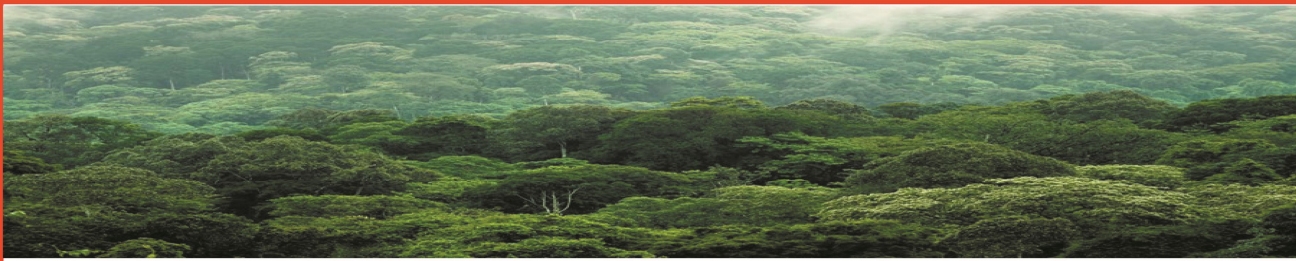


Go Green



Striving for High Ideals

Quarterly Newsletter Year 3 Issue 10 June, 2020

EFCCC - REDD+ Investment Program

Ethiopia stands firm to plant 5 billion seedlings during the pandemic

His Excellency Prime minister Abiy Ahmed has declared on his Facebook page his visit to Bishoftu's seedling preparation locality which is intended to the five billion trees act this summer. According to EM news on telegram, the prime minister has ad-

mired all the ongoing actions that aspire to make Ethiopia green again. Besides, on June 2, 2020 ENA has reported Environment, Forest and Climate Change Commission's statement on the finalization of the Five Billion Trees Act. According to ENA, Commissioner Fika-

du Beyene has stated that preparation has been taking place since last year and all the five billion seedlings are ready for the intended action. What is more, reports indicate that the tree seedlings include avocado and mango which are nursed in 38,000 sites across the nation. Meanwhile,

the government has assured to take all the necessary safety measures to protect people from getting infected by the virus while mass planting is taking place. The efforts so far has been encouraging and the government is also awakening the general public to increase its participation. This green

legacy initiative targets to plant 20billion trees within the coming few years. Reports indicate that among the tree seedlings planted last year, 84% have survived. Serious follow up will be made this year also to increase the survival rate.

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Making Ethiopia Green Again



Our forests are our water fountains. They provide much of the drinking water for over 1/3 of the world's largest cities

Editorial

Working From Home

Our world is suffering from a plague known as COVID-19. Five million plus cases have been registered now and over three hundred thousand people are dead since the breakout. By chance, Africa is less affected continent compared to other continents. The thing that made this pandemic disastrous is the problem it caused on worldwide economy due to lockdown. Although the problem has been tragic to developed countries such as USA and Europe, it has caused awful problem in Africa too. Compared to other many of African

countries, Ethiopia is in a good shape presently. Our government is doing amazing job to prevent the spread of the virus. As the result, the country is still not on lockdown, most of the elderly individuals are working from home though. Working from home ought to be seen as an opportunity to attaining a new experience. One can be more productive while working from home than working from office. The secret to achieve a good result is

wisdom. Wisdom means to be knowledgeable through information and apply the knowledge in the day today life.

Experts advise the following:

I. Plan for a day

Write a to do list
Prioritize the list
Review the list
Evaluate the progress each day
Prepare a list for the next day
Stick to the schedule

II. Stay alert

Don't work in pyjamas
Dress well to feel comfortable

Keep kids occupied
Divide parental duties with spouse
Take regular short breaks
Maintain self-discipline

III. Stay informed

Take the necessary health and safety precautions
Follow up the news of the pandemic closely
Get regular information from ministry of health via telegram
If outbreak rises maintain calm
Stay informed not overwhelmed

IV. Stay active

Communicate with office staff
Socialise via electronic communication
Stay connected with office colleagues
Use video conference: Skype, Zoom, and Google Meet
Take time for self care

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Ecohydrological cycle under ...

Mitigation measure

- ◆ Land use land cover identification and application evaluation to identify critical gaps to come up with a problem solving integrated solution at regional level.
- ◆ Priority for range (grass) land and tree planting last and most important
- ◆ Integration and networking both at different institution at basin (trans-boundary) level through information exchange to avoid redundancy and intensive regional training based on respective basin

Blood tie had caused a bloody war in history. If we see the root-cause for water scarcity, it is human greed that has to be blamed for. Improper management and unfair share had brought water crisis in general and for the poor in particular. For all of us, water plays a prime and vital role in science, history, religion philosophy and the like. To the writer, as a non politician and a sort of little local practitioner histo-

rian, the battle of Adwa's victory is obtained by Hydro-War.

