

MAYA

The Voice For Environmental And Climate Justice



DEMANDING
ENVIRONMENTAL AND CLIMATE JUSTICE IN OUR LIFETIME.

BULLETIN

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APRIL 2020



MAYA BACKGROUND

The Manica Youth Assembly (MAYA) seeks to organise and empower ordinary youth to actively and consciously participate in public affairs and proffer solutions. It is non-profit-making, non-partisan and solution-centred.

MAYA was established in 2018 by youth who had come to understand the effects of the wanton destruction of the environment and the effects of climate change on the Earth and upon society, and who had come to realise that it is the young people of today who will bear the effects of climate change in the future.

MAYA will capacitate young people to protect and improve the environment through creative and sustainable initiatives.

MAYA exists to create a popular and political will to introduce climate and environmental solutions for the greater good of society.



HARTZELL MISSION, AFRICA UNIVERSITY AND THE MUTARE RIVER VALLEY



CORONAVIRUS COVID-19 WHAT TO DO IN ZIMABWE

As much as we would like to see a comprehensive plan by government to control the virus and cure those infected, the fact that we no longer have a real health system in Zimbabwe means that we must now look for other ways to try to prevent the spread of the virus and to stop people from dying from it.

Firstly, we need to understand — What is a virus?

A virus is an extremely tiny and simple organism. Because it is so simple, it is easy for it to mutate — to change shape and for a new virus to emerge. Other examples are the Flu of 1919 which killed 40 million people across the world; HIV which appeared in the late 1970s; Ebola virus first appeared in 1976 and the Sars virus which is related to the Covid-19 virus and was identified in 2002.

Unlike diseases caused by bacteria, a completely different group of germs, virus diseases cannot be cured by anti-biotics. The body must fight it itself. We can help the body by vaccination or by boosting the immune system mainly through right diet.

Better news is that Covid-19 does not kill everyone. Of those who become sick, about 1 person in 22 who catches the virus die from it.

Most at risk are smokers, the elderly, those with TB, asthma, bronchitis and other chest or breathing problems and those who are HIV positive and have low resistance.

But everyone is in some danger.

VIRUS DETECTION

The simplest way to distinguish Coronavirus from a Common Cold or Flu is that the Covid-19 infection does not cause a cold nose or cough with cold, but it does create a dry and rough cough.

The virus typically first affects the throat causing inflammation and a feeling of dryness. This symptom can last between 3 and 4 days.

The virus then travels through the moisture present in the airways, goes down the air tubes and into the lungs, causing pneumonia that lasts about 5 or 6 days.

Pneumonia is accompanied with a high fever and difficulty breathing. There may be a choking sensation.

PREVENTION

AVOID MEETING OTHER PEOPLE. If you are a church goer, pray at home. Meet as few people as possible.

DO NOT SHAKE HANDS! Fortunately in Zimbabwe we have other forms of traditional greeting which do not involve physical contact. We encourage ALL Zimbabweans to use some of these forms of greeting and avoid hand contact.

DO NOT SMOKE. Smokers are the ones who have been dying in large numbers.

This virus hates heat and dies if it is exposed to temperatures greater than 27°C. Therefore hot drinks such as tea, soup or simply hot water should be consumed often during the day. These hot liquids tend to kill the virus.

Avoid drinking fridge water or cold drinks. Drink water at room temperature.

BUT add lemon juice to water at room temperature rather than to hot water. Hot water kills the vitamin C which builds resistance.

Ensure that your mouth and throat are always wet, never DRY. You should drink a sip of water at least every 15 minutes. WHY? Even when the virus enters water or other liquids through the mouth, it will get flushed down the throat directly into the stomach where gastric acids destroy the virus. If there is not enough water, the virus can pass into the air tubes and from there to the lungs, where it is very dangerous.

When possible, sit in the Sun. The Sun's UV rays kill the virus and produce vitamin D which is good for you.

Eat liver of any animal once a week, beef, goat, chicken — all has vitamin D, vitamin A and the micro-nutrients which the body needs. Too much is not good for you, so do not eat it every day.

