper for their small businesses. Constant exposure to these toxins lead to cancer cells development in one's body. In order to protect the environment and safeguard the health of the people a limit and standards should be applied when it comes to the acquisition of used computers.

GIS in Hazard Mapping

by Bright Chituu



Many regions in the world are exposed to a number of natural hazards which cost billions of dollars annually. The growing impact of disasters in the past decades is mainly as a result of climate change. Out of 50 fastest growing cities in the world 40 of them are located in earthquake zones. More than 10 million people in developing countries live under constant threats of floods. To minimize disaster losses more efforts should be put in place on Disaster Risk Management, with a focus on hazard assessment, elements-at-risk mapping, vulnerability assessment and risk assessment, which all have an important spatial component.

Spatial information has a big role to play in impelling the decisions we make every day by giving a clear picture of the space around us. It allows us to identify the relationships and trends that were not apparent otherwise. GIS users are discovering increased use in risk analysis due to its capabilities in linking location with the associated information. It helps to efficiently capture, manipulate, store, and analyze information about geographic locations. One of the basic principles of risk assessment is that risks that happen due to natural catastrophes such as hurricanes, earthquakes, and floods are dependent on the location and can be assessed if reliable location intelligence is available. Considering this aspect, many institutions use GIS to assess the risk of life and property due to natural hazards.

GIS software companies such as Esri have developed methods that can help public safety agencies who respond to Natural Disasters through reducing their impact, providing first responders with the best information to make optimized safety decisions under stressful conditions, recovering from emergencies quickly and providing business continuity.

Forest fire is one of the natural hazards causing a huge life, property and ecology losses. These fires occur frequently and there is a need for supranational methods that analyse wide scenarios of aspects involved and global fire effects. Satellite data has been widely used to detect forest fires in different parts of the world and the Geographical Information System (GIS) and remote sensing techniques have been useful in assessing and predicting the fire frequency. It is impossible to control nature, but is possible to map forest fire risk zone and in that way reducing the frequency of fires. GIS can deliver tools to work with tactical, location-based information such as floor plans, utility control points, pre-fire plans, hazardous material contents and locations, surrounding exposures, aerial imagery, and hydrant locations. Access to this information allows firefighters to deploy more quickly, effectively, and, most important, safely.

GIS has proved useful in managing natural hazards such as floods. Flooding can be very perilous and can totally disturb public and personal transport by cutting off roads and communication channels when telephone lines are damaged. Several GIS models have been utilized in flood simulation, including the use of specialised GIS software like SOBEK, HEC-RAS, MIKE II, LISFLOOD, one-dimensional two-dimensional (1D2D) hydraulic and TUFLOW to mention just a few. Flood hazard assessment and mapping is used to identify areas at risk of flooding, and consequently to improve flood risk management and disaster preparedness. Flood hazard assessments and maps typically look at the expected extent and depth of flooding in a given location, based on various scenarios for example 100-year events or 50-year events. In Zimbabwe, the Civil Protection Unit has taken advantage of using GIS technologies to monitor flooding in areas such as Muzarabani, Zimbabwe Low Veld, Save and areas in Hwange District. Flood mapping exercises have been carried out to identify flood prone areas and evacuation centres. This makes the exercise an integral part of a flood early warning system and for emergency preparedness plan.

GIS provides an opportunity to civilian authorities and international agencies to boost their alertness for coping with natural disasters. GIS can help to manage the impact of earthquakes, hurricanes, avalanches and volcanoes. It also helps in assessing risk and hazard locations in relation to populations, property and natural resources, integrating data and enabling understanding of the scope of an emergency to manage the hazard, recommending preventive and mitigating solutions, determining how and where scarce resources should be assigned as well as prioritizing search and rescue tasks



Guerrilla Farming – Pros and Cons

by Jairos Nzvimba

According to the United Nations, by 2050, two-thirds of all humanity, that is close to 6.5 billion people, will be living in urban set ups. Cities in developing countries including Zimbabwe are recording high levels of rural to urban migration as people look for employment, better educational opportunities and being attracted by the bright lights of the city. This has created an immediate need for using urban natural resources at hand for survival.