Traditionally in the time of urgent need a man calls not for his blood but for his beloved one as it has been told in Amharic for generations «የወንዙ ልጅ ጥረሽ ነይ በነፍሱ ድረሽ» translated as follows: “my beloved daughter of my river come and save my life”

An Italian space woman right after landing has been asked what she had missed most while she was in a space. She said “shower”.

According to unconfirmed secondary information quote unquote an American soldier upon arrival from Saudi Arabia mission has been asked the same question. His response was a highland mineral water called Ambo from the water tower of Africa.

To the writer, blood constitutes nothing but a little mineral, minerals and a lion share of water.

Global average drinking water requirement is 4

liter/day/person, either directly or indirectly in a form beverage. It takes 2,000 liters of water to produce the food we consume each day-500 times as much as we drink (Lister R. Brown 2009). If we contextualize to our situation under rain fed food production we can understand the validity of the above information. Three Teff bread consumed per person weighs 400gram. This amount is produced in one meter square farm. The total rain that this spot receives is 1200mm of rain. This amount alone is half the world average. If we consider milk and the corresponding rangeland grass the cow browse, vegetables and other supplements it will nearly approach the global consumption average. Thus virtually we eat water not food.

Ridge of a hill and rivers are classified as natural boundaries that delineate country, region and continent. The ridge can serves the purpose of natural boundary but rivers play an inverse role however perceived. From the

cradle of civilization to date, rivers are unifier. Had the modern concept of Geographical terms hold true. Egypt, Somali, Congo, India, Brazil Italy and The United States would have been divided into two countries by Nile, Juba, Congo, Ganges, Amazon, Po, and Mississippi rivers respectively. The author ponders around water not to convince but to be convinced through substantial dialogue if he is under hypnosis.

Conclusion

Role of grasses and trees in eco-hydrologic cycle is a complex issue to understand. In a simplified example the major actors and act could be like a basket ball game player. Defenders are trees while the scorers are grasses. Play ground is the basket ball field while the tent is mountains (mountain chain). Trees as players play the gravity water ball game with their branch and leaves representing arms and fingers respectively. The basket ball is rain water. The defenders intercept the ball (water) not to fall on the ground and further push to reach the higher mountain-

moving water uphill against the gravity and beyond. The scorers (grass) will smash to allow the ball to fall on the ground and further burry-make it enter/infiltrate/ into the soil and further recharge the aquifer/underground water bank/ to sustain river water flow. The two major vegetations namely grasses and trees are major biological functional actor in the Ecohydrology cycle.

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National REDD+ Secretariat

FORESTS: NATURE-BASED SOLUTIONS TO WATER MANAGEMENT - NATURAL INFRASTRUCTURE FOR WATER

Dr. Yitebitu Moges

Nature-based solutions are actions that protect, sustainably manage and restore natural and modified ecosystems in ways that effectively and adaptively address societal challenges and deliver benefits for human well-being and biodiversity. In water management, nature based solutions involve the management of ecosystems to mimic or optimize natural processes, such as vegetation, soils, wetlands, water bodies and even groundwater aquifers, for the provision and regulation of water. The adoption of nature-based solutions for water requires a transformative shift in thinking from demand- to supply-oriented water management and planning, in which crucial ecosystems such as forests are seen not only as users but also as regulators of fresh water. Nature-based solutions have gained attention in recent years because of their potential for addressing water scarcity and contributing to the achievement of the Sustainable Development Goals (SDGs); the Paris Agreement on climate change, the Sendai Framework for Disaster Risk Reduction, the Aichi Biodiversity Targets, and other international commitments.

Grey infrastructure alone such as dams will be insufficient to achieve the social, economic and environmental goals embedded in them; it is essential, therefore, to strategically integrate natural solutions, including green and blue infrastructure, into overall management approaches. The integration of nature-based solutions shows promise for addressing water scarcity through supply side management, partic-

ularly by increasing water quality and groundwater recharge, which ultimately is essential for sustainable food production, improved human settlements, access to water supply and sanitation, water-related risk reduction, and building resilience to climate variability and change. It is estimated that USD 10 trillion will need to be invested in grey infrastructure between 2013 and 2030 for adequate water management. Nature-based solutions could reduce this investment burden while also improving economic, social and environmental outcomes.