The Coronavirus has a large size for a virus, (diameter of 400-500 nanometers) so face masks can stop it. BUT face masks must be changed daily.

If an infected person is sneezing nearby, stay at least 3.3 metres away to allow the virus fall to the ground and prevent it from falling on you.

Anything which is touched by hand should be washed thoroughly and/or disinfected with an alcoholic hand cleaner. In Zimbabwe, surgical spirit, methylated spirit (meths) or even cheap vodka or cane spirit can be used.

BUT DO NOT DRINK ALCOHOL AT THIS TIME. IT WEAKENS RESISTANCE.

The virus can live on clothes and tissues between 6 and 12 hours. Common detergents can kill it. So can Jik. Things that cannot be washed should be exposed to the Sun and the virus will die.

The transmission of the virus mainly usually occurs by water droplets when someone coughs or sneezes, But it is also spread by touching surfaces or cloth where the virus is present.

Washing your hands is essential.

The virus survives on our hands for only about 10 minutes. In that time many things can happen, rubbing the eyes, touching the nose or lips. This allows the virus to enter your throat. Therefore, for your good and the good of all, wash your hands very often and disinfect them.

You can gargle with disinfectant solutions (e.g. Listerine, Dettol or Hydrogen Peroxide) that eliminates or minimizes any virus that has entered your throat. Doing so can remove the virus before it goes down to the air tubes and then to the lungs.

Disinfect things touched often: door handles, mobile phone, keyboards, steering wheels, etc...

We hope that in Zimbabwe, government WILL come up with a plan to treat those infected, but at present there is nothing.

CURE

In most cases with virus diseases, the body cures itself. But we need to help the body. If you become sick with Covid-19, here are things you should do,

- 1.** Keep isolated. Do not spread the disease to others. Anyone helping you with food should cover their nose and mouth with a mask and the body with a plastic bin-liner over the clothes.
- 2.** Stay warm. The virus does not like heat. Rest.
- 3.** If you can go out for fresh air during the warmer part of the day, do so, but keep very close to the house and DO NOT TOUCH OR TALK TO OTHERS.
- 4.** Take traditional cough medicine made from gum tree leaves or guava leaves.

Break up either of these kinds of leaves, but the best is to mix them half – half. Put the leaves in a pot.

Pour boiling water to double the height of the leaves. Leave for 2 minutes. Then drink. Unlike some traditional muti it does not taste bad and you can add lemon and sugar if you want.

WARNING: Do NOT boil the leaves or they become poisonous.

- 5.** Eat healthy food. This is often traditional food.
 - a)** Sadza/isitshwala made with small grains, nyauti, mhunga, mabele, rapoko etc. There are different kinds with different names in different languages. All are good.
 - b)** Avoid refined mealie-meal like Pearlenta and Ingwerewere. Roller-meal is better, mugaiwa is better still. And mugaiwa made from yellow mealies is best of all.
 - c)** Eat plenty of fruit — including bush fruit.
 - d)** Eat kapenta/matemba and amacimbi/madoro. They are very healthy.
 - e)** Eat garlic, it is a very good general medicine, if not, raw onion.
- 6.** During the sickness keep drinking liquids.
 - a)** No alcohol.
 - b)** No cold or iced drinks.
 - c)** If you live in a place where water is not clean, drink boiled water.
 - d)** Squeeze fresh lemon or orange juice into the water if you can.
 - e)** Drink plenty of tea whether ordinary tea or rooibos. Even plain hot water.
 - f)** Hot soup with pepper should be drunk especially when you feel cold.

This message has been composed and approved with the direction and assistance of a senior Zimbabwean doctor based in South Africa. It is a guide, especially where there are little or no health services. Should the health services improve, please use them.

This has been prepared by the Manica Youth Assembly as a service to our Province and to all the people of our country. Please feel free to circulate with or without acknowledgement.

