

## Editors Column

It has been an interesting year thus far, in this edition we discuss Carbon Sinks, what they are and what they do. With Carbon sinks and climate change in mind we discuss the International Day of Forests where experts highlight the critical role that forests play. , We look at the progress of one of Black Crystals projects: the Kariba REDD+ (Reducing emissions from deforestation and forest degradation) and details on how Black Crystal celebrated National Tree Planting day.

We welcome your comments and environmental contributions to the Editor:

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Thank you and happy reading!



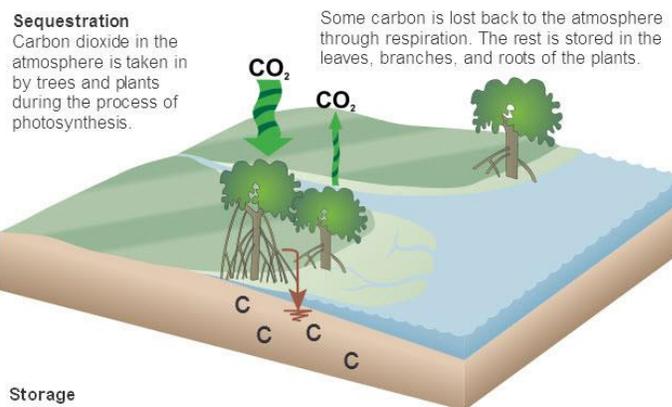
Environmental Consultants  
Caring for the environment beyond today

Black Crystal Consulting is one of Zimbabwe's leading reputable companies offering a quality service in environmental and socioeconomic consultancy services. Black Crystal Consulting believes in **caring for the environment beyond today** to ensure that biodiversity is maintained and that natural resources are not depleted for the next generation.

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## Carbon Sinks Are Good

A carbon sink is anything that absorbs more carbon than it releases, whilst a carbon source is anything that releases more carbon than it absorbs. Forests, soils, oceans and the atmosphere all store carbon and this carbon moves between them in a continuous cycle. Climate change presents an increasingly significant challenge for most global organizations to implement measures to reduce both direct and indirect greenhouse gas (GHG) emissions associated with its activities, products, services and those within its control and sphere of influence and to also adapt to the physical impacts of a changing climate. To reduce their environmental impacts, organizations need to consider an integrated approach that takes into consideration the wider economic, social and environmental implications of their decisions and activities.



**Storage**  
Dead leaves, branches, and roots containing carbon are buried in the soil, which is frequently, if not always, covered with tidal waters. This oxygen-poor environment causes very slow break down of the plant materials, resulting in significant carbon storage.

Carbon dioxide (CO<sub>2</sub>) is a natural greenhouse gas (i.e. traps heat near the earth's surface) in our atmosphere. CO<sub>2</sub> is responsible for the earth's stable climate; however, over the years with increase CO<sub>2</sub> emissions this has resulted in climate change. Human activities such as burning of fossil fuels (coal, oil, destruction of forests) increase the level of CO<sub>2</sub> in the atmosphere. Research has shown an increase in concentrations of CO<sub>2</sub> in the atmosphere from 284 parts per million in 1832 to 387 parts per million in March 2009 ([en.wikipedia.org/wiki/carbon\\_dioxide](http://en.wikipedia.org/wiki/carbon_dioxide)). Mean annual temperature increases between 1° and 6° are projected over the next 70 years. Agricultural activity and biological processes produce Methane and other nitrous oxide with a much greater warming impact per tonne than CO<sub>2</sub>. The effect of greenhouse gases

global warming is manifest in extreme weather patterns – higher or lower average temperatures, reduced or increased rainfall and drought.

Natural vegetation (particularly trees) act as sinks for absorbing CO<sub>2</sub> through photosynthesis, and release oxygen. Trees store carbon (C) in their leaves, branches, stem, bark and roots. The process of trees absorbing CO<sub>2</sub> is also referred to as carbon sequestration. Naturally reforesting deforested areas will create carbon sinks to counteract greenhouse gas emissions and will also improve soils, and provide habitats for other species e.g. birds, thus improving the biodiversity of the area as well.

### **Definitions – Greenhouse Gases**

#### **Carbon Dioxide (CO<sub>2</sub>)**

Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions. CO<sub>2</sub> is removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle.

#### **Methane (CH<sub>4</sub>)**

Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in solid waste landfills.

#### **Nitrous Oxide (N<sub>2</sub>O)**

Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

#### **Fluorinated Gases**

Hydro fluorocarbons and sulphur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e.: CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases (‘High GWP gases’).