Nearly USD 24 billion is estimated to have been spent on green infrastructure for water in 2015, benefiting 487 million hectares of land. Paying greater attention to landscape management, including integrated watershed management, land protection, reforestation and riparian restoration, could reduce the operational and maintenance costs of grey infrastructure.

ROLE OF FORESTS: All forests affect hydrology and so, therefore, does their management. Forests and trees use water and provide many provisioning, regulating, supporting and cultural ecosystem services. Forested areas and landscapes with trees, therefore, are integral components of the water cycle, regulating streamflow, fostering groundwater recharge and contributing to atmospheric water recycling, including cloud generation and precipitation through evapotranspiration.

Forested areas and landscapes with trees also act as natural filters, reducing soil erosion and water sedimentation, thus providing high-quality water for human consumption, industry and the environment. Land-use decisions can have significant consequences for water resources, communities, economies and environments in distant (downstream and downwind) locations. The loss of natural forests may increase water yields in the short term but have long-term negative impacts on water quantity and quality. For example, evapotranspiration from the Amazon River and Congo River basins is a major source of precipitation (around 50–70 percent) in the Rio de la Plata basin and the Sahel, respectively (Van der Ent et al., 2010; Ellison et al., 2017). Large-scale forest loss and land conversion affect these natural processes, reducing cloud cover and precipitation downwind (Ellison et al., 2017; Creed and van Noordwijk, 2018). Forest restoration and tree planting will likely improve water quality, with the impacts of such interventions depending on species, management regime and temporal and spatial scale.

It is estimated that land conservation and restoration, including forest protection, reforestation and agroforestry, could lead to a reduction of 10 percent or more in sediments and nutrients in watersheds. Care is needed, however, to ensure that achieving water-quality goals does not result in unacceptable trade-offs with water yield.

In addition to their water-related ecosystem services,

forests provide habitat for fish and other aquatic species, which, in turn, play roles in ensuring the functionality of these ecosystems. The quantity, quality, temperature and connectivity of water resources influence fish populations and aquatic biodiversity.

Changes in these factors can affect species richness, evenness and endemism, thus influencing the biodiversity and food systems of dependent populations. Many fish and other aquatic organisms are sensitive to ecosystem degradation, such as through eutrophication, habitat degradation and fragmentation, acidification, and changes in temperature and climate. For example, the number of threatened and endangered freshwater species has increased due to the poor health of inland water systems. The Living Planet Index indicates an 83 percent decline in freshwater species populations since 1970.

Forests and trees can help mitigate minor to moderate flooding events, control avalanches, combat desertification, and abate storm surges. Changes in land use – such as large-scale deforestation or, conversely, forest restoration – can influence the resilience of landscapes in the face of water-related natural hazards.

It is important, therefore, to manage forests and trees with water ecosystem services in mind and to maximize the forest benefits for water and mitigate negative impacts. A range of management decisions, such as

species selection, stocking densities, and location in the landscape, can have important effects on hydrology. Managing forests for multiple benefits is the foundation of sustainable forest management, but it requires an understanding and recognition of trade offs. For example, fast growing exotic species planted for biomass and carbon sequestration may have a positive impact on water quality but could greatly reduce water supply. Reducing tree densities, prolonging rotation cycles and conserving native forests in riparian buffer zones could mitigate these negative effects.

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INTERNATIONAL NEWS

No let-up in global rainforest loss as coronavirus brings new danger

The Times of India

KUALA LUMPUR: Tropical rainforests disappeared at a rate of one football pitch every six seconds last year, researchers said on Tuesday, urging countries to include forest protection in post-pandemic plans.

The loss in 2019 of 3.8 million hectares (9.3 million acres) of tropical primary forest - which means intact areas of old-growth trees - was the third biggest decline since the turn of the century, according to data from [Global Forest Watch](#) (GFW).

"Primary forests are the areas we are the most concerned about - they have the biggest implications for carbon and biodiversity," said Mikaela Weisse, a project manager at the GFW forest monitoring service, run by the World Resources Institute.

"The fact that we are losing them so rapidly is really concerning," she told the Thomson Reuters Foundation.

Loss of primary forest, which hit a record high in 2016 and 2017, was 2.8% higher in

2019 than the year before.

Agricultural expansion, wildfires, logging, mining and population growth all contribute to deforestation, according to GFW researchers.

Cutting down forests has major implications for global goals to curb climate change, as trees absorb about a third of the planet-warming greenhouse gas emissions produced worldwide.

Forests also provide food and livelihoods for people who live in or near them, are an essential habitat for wildlife, and aid tropical rainfall.