MAYA LAUNCHES MUTARE GREENING AND REFORESTATION PROJECT

6th DECEMBER 2018

The Manica Youth Assembly (MAYA) achieved a milestone when on the 6th December 2018 it successfully launched the Mutare Green and Reforestation Project at Murahwa Hills Primary School in Chikanga. The launch occasion was graced by His Worship the Mayor of Mutare Clr. Blessing Tandi and other Councilors. More significant was the attendance of five Mayors from, Bindura, Zvishavane, Hwange, Chinhoyi and Kariba.



MAYA donated 100 trees and shrubs which were planted at Murahwa Hills Primary School.

This event marked the genesis of MAYA's strategic Green and Reforestation Project aimed at planting 5000 trees in the following 12 months in Mutare and other parts of Manicaland.

MAYA recognises the serious negative effects of climate change and environmental degradation on Mother Earth and has therefore taken the Green and Reforestation Project to be of great importance.

Most of the southern African region is mostly affected by climate change resulting in negative impacts on livelihoods, food production, pollution, poverty and the spread of disease. His Worship the Mayor of Mutare, Cllr. Blessing Tandi commended MAYA for complementing the council's vision and efforts for a clean and safe city — a vision which is in line with the sustainable development goals. He mentioned the need, for continuous engagement and co-operation between the local authority and stakeholders for the betterment of Mutare city. Furthermore, the Mayor encouraged citizens to assist where ever they can to enhance service delivery and protect the environment.

MAYA pledged to continue partnering with the local authority and to become strong advocates for the improving the environment and resisting climate change.

PEACE DIALOGUE WORKSHOP

Hosted by the Zimbabwe Council of Churches

SAKUBVA 29th NOVEMBER 2018

MAYA pledges to work tirelessly towards the attainment of sustainable peace and development in our society. However, as young people we noted that for the nation to enjoy peace there is need to invest on pro-poor, pro-people and youth-friendly and gender-sensitive social and economic policies especially in education and skills development in order to foster an inclusive society where human security is guaranteed for all.

MAYA urges those entrusted by the citizens with power to always put the people first and to desist from diverting the agenda and the funding.

MAYA encourages leaders to harness the huge mineral and human capital the country is blessed with for sustainable development and peace.



The church plays a significant role in the socialisation of society and is capable of playing a major part in promoting change for the better. The church must be able to transform word into deed and action in the areas where it matters, rather than to simply preach without meaningful result.

Our ministers of religion should preach the gospel of peace and be a centre for mobilising society for the common good. MAYA will stand with the church in defending and nurturing peace because our lives depend on it.

Sustainable peace has to be built from the building blocks of strong independent institutions which shun corruption, tribalism, nepotism, racism and other destructive ‘isms’. There should be respect for the rule of law, service to the people, inclusion of youths and women in decision making, bringing to an end the abuse of young people by unscrupulous politicians during election campaigns.

Lastly, as MAYA, we are convinced that the young people can positively work for peace in an environment which values them and make them worthy members of society. Youth with nothing to lose is a danger and a threat to peace while socialized, skilled and employed youth with is an asset to society.



MAYA attends Zimbabwe Council of Churches

YOUTH CARE WEEK

21st – 28th FEBRUARY 2019

In February 2019, MAYA attended Youth Care Week in Mutare, an event sponsored by the Zimbabwe Council of Churches.

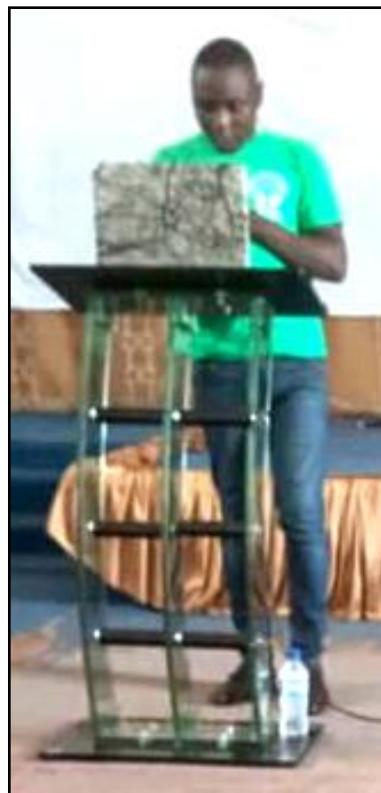
Youth Care Week is intended to bring all youth issues to the attention of policy makers and development stakeholders when national and local development narratives are being considered, in particular urban and rural planning, job creation, sexual and reproductive rights, and, of course, proper budgetary prioritisation to make sure that money is used for the most important problems first.