#### **Global Warming Potential**

The Global Warming Potential (GWP) depends on both the efficiency of the molecule as a greenhouse gas and its atmospheric lifetime. GWP is measured relative to the same mass of CO<sub>2</sub> and evaluated for a specific timescale. Thus, if a gas has a high radioactive forcing but also a short lifetime, it will have a large GWP on a 20 year scale but a small one on a 100 year scale. Conversely, if a molecule has a longer atmospheric lifetime than CO<sub>2</sub> its GWP will increase with the timescale considered. CO<sub>2</sub> has a variable atmospheric lifetime, and cannot be specified precisely. While more than half of the CO<sub>2</sub> emitted is currently removed from the atmosphere within a century, some fraction (about 20%) of emitted CO<sub>2</sub> remains in the atmosphere for many thousands of years. CO<sub>2</sub> is defined to have a GWP of 1 over all time periods.

Methane has an atmospheric lifetime of 12 ± 3 years and a GWP of 72 over 20 years, 25 over 100 years and 7.6 over 500 years. The decrease in GWP at longer times is because methane is degraded to water and CO<sub>2</sub> through chemical reactions in the atmosphere.

#### **Carbon Footprint**

A carbon footprint is the total set of GHG emissions caused by an organization, event or product. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs emitted.

#### **Did you know!!!**

Oceans have the largest area of contact with the atmosphere and are thus the largest and most important of carbon sinks. . It contains more carbon than all the terrestrial vegetation and the atmosphere combined. Soil is also an important carbon sink One of the aspects of the Kyoto protocol is a possibility for nations to plant more trees and other vegetation to offset fossil fuel use. Carbon sinks are thus officially seen as relevant to combating global warming.

#### **National Tree Planting Day**

The National Tree Planting Day in Zimbabwe was celebrated on 6<sup>th</sup> December 2014 when people from all walks of life participated by planting tree saplings. The theme for 2104-2015 is “Forest For Food Security And Nutrition”. The tree of the year is *Bolusanthus speciosus* which is also known as Tree Wisteria (English) Impaca/

Mpaca (Ndebele) Mubacha/ Mukweshangoma/ Mupaka/ Murutsa (Shona) Mushengamhara (Shona). It is a small, deciduous tree, often multi-stemmed with drooping foliage. Bark dark, rough and vertically fissured. Leaves imparipinnate with 3-7 pairs of leaflets plus a terminal leaflet; leaflets lanceolate with an asymmetric base, up to 7 cm; midrib and lateral veins yellowish and conspicuous; margin entire or irregularly scalloped. Flowers in striking, pendulous, terminal sprays, blue to deep mauve. Fruit a flat narrow pod up to 7 cm, straw-colored to grey-black when ripe.



*Bolusanthus speciosus*

Animals including monkeys, gemsbok, giraffe and grey duiker eat the pods and leaves. The wood, which is highly sought after by carpenters, makes excellent furniture. It works well on a lathe, turning out beautiful lampshades and other articles. The straight growing stems are very hard, termite resistant and used for fencing posts. The roots are used medicinally to alleviate stomach problems and the inner bark used to treat abdominal cramps. It also has excellent potential as a tree for landscaping and growing in the home garden.

Every year Black Crystal collaborates with various companies and schools in tree planting activities by donating and planting tree saplings, in secure areas, as part of our Social Responsibility programme. This year we are proud to say that we partnered with the Jesuit Province of Zimbabwe and one of their schools: St

Peter's Kubatana High School in a tree planting ceremony. The school was founded over 50 years ago in 1963. Today it is one of the best Catholic run schools in Highfield and well known for good academic results and providing post GCSE 'O' Level apprenticeship training and education in its technical college adjacent to the high school.



As part of Black Crystals on-going social responsibility programme we donated various tree saplings to the school in commemoration of National Tree Planting Day 2014. Mr Chiromba the Head master met with Ms Childes and Mrs Waterworth of Black Crystal who explained that the school is working towards establishing indigenous woodland on the school grounds so that the students may enjoy their time outside under the shade of the trees. He also said that they are planning to plant fruit trees as well. Then they were joined by Mr Mawetera Deputy Head, Mr Mvindi School Accountant and Mr Rukweza head Gardner.



Happy Form 5 and 6 Agricultural students with Mr Chiromba, Headmaster

Unfortunately there were no Mubacha available for planting, but Ms Childes and Mrs Waterworth handed over the following indigenous tree species to the school:

- *Ficus sycamorus* Common Name: Sycamore Fig or Mukuyu. This grows into a large shade tree with pale yellow bark and rough papery leaves and can grow on a range of soil types;
- *Philenoptera violacea* Common Name: Rain Tree or Mupanda. This tree is associated with heavier clay soils in riparian areas. It has attractive violet flowers and in spring it appears to “rain”. The drops of moisture are not rain but come from insects that feed on the tree’s sap;
- *Syzygium guineense* Common Name: Waterberry or Mukute. This is an attractive evergreen green that occurs along stream banks and in wetlands on heavier soils. It has small edible fruit.