Governments preparing post-coronavirus economic stimulus plans should include measures to protect forests, said Weisse. In the short-term, the virus may weaken enforcement of forest laws, with people taking advantage of that to commit environmental crimes, she warned.

In the medium-term, economic stress could hike pressure for more extractive industries in forests or larger-

scale agriculture, she added. Workers coming home from cities after losing jobs could also turn to forests to help feed their families, increasing the risk of deforestation, she said.

"The situation has changed," Weisse said of the COVID-19 pandemic. "What we need to do has also changed."

WILDFIRES

The top three countries for primary forest loss last year - Brazil, Democratic Republic of Congo (DRC) and Indonesia - have remained largely the same this century, GFW researchers said.

Brazil accounted for more than a third of all primary forest loss in 2019 at 1.36 million hectares.

Many of the Brazilian forest fires that made international headlines last year did not occur inside primary forest, but in already deforested areas as farmers cleared logged land for agriculture and cattle, accord-

ing to the data.

Neighbouring Bolivia, however, experienced record-breaking primary forest loss at 290,000 hectares, due to fires in both forests and surrounding woodlands, GFW said.

And Australia experienced a 560% jump in tree cover loss from 2018, driven by unprecedented bushfires, making it easily the country's worst year on record.

The DRC saw its losses fall slightly to 475,000 hectares, still the third-highest year on record for the African nation, the data showed.

Malaysia lost 120,000 hectares of primary forest last year, ranking 6th behind Peru at 162,000 hectares, it added.

The figure for Indonesia remained at historically low levels for the third year in a row at 324,000 hectares, a 5% reduction in losses from 2018, according to GFW. Tougher law enforcement to prevent forest fires and land clearing, and bans

on forest-clearing and new oil-palm concessions all helped, said Arief Wijaya, forests and climate manager at think-tank World Resources Institute Indonesia.

"I would (now) like to see the government not only trying to reduce deforestation but reverse deforestation," Wijaya said.

As the Southeast Asian nation battles the coronavirus pandemic, it is important that funds set aside for forest protection and restoration are not reallocated to help the wider economy and healthcare system, he added. In total, the tropics lost 11.9 million hectares of tree cover - which includes all natural forests and tree plantations - in 2019, according to the GFW data.

"There has been so much international effort to try and slow or stop tropical deforestation, and the fact that we're not seeing the numbers budge at a global level is something we are quite concerned about," said Weisse.

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Air pollution linked with higher Covid-19 death rate: Study

The Times of India

BERLIN: Higher levels of [nitrogen dioxide](#) pollutants in the air may be associated with an increased number of deaths from [COVID-19](#), according to a study. The research, published in the journal *Science of the Total Environment*, combined satellite data on [air pollution](#) and air currents with confirmed deaths related to COVID-19. It revealed that regions with permanently high levels of pollution have significantly more deaths than other regions, according to the researchers at Martin Luther University Halle-Wittenberg (MLU) in Germany. Nitrogen dioxide is an air pollutant that damages the human respiratory tract, the researchers said.

For many years it has been known to cause many types of respiratory and cardiovas-

cular diseases in humans, they said. "Since the novel coronavirus also affects the respiratory tract, it is reasonable to assume that there might be a correlation between air pollution and the number of deaths from COVID-19," said Yaron Ogen from MLU. The researchers combined three sets of data, including the levels of regional nitrogen dioxide pollution measured by the [European Space Agency's](#) (ESA) Sentinel 5P satellite, which continuously monitors air pollution on the Earth.

Based on this data, he produced a global overview for regions with high and prolonged amounts of nitrogen dioxide pollution. "I looked at the values for January and February of this year, before

the corona outbreaks in Europe began," explained Ogen. He combined this data with data from the US weather agency NOAA on vertical air flows. He explained that if air is in motion, the pollutants near the ground are also more disseminated.

However, if the air tends to stay near the ground, this will also apply to the pollutants in the air, which are then more likely to be inhaled by humans in greater amounts and thus lead to health problems, Ogen said.

Using this data, the researcher was able to identify hotspots around the world with high levels of air pollution and simultaneously low levels of air move-

ment. He then compared these with the data on deaths related to COVID-19, specifically analysing the data from Italy, France, Spain and Germany. He found that the regions with a high number of deaths also had particularly high levels of nitrogen dioxide and a particularly low amount of vertical air exchange. "When we look at Northern Italy, the area around Madrid, and Hubei Province in China, for example, they all have something in common: they are surrounded by mountains. This makes it even more likely that the air in these regions is stable and pollution levels are higher," Ogen said.