Youths in Manicaland feel strongly that they have been left out of the development process in Zimbabwe. In this regard, MAYA fully endorses the campaign being carried out by the Zimbabwe Council of Churches, but feels that it must not be limited to a few days but should be a 365 day programme. According to the national census, youth now forms 60% of the population — it is the most strategic and potentially the most productive group in society.

Youth in Manicaland report the following challenges to MAYA, social exclusion, unemployment, sexual reproductive issues, crime, drug abuse, health, shelter, and education which is irrelevant to real needs. Youths feel left out in development and they feel like they are aliens in their Motherland, and that adults have adopted a scotched earth policy destroying everything, especially the economy, as they pursue politics of personal power.

People with nothing to lose become dangerous unto themselves and to society. MAYA is working to address this enormous problem.

In conclusion, MAYA pledges to work tirelessly with all organisations with a developmental agenda of which the Zimbabwe Council of Churches is an important one. We are striving for sustainable development goals and peace in our life time.



PUBLIC AWARENESS ON ENVIRONMENTALISM

MUTARE 22nd NOVEMBER 2019



Manica Youth Assembly facilitated a community education and public awareness programme on environmentalism. As a progressive and vibrant youth movement, MAYA raises awareness on the need to educate both young and old on the need for sustainable development and in particular on the importance of all things green.

The cultivation of a positive mindset and the encouragement of innovative ideas and hard work in achieving an improved environment are essential.



MUTARE

TMAS TREE PLANTING

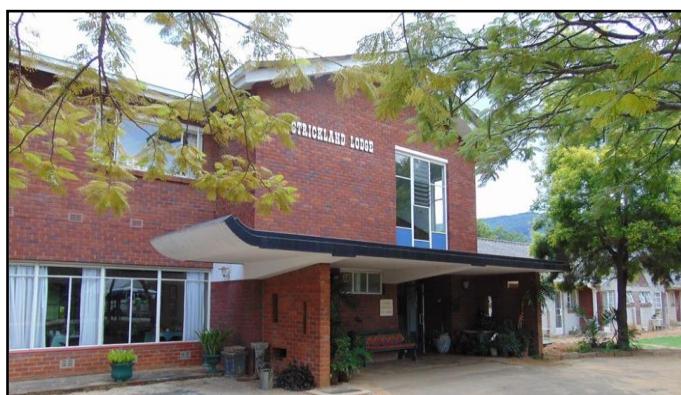
10th DECEMBER 2019



Manica Youth Assembly visited the residents at Eastern Highlands Trust in Mutare interacting with the elderly and encouraging them to plant trees under the theme:

“Do not just grow old, but grow a tree”.

On this day, Linda Botha the administrator of the Trust, volunteered to play an oversight role in MAYA's administration. The youths also managed to gain wisdom on how to leave in harmony with nature when they interacted with the elderly.



MATIKA PRIMARY SCHOOL

16th JANUARY 2020



Manica Youth Assembly held a tree planting event in partnership with Matika Primary School in the Dora area of Mutare to help curb the problem of deforestation especially due to a high demand for firewood from nearby Mutare City. This event was held on the 16th January 2020 and attended by MAYA representatives and Matika Primary School staff and learners.

MAYA's thrust is concentrated on being a voice for climate justice and hence tree planting is at the centre of our activity. It coincided with the beginning of the United Nations Decade of Action. MAYA is primarily concerned with Sustainable Development Goal 13 "Act Now to Prevent Global Warming" a critical player throughout the year. We are encouraging people to keep the environment clean and safe both for this generation and for future generation.