Urban agriculture also referred to as guerrilla farming, is defined as food production within the confines of cities and towns, at the backyard, on rooftops, on the rural urban interface, on unused spaces and in greenhouses. Advocates have argued that, policy-makers should recognize the opportunities provided by urban agriculture as we counter

increasing urbanization and food demand. There is some benefit as it earns income to families, employment of low-skilled unemployed residents, improved air quality and hydrology, provides a place for disposal of organic solid waste (manure) and reduction of urban blight. World over farming in plots near cities and within individual properties are recognised and supported with the potential to sustainably and significantly contribute to food security. A resident in Harare had to say, "My yard sprouts with, tomatoes, vegetables, garlic and onions. I see benefit; We always meet with my neighbours at the garden fence and exchange for money. My street and backyard have grass, trees, lawn and flowers. I always see beauty".

While we cherish the benefits of urban agriculture, the fact remains "if things

are done wrong then things will go wrong" and this brings attention to the commonly practiced form of urban agriculture - Illegal Urban farming - . with impacts ranging from environmental, social, health to infrastructural risks. This is a critical subject that requires increased attention and response, raising concern over Sustainable Development Goal (SDG) 11 on Sustainable cities and communities. The SDG endeavours to make cities inclusive, safe, resilient and sustainable. Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. When we utilise every 'available' piece of land without much regard to anything else. Any 'unused' piece of land is a target, be it on hill slopes, on wetlands, along urban stream banks, near dumpsites, near electricity, water and sewer



infrastructure and along road sides. These are likely to cause significant long term damage to the urban ecological and economic systems. While providing food security in the short term, can consequently hinder the ability of urban residents to secure food as it is likely to become the leading cause of distress in relation to SDG 11 thereby putting Zimbabwe in stark contrast to national, regional, and international commitments towards attaining sustainability.

Citizens should be aware of the impacts of their actions and other risks as secondary to meeting their food requirements. Use of fire as we clear land poses a great risk on the environment, as an agent of pollution and fragmentation of urban species habitats. Tilling itself particularly on hill slopes and road sides triggers soil

erosion resulting in gullies, one of the most prominent characteristics of degraded land and an eyesore. Land clearing also interferes with green spaces and threatens biodiversity by replacing natural environments causing disturbance and draining of wetlands and vleis which impede their ability to carry out their ecological services that include renewing ground water supply, water filtration of excessive nutrients among others. The use of chemicals for pest control, use of inorganic fertilisers worsens the situation as these chemicals end up contaminating water sources and endangering aquatic life. Proximity of fields to potentially precarious land uses such as industries which produce pollutants in solid, liquid or gaseous state result in absorption of heavy metals that endanger pregnant women, the elderly and children. Crops can also be hazardous to public

safety by harbouring criminals as they create crime generation from hideouts; muggings and robberies are known to be on the rise during the cropping season as people plant crops along footpaths used by residents to go to the bus ranks, shops, clinics and adjacent suburbs.

Tilling under electricity poles can weaken the pole or accidental exposure to naked wires. High health risks on drinking-water contamination through potential groundwater contamination. Flooding, damage to property, transport routes and infrastructure; lowering of the land surface; logging of city drains, algal blooms and water hyacinth, high costs of water purification, loss of scenery and diversity of the environment, loss of recreational spaces; water for domestic use being diverted to irrigation causing shortages municipal supply.

Demystifying an Environmental Impact Assessment; What is in it?

by Siphon Graham Ndebele

SUSTAINABLE DEVELOPMENT is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. To implement a project, various resources are required; which undergo a series of activities and transformation to deliver the project's objectives. For instance, to establish an irrigation scheme in light of food security; soil, land and water are the prerequisite requirements. To meet these needs, natural resources are exploited including human capita. Activities that transform the environment have both social and environmental, negative and positive impacts such as habitat and biodiversity loss, displacement of settlements, employment creation, pollution and depletion of resources. There is need to evaluate impacts associated with a project in order to prevent, mitigate or compensate related negative effects while enhancing the positive effects for ideal public and ecological health. To attain this balance, an Environmental Impact Assessment (EIA) is a tool which can be applied to effect sustainable development and growth.