The advantage of the analy-

sis, he noted, is that it is based on individual regions and does not only compare countries. "Even though we can obtain a country's average value for air pollution, this figure could vary greatly from region to region and therefore not be a reliable indicator," said Ogen. The geoscientist suspects that this persistent air pollution in the affected regions could have led to overall poorer health in the people living there, making them particularly susceptible to the virus. "However, my research on the topic is only an initial indication that there might be a correlation between the level of air pollution, air movement and the severity of the course of the corona outbreaks," said Ogen.

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INTERNATIONAL NEWS

Global environmental changes leading to shorter, younger trees

Science daily

Ongoing environmental changes are transforming forests worldwide, resulting in shorter and younger trees with broad impacts on global ecosystems, scientists say.

In a global study published in the May 29 issue of the journal *Science*, researchers led by the U.S. Department of Energy's Pacific Northwest National Laboratory found that rising temperatures and carbon dioxide have been altering the world's forests through increased stress and carbon dioxide fertilization and through increasing the frequency and severity of disturbances such as wildfire, drought, wind damage and other natural enemies. Combined with forest harvest, the Earth has witnessed a dramatic decrease in the age and stature of forests.

"This trend is likely to continue with climate warming," said Nate McDowell, a PNNL Earth scientist and the study's lead author. "A future planet with fewer large, old forests will be very different than what we have grown accustomed to. Older forests often host much higher biodiversity than young forests and they store more carbon than young forests."

Carbon storage and rich biodiversity are both keys to mitigate climate change.

The study, "Pervasive shifts in forest dynamics in a changing world," determined that forests have already been altered by humans and will mostly likely

continue to be altered in the foreseeable future, resulting in a continued reduction of old-growth forests globally.

Three conditions generate a deforestation loop

The researchers used satellite imagery along with a detailed literature review to conclude that the globally averaged tree size has declined over the last century and is likely to continue declining due to continuing environmental changes.

Several factors have led to the loss of trees through human activity and natural causes -- clear-cutting, wildfire, insects and disease are leading causes. Known as deforestation, the phenomenon has led to an imbalance of three important characteristics of a diverse and thriving forest: (1) recruitment, which is the addition of new seedlings to a community; (2) growth, the net increase in biomass or carbon; and (3) mortality, the death of forest trees.

"Mortality is rising in most areas, while recruitment and growth are variable over time, leading to a net decline in the stature of forests," said McDowell.

"Unfortunately, mortality drivers like rising temperature and disturbances such as wildfire and insect outbreaks are on the rise and are expected to continue increasing in frequency and severity over the next century. So, reductions in average forest age and height are already happening and they're likely to

continue to happen."

Vegetation dynamics are changing

The conditions promoting deforestation will likely accelerate, drastically altering the living conditions for plants and animals, McDowell said.

"Over the last hundred years we've lost a lot of old forests," McDowell said. "And they've been replaced in part by non-forests and in part by young forests. This has consequences on biodiversity, climate mitigation, and forestry."

Wide-ranging impact

The study also reveals that other mechanisms of deforestation -- "chronically changing drivers" -- are underway. They include:

- ◆ Atmospheric carbon dioxide: Carbon dioxide levels in the atmosphere have increased dramatically since the Industrial Revolution and are projected to continue rising over the next century. Higher levels of carbon dioxide can increase a tree's growth rate and seed production. However, such carbon dioxide fertilization appears to only happen in younger forests with abundant nutrients and water. Most forests globally are exposed to limitations in nutrients and water, which drastically reduces the carbon dioxide benefits to trees.

- ◆ Temperature: Rising temper-

atures limit life-giving photosynthesis, leading to lower growth, higher mortality, and reduced regeneration. This is one key to shorter trees, the study determined.

- ◆ Droughts: They're expected to increase in frequency, duration and severity globally. Drought can directly cause tree death or indirectly lead to mortality through associated increases in insect or pathogen attack.

Other factors are altering the face of the world's forests:

- ◆ Wildfire is increasing in many forests worldwide and future fires may be more frequent than they have been in the past 10,000 years in some regions, the study found. Plant growth following forest fires may be slow or absent due to elevated temperatures.

- ◆ Biotic deforestation disturbances -- by insects, fungi and choking vines -- have been on the increase. The carbon storage lost to insects each year is the same as the amount of carbon emitted by 5 million vehicles, a study published last year says. This is expected to continue with warming, along with other biotic deforestation disturbances, such as fungi and

bacteria. In the tropics, vines that use other plants as host structures are choking trees to death.