Environment must be safe-guarded at all costs. Deforestation is a major problem that needs a combined effort. Partnership with primary schools such as Matika, is important in winning the hearts of minds of our people from an early age. MAYA is establishing vibrant environment clubs in schools to plant trees and establish other awareness activities, in particular to stop indiscriminate cutting down of trees without replacing them.

The trees that were planted include Tipuana tipu, Mexican ash, privet and jacaranda which can resist drought. If all the school clubs that have been established could follow the example, we will have thousands of trees grown every year to replace those that are being cut for firewood and domestic use.



VALENTINE'S DAY TREE PLANTING

14th FEBRUARY 2020



A greening event in which the Manica Youth Assembly held a Valentine's Tree Planting at Dangamvura High School, Mutare which saw 100 trees planted in the course of the day.

Valentine's Day is regarded by many as a day to show love to partners, friends and family. MAYA chose a different and unique way to celebrate the same day by showing the same love to the environment by planting trees and at the same time raising awareness on the need to embrace the Sustainable Development Goals (SDGs).

After planting trees MAYA went on to introduce the school's Environmental and Tree Planting Club. The club will take a big role in monitoring the watering and upkeep of the trees after the event and also for the Dangamvura High School Environmental and Tree Planting Club to work together with MAYA to organise more events at the school and in the community.

HOBHOUSE PRIMARY SCHOOL

3rd MARCH 2020

Manica Youth Assembly planted 60 trees at Hobhouse Primary School in line with their ongoing environmental awareness campaign. The event was attended by Mutare Mayor, Clr. Blessing Tandi and Clr. John Nyamhoka of Ward 17.

Speaking at the event, the Mayor implored the residents to safeguard trees and avoid deforestation.

“Today we are here planting trees courtesy of MAYA. This is a noble idea of reforestation,” Clr. Tandi said. He encouraged residents to report

anyone seen cutting down trees.



JUSSA KUDHEREZERA

MAYA Co-ordinator Mr Jussa Kudherezera said that they are continuing with their climate and environmental awareness campaign. He maintained:

“Until every citizen is aware of the importance of trees in our environment we will keep on with our awareness campaign, trees are life and they must be safeguarded.”



COMMUNITY AWARENESS PROGRAMME

6th MARCH 2020



Manica Youth Assembly participated in a community engagement meeting with the His Excellency, Mr René Cremonese, Ambassador of Canada to Zimbabwe. The meeting was hosted by United Mutare Residents and Ratepayers Trust primarily to raise awareness on environmentalism and the need to embrace the UN Sustainable Development Goals. The Ambassador urged the youth to value bio-diversity and the importance of living in harmony with nature. MAYA Programmes Officer Tendai Nyamadzi further challenged the youth to be the driving force in climate action and make more noise about the environment.



St. JOSEPH'S HIGH SCHOOL

10th MARCH 2020



Manica Youth Assembly visited St Joseph's High School in Mutare on 10th March 2020 where they addressed students about the importance of bio-diversity, raising awareness among young people.

MAYA is striving to inspire youth and future leaders to work for the sustainable use, development, management and conservation of our Mother Earth in order to build a healthy and safe society. In harmony with nature.

Mr. R Mafundu a senior teacher at the school encouraged the students to embrace the sustainable use of both natural and manmade resources.



NYAMAURU SECONDARY SCHOOL

20th MARCH 2020



Manicaland Youth Assembly closed its first phase of tree planting activities by planting 100 trees at Nyamauru Secondary School in Dangamvura at an event well attended by staff and students.

The school headmaster Mr Chirenje and senior agriculture teacher Mrs Chiuyo thanked MAYA for their good gesture. A lecture was given on how trees play a paramount role in the mitigation of climate change.

MAYA's environmental officer, Ms Tryphine Marange challenged other liked minded organisations and institutions to keep raising awareness on climate change. She also took the opportunity to raise awareness on the outbreak of the Coronavirus pandemic, urging students to practice social distancing as a practical method of preventing the spread of COVID-19 and to always seek correct information regarding it since there is a lot of false information circulating that may prejudice them. She said that MAYA has made great strides, planting over 2500 trees at schools, churches and public places and reaching out to over 10,000 people.