Ms Childes handed over copies of a how to plant your tree booklet to Mr Magosha Head of Agriculture and explained the contents to the eager Form 5 and 6 students gathered around. She also explained that the tree planting exercise could be used to teach students about soil types, tree species, habitats and birdlife. By planting a variety of tree species, a range of insects and birds will be attracted into the school grounds and give the students an opportunity to see examples of biodiversity first hand.

But why bother to plant trees? Well the planting of trees has significant benefits globally, including the following:

- Combating the greenhouse effect;

- Cleaning the air;
- Absorb pollutant gases and filter particulates out of the air by trapping them on their leaves and bark;
- Providing oxygen: in one year an acre of mature trees can provide enough oxygen for 18 people;
- Cooling the streets and the city by up to 10°F, by shading our homes and streets, breaking up urban “heat islands” and releasing water vapor into the air through their leaves;
- Conserving energy: 3 trees placed strategically around a single-family home can cut summer air conditioning needs by up to 50%. By reducing the energy demand for cooling houses and offices, carbon dioxide and other pollution emissions from power stations are also reduced;
- Saving water: shade from trees slows water evaporation from thirsty lawns. Most newly planted trees need only fifteen gallons of water a week. As trees transpire, they increase atmospheric moisture;
- Help prevent water pollution by reducing runoff by breaking rainfall thus allowing the water to flow down the trunk and into the earth below the tree. This prevents storm water from carrying pollutants to the ocean;
- Help prevent soil erosion: On hillsides or stream slopes, trees slow runoff and hold soil in place;
- Shield people from ultra-violet rays: They reduce UV-B exposure by about 50% and reduce cases of skin cancer;
- Provide food for humans, birds and wildlife;
- They have healing properties;
- They create economic opportunities;
- Trees add unity: as landmarks they can give a neighborhood a new identity and encourage civic pride.
- They provide a canopy and habitat for wildlife and they block unsightly views like concrete walls or car parks;
- They provide wood and
- Increase property values.

### Don't Miss the BIG Live Earth Event: the Road to Paris - 18 June 2015

Some of the world’s best known superstars are going to use the universal power of music and come together as one voice with one message: ‘take climate change

action'. On 18 June 2015 more than 100 artists will perform live over a 24 hour period to an estimated global audience of more than 2 billion people. Concerts will be held in each and every one of the continents. One of the biggest music collaborations the world has ever seen will be streamed on various social media sites including YouTube, radio and TV. Pharrell Williams is the Creative Director and the host is the former US Vice-President Mr Al Gore who received a Nobel Peace Prize for his work in climate change activism.

**JUNE 18, 2015**



**LIVE EARTH**  
ROAD TO PARIS

A BILLION VOICES. SEVEN CONTINENTS. ONE MESSAGE.  
URGE WORLD LEADERS TO

**TAKE CLIMATE  
ACTION NOW**

[www.liveearth.org](http://www.liveearth.org)

Their message is clear: many people are in denial about climate change: politician's need to get serious and address climate change and every global citizen can help by reducing emissions, creating carbon sinks etc.

The world has witnessed 'super storms' for instance in the Philippines and the USA. Increasing ocean temperatures lead to an increase in evaporation and humidity in the air which then holds more water that leads to unprecedented downpours, floods and mud slides as was experienced in China and India. In addition to this the extra heat that evaporates from the oceans pulls

moisture quicker from the soil leading to droughts as seen in Nigeria, Guatemala, California and Korea. In China one of their largest lakes has dried up. Closer to home droughts are occurring in Malawi and Mozambique. Droughts have led to food shortages and food riots in Pakistan, South America and North Africa. From the period 2006-2010 drought in Syria turned 60% of its fertile land into sterile desert and killed 80% of the countries cattle. By 2010 there were 1 million refugees flooding into the cities.

'Air pollution from burning fossil fuels has risen rapidly globally. In China the average life expectancy has been reduced by an average of 5.5 years in the northern areas whilst the air Pollution index in Beijing is nearing extreme levels and it is nearing a level that is no longer viable for human beings to live in'. (Shanghai Academy of Social Science, February 2104). Sea levels are rising and the cities most at risk (by population) are: Calcutta, Mumbai, Dhaka, Guangzhou, Ho Chi Ming, Shanghai, Bangkok, Rangoon, Miami and Hai Phong. The US Department of Defence 2014 Climate Change Roadmap cited that "Rising global temperatures, change in precipitation rates, rising sea levels and more extreme weather events will intensify the challenge of global instability, hunger, poverty and conflict. The cost of using carbon is adding up such as the cost of insurance increasing, floods and mudslides, dying coral, climate refugees, the increase of infectious diseases, melting glaciers, political instability, famine, war, collapse of ecosystems, species extinction, rising sea levels, drought, wild fires, water shortages and infrastructure loss.