An EIA is a process that identifies and evaluates the potential environmental and social impacts, related to the implementation of a project. In Zimbabwe, an EIA is a legal requirement in terms of the Environmental Management Act (EMAct) Chapter 20:27 of 2002 read together with Statutory Instrument (SI) number 7 of 2007 on Environmental Impact Assessment and Ecosystem Regulations. These regulations provide a framework for social, environmental and ecosystems protection including enhancing sustainable socio-economic transformation.

The EMAct details environmental

impacts assessment requirements under sections 97 to 108 whilst SI 7 of 2007 regulates the extraction of clay and sand deposits, environmental impact assessments, prevention of fires, sloughs and protection of wetlands, public streams and other certain lands. Under the first schedule of the EMAct Chapter 20:27, all projects with significant social and environmental impacts subject to environmental impact assessment are described. These projects include dam construction, power generation, farming and mining activities. SI 7 of 2007 provides a procedure for undertaking an EIA, where a developer is required to submit a prospectus report to the Environmental Management Agency, which is reviewed under 20 working days or less. For any prescribed project to take place in Zimbabwe, a prospectus report is the prerequisite requirement. The purpose of this report is to provide a baseline environmental setting of the project site, including its key information such as the project location, description, area size and the potential social and environmental impacts. This information provides evidence to the Environmental Management Agency as basis for decision making on whether an Environmental Management Plan should be done or a full EIA, based on its scope and possible impacts.

Upon approval of the prospectus report by the Agency, the developer is required to engage an eligible and registered consultant to undertake a full EIA in line with the set EIA requirements. The EIA report is reviewed and approved within 60 working days or less. An EIA certificate is then issued upon a satisfactory finding of the regulatory agency by the EIA findings. If the project requires a full EIA, it is expected to conduct a public consultation process which informs relevant stakeholders and

the public on the project objectives and the related impacts. This motion highlights social inclusion within the project implementation scope in order to prevent, mitigate or compensate any social and environmental impacts. The EIA requirements also expect the project to identify, assess and evaluate significant environmental impacts and address them through an Environmental Management Plan. After the Environmental Management Agency issues an EIA certificate; valid for 2 years, the project is subject to quarterly environmental audits. The reports for the quarterly environmental audits are submitted to the Agency for monitoring compliance and renewal of the EIA certificate is done annually thereafter.

In addition, licenses and permits are required first before extraction of natural resources or disposing of waste. An example is that of SI 7 of 2007 which stipulates that a license is required before extraction of clay and sand deposits for commercial purposes. The license is valid for one year and it is not transferable. The Statutory Instrument also prohibits lighting up fire outside residential and commercial areas during the 31st July to 31st October of each year. It also encourages land owners or users to establish fire prevention measures by designing and erecting at least a 9-meter fire guard. In regards to sloughs, the regulations prohibit the use or license of sloughs on any land. Wetlands are an essential part of our ecosystem as they facilitate water purification, act as a carbon sink and are habitat to diverse organisms. To protect wetlands, the SI prohibits any operation on a wetland, unless a license has been issued to a developer by the agency. The regulation also prohibits development activities on land that is within 30 meters of naturally defined banks or public streams.



Africa's Green manufacturing: Opportunities for the determined

by Innocent Nhire



THE AFRICAN CONTINENT remains at cross roads. It is the most vulnerable to climate change and climate variability. The incentive is strong for African countries to join global efforts to reduce greenhouse emissions while also increasing its adaptive capacity. In the same vein, African countries have committed to industrialising their economies to meet the challenges of poverty, growing populations and unemployment. If Africa is to realise these, using the same road to economic development that developed countries took, it would be disastrous to the environment. Globally, countries have been setting out plans to reduce greenhouse gas (GHG) emissions by the middle of the century so as to limit the increase in global average temperatures. The increase in global temperatures is being noted as a cause of concern as it increases the chances of extreme weather events occurring, rising of sea levels which lead to hunger and migration. Unrestrained growth of emissions in Africa gets in the way of economic development, and would

pose economic impacts which include export linked penalties and reduced financing. In this article, the continent's manufacturing trajectories as well as potential reduction approaches for the long term are explored.