She concluded:

"Thank you all for being environmentalist and for everything you do to support the places around you, from planting trees to washing your hands to being kind to others. While we wait this out, please continue to believe in our objectives. Communities coming together in times of crisis, whether to better our climate or to care for each other in times of need, ultimately strengthen all of us as people."



CAUSE AND EFFECTS OF CLIMATE CHANGE

by Christina Nunez

22nd JANUARY 2019

Acknowledgements to National Geographic for this article.

Glaciers are melting, sea levels are rising, cloud forests are dying, and wildlife is scrambling to keep pace. It has become clear that humans have caused most of the past century's warming by releasing heat-trapping gases as we power our modern lives. Called greenhouse gases, their levels are higher now than at any time in the last 800,000 years.

We often call the result, "global warming", but it is causing a set of changes to the Earth's climate, or long-term weather patterns, that varies from place to place. While many people think of global warming and climate change as synonyms, scientists use "climate change" when describing the complex shifts now affecting our planet's weather and climate systems — in part because some areas actually get cooler in the short term.

Climate change encompasses not only rising average temperatures but also extreme weather events, shifting wildlife populations and habitats, rising seas, and a range of other impacts. All of those changes are emerging as humans continue to add heat-trapping greenhouse gases to the atmosphere, changing the rhythms of climate that all living things have come to rely on.

What will we do — what **can** we do — to slow this human-caused warming? How will we cope with the changes we've already set into motion?

While we struggle to figure it all out, the fate of the Earth as we know it — coasts, forests, farms, and snow-capped mountains — hangs in the balance.

Sunlight shines onto the Earth's surface, where the energy is absorbed and then radiate back into the atmosphere as heat. In the atmosphere, greenhouse gas molecules trap some of the heat, and the rest escapes into space. The more greenhouse gases concentrate in the atmosphere, the more heat gets locked up in the molecules.

Scientists have known about the greenhouse effect since 1824, when Joseph Fourier calculated that the Earth would be much colder if it had no atmosphere. This natural greenhouse effect is what keeps the Earth's climate liveable. Without it, the Earth's surface would be an average of about 33°C cooler.

In 1895, the Swedish chemist Svante Arrhenius discovered that humans could enhance the greenhouse effect by making carbon dioxide, a greenhouse gas. He kicked off 100 years of climate research that has given us a sophisticated understanding of global warming.

Levels of greenhouse gases have gone up and down over the Earth's history, but they had been fairly constant for the past few thousand years. Global average temperatures had also stayed fairly constant over that time — until the past 150 years. Through the burning of fossil fuels and other activities that have emitted large amounts of greenhouse gases, particularly over the past few decades, humans are now enhancing the greenhouse effect and warming Earth significantly, and in ways that promise many effects, scientists warn.

Aren't temperature changes natural?

Human activity isn't the only factor that affects Earth's climate. Volcanic eruptions and variations in solar radiation from sunspots, solar wind, and the Earth's position relative to the sun also play a role. So do large-scale weather patterns such as El Niño.

But climate models that scientists use to monitor Earth's temperatures take those factors into account. Changes in solar radiation levels as well as minute particles suspended in the atmosphere from volcanic eruptions, for example, have contributed only about two percent to the recent warming effect. The balance comes from greenhouse gases and other human-caused factors, such as land use change.

The short timescale of this recent warming is singular as well. Volcanic eruptions, for example, emit particles that temporarily cool the Earth's surface. But their effect lasts just a few years. Events like El Niño also work on fairly short and predictable cycles. On the other hand, the types of global temperature fluctuations that have contributed to ice ages occur on a cycle of hundreds of thousands of years.

For thousands of years now, emissions of greenhouse gases to the atmosphere have been balanced out by greenhouse gases that are naturally absorbed. As a result, greenhouse gas concentrations and temperatures have been fairly stable, which has allowed human civilization to flourish within a consistent climate.

Greenland is covered with a vast amount of ice — but the ice is melting four times faster than thought, suggesting that Greenland may be approaching a dangerous tipping point, with implications for global sea-level rise.