- ◆ Wood harvests alone has had a huge impact on the shift of global forests towards younger ages or towards non-forest land, reducing the amount of forests, and old-growth forests, globally. Where forests are re-established on harvested land, the trees are smaller and biomass is reduced.

Deforestation study born of collaboration

McDowell collaborated with more than 20 scientists to produce the deforestation study, which included data and observations made in more than 160 previous studies.

"Environmental changes are making disturbances worse, and this is causing a change in vegetation dynamics towards shorter, younger forests," McDowell said.

The DOE's Office of Science and several other organizations funded the work. The study's authors include PNNL's Ben Bond-Lamberty of the Joint Global Change Research Institute, and other researchers come from more than a dozen institutions, including four national laboratories: PNNL, Lawrence Berkeley, Los Alamos and Oak Ridge.

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Record-breaking hole in ozone layer over Arctic closed: EU sat

The Times of India

In a good news, European satellite system [Copernicus](#) has found that a record-breaking [hole](#) ever observed in the [ozone](#) layer over Arctic has closed.

In late March, scientists had spotted signs of a hole forming and it was thought to be the result of low [temperatures](#) at the north pole. The ozone layer shields the Earth

from most of Sun's ultraviolet radiation, a major cause of skin cancer. The largest hole ever detected would only have posed a direct threat to humans if it had moved further south to populated areas. But recently (on April 23), Copernicus earth observation satellite system, comprising a constellation of six families of satellites (Sentinels) and dozens of third party satellites, found the hole had

closed. However, the closing has nothing to do with the reduction in pollution caused by Covid-19 lockdown in several countries. Instead, it's due to the polar vortex, the high-altitude currents that normally bring cold air to the Polar Regions. This has split in two giving the Arctic region a relative heatwave, with temperatures up to 20°C higher than is normal for this time of year. This year

the polar vortex was extremely powerful and temperatures inside it had been very cold. This generated stratospheric clouds that destroy the ozone layer by reacting with [chlorofluorocarbon](#) (CFC) gases. However in recent days, the polar vortex had broken up and weakened.

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What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another.

Mahatma Gandhi

Ecohydrological cycle under Eastern African Sky

Water is thicker than BLOOD

By Dechasa Jiru: Indigenous knowledge based agroforestry technology generator and promoter

Introduction

For a common understanding, Eco-hydrological cycle is a movement of liquid water from highest upper catchment to the lowest through surface valleys and underground to reach a final destiny. The destiny could be lakes in the rift, seas and oceans. The reverse (counteracting) movement is the evaporated water by the sun heat from the lowest surface that moves by the energy of sun and is transported upslope by wind in the air. Upon cooling due to elevation factor the vapor condenses and rains mainly in mid and highlands to complete the first cycle. The gravity water that reaches the ground will continue for the second round of the eco-hydrological cycle.

Current science defines as eco-hydrology as a sub discipline of hydrology that focuses on ecological processes occurring within the hydrological cycle that enhances environmental stability. (Zalewski M., Johannes Z., and Urbaniak m. 2010)

To the author's understanding, trees play a fundamental role in eco-hydrology by retaining (intercepting) rain water by their leaves in the air and absorbing water (moisture) from the soil and underground water by their root. Trapped water by leaves and the absorbed by roots evaporate and transpire by the sun energy respectively. The transpired water vapor is carried up by wind up slope. Grasses mainly infiltrate most of the rain water into the soil and banks it in the aquifers to be used by plant root and be discharged in the form of

spring and rivers. In this article, role of the two major plants namely grasses and trees are the flesh and sole of Eco-hydrology function. For further information please read the journal article (Dechasa Jiru 2010).

Indiscriminate devegetation had caused soil acidity in the wet highland and soil salinity in dry irrigated lowland. It had exacerbated the level of acidity in the highland by lowering and its pH. On the contrary, it increases the pH in the low dry irrigated land. In the later major civilization that has been started in the lower valleys like Babylon, Egypt and other cradle of civilization had collapsed due to devegetation of perennial plant and conversion to irrigation farms of annual cereal and grasses where drainage is poor like the rift valleys farms. Such anthropogenic change in land use land cover will allow salt level rise which will brought down annual crop yield a fundamental cause in civilization collapse. The Australian contemporary large scale farm under industry lead has been hit by wheat and sheep production loss. This tragic anthropogenic phenomenon had negatively impacted on global wheat, wool and meat supply (author's personal observation from 1990 to 1994 during his stay in Australia). In well drained site especially in the valley of the river that empties into the sea or ocean, shallow root crops and grasses can't cause a problem. From early civilization to date an industry lead economy of the most



developed nation is still the victim of such tragedy of crop yield jeopardy.