At a global level, the manufacturing industry has been regarded as a major GHG emission contributor based on its power demand. It is very important to take note of this in pushing to realise the 1.5 °C pathway. Though Africa's contribution through manufacturing is negligible, it will inevitably increase as the continent industrialises its economy. According to the 2020 World Bank data, Africa's manufacturing sector presently emits around 440 megatons of carbon dioxide, which is around 30 to 40 percent of total African emissions. If this growth trajectory continues in the absence of any decarbonisation efforts, emissions could double to about 850 megatons by 2050. This would be a major setback to the global efforts of emission reduction. More importantly it would also put Africa at

an economic disadvantage. Africa would run a risk that it might not be able to export to international markets and with many countries passing environmental legislation and implementing taxes on GHG emissions of imported goods, there is a risk of a dire situation for Africa to rely more on international development, if no action is taken.

Robust efforts to decarbonise the manufacturing and power sectors will have fundamental implications for the African continent which can enable the manufacturing sector in Africa to grow and create clean jobs, while remaining globally competitive. In reality, to achieve this a lot of funds are needed. Estimates by African Development Bank show that approximately US\$2 trillion is required in additional investment in manufacturing and power industries in the next 30 years. Around US\$600 billion would also be required to decarbonise the current industries operating, to turn them into green facilities. The rest of the US\$1.4 billion would be needed



to assist in the creation of new, low emitting businesses which would replace or supplement high emitting legacy sectors. Michael Turner, Director of Actis, a leading market investor stated that, "As African economies industrialize and energy demand increases, the availability of affordable green energy will be vital. Without green power, it will not be possible to realize Africa's green manufacturing potential." It is important to note that millions of jobs can be created from decarbonisation led growth, despite having about 2 million jobs being lost from legacy industries as consumers make the switch to greener options. Predictions are being made that about 6 million new jobs could be created in the new green businesses by 2050, mainly in cross laminated timber and electric vehicle charging infrastructure and with strong performances in the solar and wind industries.

Already there are many promising sectors which are being explored in

the continent. In the renewable energy sector, there are some good examples of excellent work being done. In Nigeria, a country which is not exactly abundant in solar and wind, Auxano is running its own solar photovoltaic manufacturing company, alongside Nayo Tropical Technology which has been operating in Nigeria as well, providing solar inverter solutions and manufacturing solar panels and other important components for solar home systems and mini grid systems. There are real prospects for a scale up and growth throughout the continent. A good example is the East African electric motor cycle start-up, Ammpersand, which is a leading electric vehicle operation in the region. It leases or sells purpose-built electric two-wheelers to motorcycle taxi drivers, assembles all motorcycles and batteries on site, helping to ensure that the next generation of African developers and engineers are being nurtured in Africa.

The road towards net zero emissions for Africa is not an easy one but the risks

of not realising this goal, do outweigh the sacrifices and costs that would have been made to get there. The need for action has never been greater, as the window for containing global warming below 1.5° continues to narrow. In many sectors green technology and production processes are available, with additional low carbon technologies developed and should reach economic viability and maturity by 2030 and this should close the gap to decarbonisation by 2050. At the same time businesses and investors have an opportunity to quickly seize on green manufacturing opportunities. At this important juncture as African countries grapple with the fallout from COVID 19, there is an opportunity to step back and reimagine Africa's growth on a more sustainable path. Considering that Africa's manufacturing sector remains negligible, there is an opportunity to build its innovation, greener jobs and technologies which are geared towards a suitable development which has remained elusive for Africa.

UNDERSTANDING USED OIL CHALLENGES AND SUSTAINABLE DISPOSAL OPTIONS

by Simbarashe Machisa

It has been noted that environmental pollution is a global challenge as it results in damaged ecosystems, economic loss and tourism disruption. It occurs as a result of careless incidents such as industrial wastes discharge and oil spillages. Waste oil is produced across industries, from mining, manufacturing, construction, catering and agriculture. Waste oil is defined as any petroleum-based or synthetic oil that has become unsuitable for its original purpose due to the presence of impurities or loss of original properties. The discharge of used oil pollutes the land, air, and water thereby, damaging the entire ecosystem.

Common causes of oil spillages

- Carelessness
- Equipment failure
- Leakages
- Natural disasters
- Acts of vandalism
- Poor equipment maintenance

Organisations whether big or small should come up with sustainable methods on handling and disposing of used oil from equipment maintenance operations, process procedures and any other activities where used oils are generated.