Now, humans have increased the amount of carbon dioxide in the atmosphere by more than a third since the Industrial Revolution. Changes that have historically taken thousands of years are now happening over the course of decades.

Why does this matter?

The rapid rise in greenhouse gases is a problem because it's changing the climate faster than some living things can adapt to. Also, a new and more unpredictable climate poses unique challenges to all life.

Historically, Earth's climate has regularly shifted between temperatures like those we see today and temperatures cold enough to cover much of North America and Europe with ice. The difference between average global temperatures today and during those ice ages is only about 5°C, and the swings have tended to happen slowly, over hundreds of thousands of years.

But with concentrations of greenhouse gases rising, Earth's remaining ice sheets such as Greenland and Antarctica are starting to melt too. That extra water could raise sea levels significantly, and quickly. By 2050, sea levels are predicted to rise between 30cm and 70cm as glaciers melt.

As the mercury rises, the climate can change in unexpected ways. In addition to sea levels rising, weather can become more extreme. This means more intense major storms, more rain followed by longer and drier droughts — a challenge for growing crops — changes in the ranges in which plants and animals can live, and loss of water supplies that have historically come from glaciers.

Christina Nunez is a writer and frequent contributor to *National Geographic*.



GREENLAND

TREE PLANTING “HAS MIND-BLOWING POTENTIAL TO TACKLE CLIMATE CRISIS

Research shows that a trillion trees could be planted to capture huge amount of carbon dioxide

by Damian Carrington

Environment Editor, The Guardian (London)

5th JULY 2019

Acknowledgements to The Guardian



PLANTING MANGROVES TO PROTECT THE COASTLINE OF INDONESIA

Planting billions of trees across the world is by far the biggest and cheapest way to tackle the climate crisis, according to scientists, who have made the first calculation of how many more trees could be planted without encroaching on crop land or urban areas.

As trees grow, they absorb and store the carbon dioxide emissions that are driving global heating. New research estimates that a worldwide planting programme could remove two-thirds of all the emissions that have been pumped into the atmosphere by human activities, a figure the scientists describe as “mind-blowing”.

The analysis found there are 1.7 billion hectares of treeless land on which 1.2 trillion native tree saplings would naturally grow. That area is about 11% of all land and equivalent to the size of the US and China combined. Tropical areas could have 100% tree cover, while others would be more sparsely covered, meaning that on average about half the area would be under tree canopy.

The scientists specifically excluded all fields used to grow crops and urban areas from their analysis. But they did include grazing land, on which the researchers say a few trees can also benefit sheep and cattle.

Let nature heal climate and biodiversity crises, say campaigners

“This new quantitative evaluation shows [forest] restoration isn’t just one of our climate change solutions, it is overwhelmingly the top one,” said Professor Tom Crowther at the Swiss university ETH Zürich, who led the research. “What blows my mind is the scale. I thought restoration would be in the top 10, but it is overwhelmingly more powerful than all of the other climate change solutions proposed.” Crowther emphasised that it remains vital to reverse the current trends of rising greenhouse gas emissions from fossil fuel burning and forest destruction, and bring them down to zero. He said this is needed to stop the climate crisis becoming even worse and because the forest restoration envisaged would take 50-100 years to have its full effect of removing 200bn tonnes of carbon. But tree planting is “a climate change solution that doesn’t require President Trump to immediately start believing in climate change, or scientists to come up with technological solutions to draw carbon dioxide out of the atmosphere”, Crowther said. “It is available now, it is the cheapest one possible and every one of us can get involved.” Individuals could make a tangible impact by growing trees themselves, donating to forest restoration organisations and avoiding irresponsible companies, he added.

Other scientists agree that carbon will need to be removed from the atmosphere to avoid catastrophic climate impacts and have warned that technological solutions will not work on the vast scale needed. Jean-François Bastin, also at ETH Zürich, said action was urgently required: “Governments must now factor [tree restoration] into their national strategies.”