This article attempts to create awareness in order not to repeat the same mistake in Rift Valley large scale cereal production. The option is to convert the farm to deep rooted perennial large scale irrigation or planting of hedge rows of perennial plant that can be pollarded to minimize competition with the main crop-cereals. Besides, the article focuses on the most important biological and physical eco-hydrological measures in problem solving research results of tree and grass development in their proper site that enables the performance of the crop to contribute significantly to the millennium development.

Ten species of trees and grasses under tree shade and in open, which is common in East African Highland is selected as a representatives in Ethiopia. The result is applicable to eastern and central African region where rivers from the tower of Africa are supplied to the neighboring countries of South Sudan, North Sudan, Egypt, Kenya and Somalia. Revegetation by trees and grass will sustainably reverse crisis of water and environmental and will contribute substantially towards enhancing ecosystem service for a society. This problem

solving scientific article production is based and locally contextualized water retention (infiltration) amount by the trees and grasses that are compared with other major land use land cover like bare soil, farm land, over grazed land and home garden. The relative intercepted and infiltrated amount of water will be sequenced in an order of decreasing interception and infiltration. Providing such basic information enables small and large scale farmers to be viable in economy and environment.

Overall purpose of the article with a focus on trees and grass is to direct and re gear a move in integrated water development and sustainability under proper land use land cover in the water tower of Africa. The paper critically considers current pandemic emergency situation with the intention of linking with the national long term planned development objectives. These are:

- ◆ To create awareness with the intention of increasing and adopting proper rotational grazing in animal production. Such integrated development approach will apply in the highland and open woodland dry lands of pastoralist's range land. This problem solving indigenous knowledge based undertaking will be helpful for acceleration of hydrological cycle on sustainability in East Africa in general and in downstream nations in particular. .

- ◆ To open a national dialogue forum on water conservation, maximization by biological and related physical approach to enhance sustainable supply on the rivers entire course.

- ◆ To contribute technical and managerial input for planners line ministries through training and information exchange in line with the national and regional development planned goal.

Indiscriminate devegetation and its consequence

Jima coffee shade farmers and Borana pastoral range-land management in indigenous knowledge participatory research interview are base for integrated Eco-hydrological research findings of this article. Mellkasa tree, grass and arable land infiltrations by Infiltrometer study in modern research is another very important base from modern scientific investigation perspective. Good and bad major traditional practices that affect eco-hydrology in a landscape are illustrated below followed with brief description on each plate (4 - 9). Water interception and infiltration of different land use land cover that amalgamates indigenous knowledge and scientific knowledge in problem solving research technologies can be essential input to maximize water supply and sustenance across East and central African region. Devegetation erode soil, degrade land productivity, cause flood fill dams and lake and all the like. It is hoped that revegetation reverses such detrimental anthropogenic act and coverts land to Earthly garden.

plate 4. Application of water to different land use land cover at the rate and intensity of rain water. **Plate 5.** Modern infiltration rate study at Melkasa.

Plate 6. Acidified soil by removal of vegetation due to ox culture settlement.

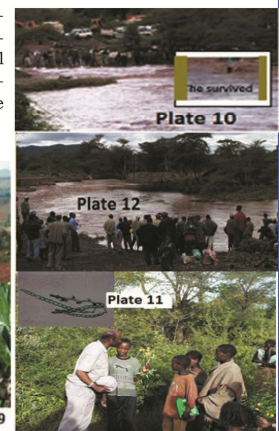
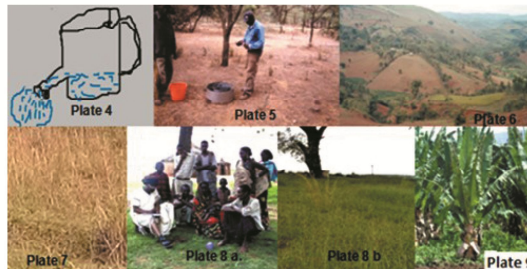
Plate 7. Tall grass at Enemor best water infiltrator, **Plate 8.a** Interview with Boran on the role of grass in banking. Rain water to aquifers. **Plate 8.b**

Dense grass range land developed by technology they cut and paste from nature with modification prescribed burning to meet domesticated livestock.

Plate 9. Enset coffee home garden another best rain water in filter.