Sources of used oil

- Fuels oil
- Lubricating oil
- Transformer oil
- Cooking oil and grease

Disposal of used oil should be done as per instructions defined in the Safety Data Sheets (SDS). Recycling of waste oil is the preferred disposal method. Only licensed operators are allowed to collect used oil for disposal. The National Oil Recyclers Association (NORA) was founded in 1985 to promote the safe recycling of used oil. Today, the organization recommends different types of recycling methods for waste oil.



Used Oil Re-Refining - The process of re-refining used oil removes impurities so that it can be used again as the base of new, lubricating oil.

Used Oil Processing - Processing used oil converts it into a fuel. This used oil can be converted into gasoline or another refinery fuel or burned directly as fuel. The latter is how our clean burn waste oil furnaces and boilers operate.

Reconditioning - This process filters used oil to extend the usable lifespan. This is the ideal waste oil disposal option for large volumes of industrial oil.

There are certain precautions that

should be taken to ensure safe waste oil disposal. Waste oil is hazardous. If one is storing waste oil, they should make sure it is done properly and clearly labeled so as not to put employees or customers at risk. When handling waste oil, be sure to use protective equipment to keep the body safe. On the other hand, it is important to develop and implement a holistic waste management plan which is in line with the concepts and principles of sustainable development and growth, especially sustainable development goal 8 on decent work and economic growth, Goal 9 industry on innovation and infrastructure as well as Goal 12 on responsible consumption and production.

Harare City developing an integrated solid waste management plan to address growing waste challenges

by Wallace Mawire

The City of Harare has developed its integrated solid waste management strategic draft plan running from 2021 to 2036 to address challenges related to solid waste management. Various stakeholders met in Harare in September 2021, to review and finalise the plan. The plan has been developed at a time the city of Harare is facing serious challenges in solid waste management.

According to a document presented by Donald Sakupwanya, Harare City Council Cleansing Superintendent, the council is operating with an inadequate set of waste management equipment and provisions. Only 16 out of 32 trucks are operational against a rise in demand for refuse collection necessitated by rapid urban development. The existing refuse collection and transportation fleet is inadequate and old, meaning increased repairs and down time, which is also reported to contribute to the challenges. Harare has 15 compactors instead of the 40 compactors needed. It has no weigh bridge to establish waste quantities. The report says that Harare City's incapacity is leading to irregular refuse collection. In addition, the city council is reported to be unable to adequately cover the whole city in its refuse collection services. Harare is still using a dumpsite in Pomona as its final waste disposal facility and there are frequent fire outbreaks at the site. A major fire outbreak was experienced in 2020 and it triggered the processes that led into the development of this integrated solid waste management plan.

It was also added that the current pricing model for refuse collection is such that ratepayers are not meeting the full cost of refuse collection services, creating a deficit and hampering effective and efficient refuse collection.

Other factors that are reported to work against efficient and effective waste

management in Harare include the city predominantly using the refuse collection and disposal model where all the waste is collected, transported and disposed of. There is no fully fledged waste management department or vision in the council structures and therefore the council's capacity to make informed decisions around solid waste management is limited. The report also states that there are no plans and systems to help the city council account for the waste generated within Harare and this undermines its ability to make informed decisions on waste management.

Waste management is being done by the Department of Works whose mandate goes beyond refuse collection, transport and disposal. Efforts have been made to set up two waste to energy plants utilising organic waste. Some material recovery is also taking place within Harare, but Harare City Council does not have a systematic account of waste management activities being undertaken by other stakeholders. This represents an opportunity for the council to improve the overall waste management within Harare through combined effort,

synchronising activities and maximising the overall effectiveness of overall waste management efforts within Harare.

Traditional waste management systems consist of a simple process whereby the local authorities collect, transport and dispose of waste at selected waste disposal sites such as disused pits or on open ground. This method is not financially and environmentally sustainable. Many cities and towns especially in high-income countries, are reported to have since abandoned this model and have shifted to more efficient integrated solid waste management models. These models comprises of a set of waste treatment methods and strategies whose main objectives are to prevent, or reduce as much as possible, the generation of solid waste, diverting as much waste as possible from landfills and improving the efficiency in solid waste management.