Christiana Figueres, former UN climate chief and founder of the Global Optimism group, said: “Finally we have an authoritative assessment of how much land we can and should cover with trees without impinging on food production or living areas. This is hugely important blueprint for governments and private sector.”

René Castro, assistant-director general at the UN Food and Agriculture Organisation, said: “We now have definitive evidence of the potential land area for re-growing forests, where they could exist and how much carbon they could store.”

The study, published in the journal *Science*, determines the potential for tree planting but does not address how a global tree planting programme would be paid for and delivered.

Crowther said: “The most effective projects are doing restoration for 30 US cents a tree. That means we could restore the 1tn trees for US\$300 billion, though obviously that means immense efficiency and effectiveness. But it is by far the cheapest solution that has ever been proposed.” He said financial incentives to land owners for tree planting are the only way he sees it happening, but he thinks \$300 billion would be within reach of a coalition of billionaire philanthropists and the public. Effective tree-planting could take place across the world, Crowther said:

“The potential is literally everywhere — the entire globe. In terms of carbon capture, you get by far your biggest bang for your buck in the tropics [where canopy cover is 100%] but every one of us can get involved.” The world’s six biggest nations, Russia, Canada, China, the US, Brazil and Australia, contain half the potential restoration sites. Tree planting initiatives already exist, including the Bonn Challenge, backed by 48 nations, aimed at restoring 350 million hectares of forest by 2030. But the study shows that many of these countries have committed to restore less than half the area that could support new forests. “This is a new opportunity for those countries to get it right,” said Crowther. “Personally, Brazil would be my dream hotspot to get it right — that would be spectacular.”

[Note: At present China has a massive tree planting programme and is treating climate change very seriously. Brazil, on the other hand, is busy destroying the Amazon Rain Forest at an horrific rate.]

The research is based on the measurement of the tree cover by hundreds of people in 80,000 high-resolution satellite images from Google Earth. Artificial intelligence computing then combined this data with 10 key soil, topography and climate factors to create a global map of where trees could grow. This showed that about two-thirds of all land — 8.7 billion hectares — could support forest, and that 5.5 billion hectares already has trees. Of the 3.2 billion hectares of treeless land, 1.5 billion hectares is used for growing food, leaving 1.7 billion of potential forest land in areas that were previously degraded or sparsely vegetated.

“This research is excellent,” said Joseph Poore, an environmental researcher at the Queen’s College, University of Oxford. “It presents an ambitious but essential vision for climate and biodiversity.” But he said many of the reforestation areas identified are currently grazed by livestock including, for example, large parts of Ireland. “Without freeing up the billions of hectares we use to produce meat and milk, this ambition is not realisable,” he said.

Crowther said his work predicted just two to three trees per field for most pasture: “Restoring trees at [low] density is not mutually exclusive with grazing. In fact, many studies suggest sheep and cattle do better if there are a few trees in the field.” Crowther also said the potential to grow trees alongside crops such as coffee, cocoa and berries — called agro-forestry — had not been included in the calculation of tree restoration potential, and neither had hedgerows: “Our estimate of 0.9 billion hectares [of canopy cover] is reasonably conservative.”

However, some scientists said the estimated amount of carbon that mass tree planting could suck from the air was too high. Professor Simon Lewis, at University College London, said the carbon already in the land before tree planting was not accounted for and that it takes hundreds of years to achieve maximum storage. He pointed to a scenario from the Intergovernmental Panel on Climate Change report of 57 billion tonnes of carbon sequestered by new forests this century. Other scientists said avoiding monoculture plantation forests and respecting local and indigenous people were crucial to ensuring reforestation succeeds in cutting carbon and boosting wildlife.

Earlier research by Crowther’s team calculated that there are currently about 3 trillion trees in the world, which is about half the number that existed before the rise of human civilisation. “We still have a net loss of about 10 billion trees a year,” Crowther said.

The Crowther Lab website can be found at: <https://gee.ethz>

Tell a Friend about MAYA

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“ I don't want your
hope. I don't want
you to be hopeful. I
want you to panic,
and act as if the
house was on fire.

Greta Thunberg