### **Did you know!!!**

Enough solar energy reaches earth every hour to meet the power needs of the whole world for an entire year! So, why do we continue to use damaging fossil fuels when renewable energy technologies are available? Homeowners in Bangladesh are installing PV systems at the rate of 2 per minute, so why can't this happen in Zimbabwe? In 2014 Germany generated 74% of its electricity from solar and wind energy. Germany lies in the northern latitudes that experience lots of cloud cover,

with the abundant sunshine hours in Zimbabwe why can't the same be achieved here?

Some good news: last year the US and China (two of the largest emitters of greenhouse gases) agreed to emissions caps and to work together to help forge an international climate change agreement this year. The Vatican City is working towards becoming one of very few countries that are carbon neutral along with Costa Rica, Iceland, Maldives, New Zealand, Norway and British Columbia. Investment in renewable energies is increasing globally – this has to be the future.

The message is clear; climate change is threatening our way of life. You can help by reducing your carbon footprint today!

### **International Day of Forests: Experts highlight critical role of forests for SDGs, climate change**

The International Day of Forests was celebrated on Saturday, 21 March, and the Center for International Forestry Research (CIFOR) highlighted the importance of forests in a crucial year for the UN-backed frameworks that will guide humanity's response to climate change and sustainable development. "We have an opportunity this year to say that forestry is not only about the environment: Forestry can contribute to eliminate poverty, to food security, to prosperity in the green economy, to energy, and so on," Mr Holmgren said.



In September in New York, the UN will finalize a set of Sustainable Development Goals (SDGs) designed to provide a pathway for all countries to a future that is economically, socially and environmentally sustainable. And in Paris this December, countries will negotiate a new global climate treaty to replace the Kyoto Protocol. Under these frameworks, countries will need to take both sustainability and climate change into account when they plan their future development, and come up with plans of action to address the goals set out under these new agreements. That cannot be done without thinking seriously about forests, which cut across nearly every level of human activity.

"Forestry is an economic activity, first and foremost," said Mr Verchot. "It contributes significantly to rural livelihoods. It contributes to sustainable development. And, as we've seen in the climate change agenda, forestry is one of the areas where the world is actually making progress."

Take Brazil: In one of the few success stories in global climate change mitigation, Brazil slashed its emissions by around 40 percent from 1990 levels—almost entirely through a concerted, national effort to tackle deforestation. Between 2004 and 2012, Brazil reduced the deforestation rate in the Amazon by 76 percent, and while recent reports suggest Amazon deforestation is creeping up again, it's an effort that makes Brazil the single largest contributor to climate change mitigation. Forests have a similarly important role in assuring sustainable development. Even though forests are mentioned specifically in only one of the 17 draft Sustainable Development Goals, they are highly relevant to almost all of them.

"Forests are going to be integral to achieving a number of these objectives, whether it's poverty reduction or access to clean water supplies or maintaining agricultural productivity – so in their planning they can't just think about forests in isolation, they have to think how do these goals get met most effectively in multifunctional landscapes," Verchot said. "There is science there that can help countries make informed choices and good political choices about the trade-offs, and there is an

international and national scientific community that's there ready to support them with information and analysis to help them make the best decisions possible."

## Kariba REDD+ Forest Conservation



New community garden in Nyamakate

Black Crystal is pleased to provide you with an update of the REDD+ projects that we worked on. The forest conservation project is aimed at providing sustainable livelihood opportunities for poor communities in Northern Zimbabwe, a region now suffering heavily from deforestation, poverty, and drought. Its aim is to reduce deforestation and forest degradation through a range of activities proposed by local communities and financed by project supporters.



George Ganyana, participant of the Kariba bee-keeping programme, Hurungwe

How this project improves lives

- Healthcare centres and family-based micro-businesses are being supported.
- Numerous repairs on school buildings will be undertaken.
- Bush roads of more than 1000km have been repaired. A bridge repair has been undertaken and numerous further are expected.
- Boreholes for water have been identified for resuscitation, with an average borehole serving up to 100 families.
- 11 community gardens have been established, enabling food production for approximately 1,200 people so far.
- School fee subsidies will be available for the poorest quartile of the population.
- Biodiversity preservation of endangered and vulnerable species such as the elephant, lion, buffalo and African wild dog is undertaken.



Liason Officer Charles Ndondo with community member at Tashinga Community Garden, Hurungwe

For more information visit:  
<http://southpolecarbon.com/Kariba/page/projectpage.php>

**Thank you!!!**