Prevention and reduction of waste is primarily done at source. This is mainly at the production, packaging and consumption stages and can be achieved through sustainable production, packaging and consumption policies, strategies and activities. Continual monitoring and evaluation of policies and strategies implemented is key in ensuring achievement of an effective Integrated Solid Waste Management System (ISWM). In Zimbabwe, the resort town of Kariba has developed a functional integrated solid waste management plan which the city of Harare is trying to emulate.



Cosmetics

and the Environment

by Tendai Kaneta

While some people assume that cosmetic products are a recent invention, the use of cosmetics can be traced back to thousands of years. Cosmetics are substances or products applied to the body for the purpose of beautifying or altering the appearance. Designed to enhance one's appearance, cosmetics can also be used to conceal blemishes. Cosmetics can also be used during performances to change the appearance of the face entirely and resemble a different person.

Currently, the beauty industry in Africa is fast growing with several makeup and skincare lines being opened. In Zimbabwe, there has been a significant increase in beauty spas and saloons and this shows an increased recognition of makeup use by society. However, only a few know about the negative impacts that come from the production and use of cosmetic products on the environment and human health.

Cosmetic products are composed of different materials including heavy metals such as mercury copper, nickel, chromium and other elements. Constant

exposure to these heavy metals may result in numerous health problems including skin allergies, DNA damage and memory loss.

These elements become part of the product intentionally as they are used for pigmentation, preservation. Ultra Violet filters are important in cosmetics because human exposure to UV radiation can cause chronic health effects. However, the elements can be circulated in the blood after they bind with plasma proteins which can cause health issues in the long run.

Cosmetics come in different packaging materials. Packaging is usually made from plastics which take hundreds of years to break down in landfills while leaching toxins into the soil and waterways. While it may be tempting to get into bed with makeup on, completely removing it before bed is advised by the specialists. Makeup removing wipes are mostly flushed out into the sewer system. These clog up sewage systems as they are not biodegrade. They persist in the environment and by the time they get to the lakes, oceans or any other water

bodies, they get ingested by different creatures which eventually die. Despite the method of disposal used, all toxic chemicals eventually find their way into water ways and soils destroying natural habitats.

In the making of beauty products, palm oil is sometimes used. The farming of palm oil has been argued by environmentalists as harmful to the environment as it requires the clearing of large pieces of land. Palm oil production is said to have been responsible for about 8% of world's deforestation through burning of forests to clear farmlands. With cosmetic products being increasingly used around the globe, more land is being cleared to meet palm oil demand, therefore worsening the already existing deforestation. This has significant impacts on the local ecosystems leading to biodiversity loss.

It is important to consider organic make up products and cosmetics packaged in biodegradable or recyclable material, as this will silently advocate for the production of environmentally safe products.



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Irrigating Horticulture Products With Effluent In Africa - Pros And Cons

by Simbarashe Machisa

Life is strange, ones stomach has the power to determine their fate, although Henley wrote, " I am the master of my fate, I am the captain of my soul. I believe this wisdom by Henley shows that we have the power to control our thoughts and are able to understand and trace the sources of products that we consume for our safety.

Wetlands in urban areas are increasingly becoming cultivation lands for horticulture products. Although the local bylaws prohibit the use of effluent to irrigate crops. Most of the aging and dilapidated sewer pipelines are the ones which open the flood gates of effluent into the environment, and these find way to plants being grown.

Horticulture is the science and art of the development, sustainable production, marketing and use of high-value, intensively cultivated food and ornamental plants.

Horticultural crops are diverse and these include:

- Annual and perennial species
- Fruits and vegetables
- Decorative indoor plants
- Landscaping plants

PROS

- Wastewater has high nutrient content mainly phosphates, nitrates
- Reliable waste-water supply allows

farmers to grow short-cycle cash crop

- This form of production has great importance as a source of income

CONS

- Health risk to consumers due to heavy metals and microbial contaminants
- Crop contamination

Waste water used for irrigation has often been proven to contain microbiological contaminants exceeding the WHO guidelines (WHO 2006). There is overwhelming information that consuming these products can be fatal to humans. Reference can be given to the cholera and typhoid cases that have been experienced in Zimbabwe.



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