Plate 10 flood formed by ox farming and free grazing devegetation causing traffic jam. The box is a closer view of the survived child shown with a kiss

on his forehead to congratulate, **Plate 12** The jammed traffickers looking at the broken bridge and at the flood with nostalgia that took the boy a few minutes ago. **Plate 11.** Immature green pod for a juvenile victim boy is illustrated and dedicated the author in his memory. A local flower gift for the survivor. Both are from the degraded highland and engaged partly in local trade for the survival. The surprising thing is that he did not lose the butter he bought hold the author. Local flow was given for the victory.



Ecohydrological cycle under Eastern African Sky

Water is thicker than BLOOD (Cont'd)

By Dechasa Jiru: Indigenous knowledge based agroforestry technology generator and promoter

Trees and grass functional role in Eco hydrological cycle

Under current global warming, glacier melting, severe land degradation, soil erosion, flood is becoming the

most important natural resource threat which has been responsible for environmental crisis and subsequent climate migration. In the following 15 years old 10 selected trees

Cordia has a lion share of retaining rain by its leaves. This is because its leaves are wide and since it is the fastest timber tree and has several branches compared

to the other. Cordia like coffee require shade to grow strait for timber production. The author had applied the traditional Enset grower farmer's knowledge and

practically employed technologies of the south and the southwest Ethiopian farmers in its complete package.

Plate 1. Rain in the open 52%



Plate 2. Rain under tree is reduced to 48%

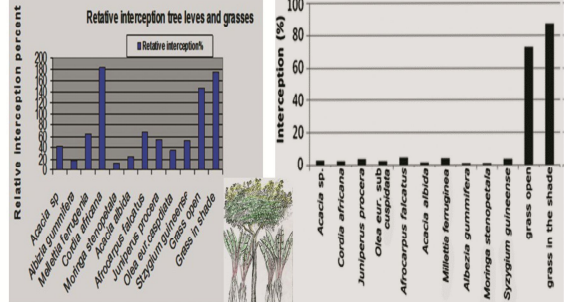


Plate 3a. Grass under the shade



Plate3b. Grass outside the shade

Figure Relative interception of equal basal area on a yearly basis of 10 trees of 15 years old canopy and annual grasses in the open and under the shade of one year old (left). The same data of the trees has been divided by 15 to get an average annual value and compared with the grass as it is (right)



The case of Cordia Africana since it is branching in the open and grows very fast rain interception capacity in 15 years is extremely high compared to other trees of the same age.

Shade tree-coffee-enset-maize traditional system

Coffee grown under shade in established temperature in the open, it will be killed either by high temperature or frost. Plate 3d is the result summary of Jima farmers'

interview that became a base for under shade Eco-hydrology in the western Ethiopia. In the following, a mid-land coffee has successfully grown out of its eco-hydrological zone at 2650m in Shikute Jeldu at Zerohunger Epicenter project. The most amazing thing is its vegetative performance-a ratio of height to canopy width which is one to one (1:1) as shown in 3f and 3g-plate



Plate 3 c



Plate 3 d

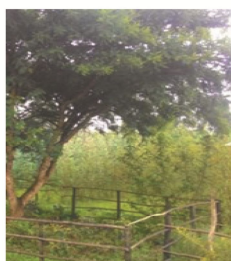


Plate 3g

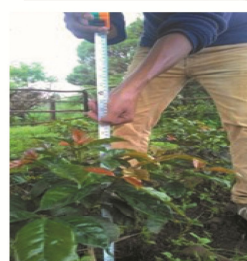


Plate 3 f

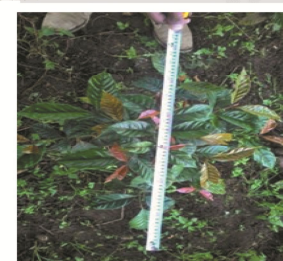


Plate 3 g

Plate 3.c Maximum and minimum thermometer, Plate 3.d Rain interception by coffee tree shade, Shade tree with a coffee seedling plated and plate 3.f closure exposure of the seedling while measuring its height and plate 3.g is colure exposure of the same seedling for canopy measurement. Figure Role of coffee shade in coffee performance in a cold highland

Comparative water infiltration potential of different land use land cover

This section shows the relative capacity of rain water absorbing potential of different land use land cover. From the different basins in Ethiopia, Omo Basin upper catchment of the Guragie highland at Enemor at Zer Hunger Epicenter is selected.

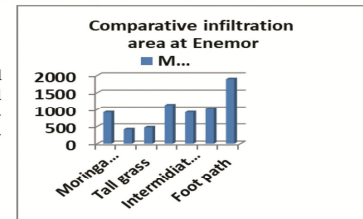
Enemor is located in the upper catchment of Gibe River-one of the main tributary of Omo

River. It has both home garden and mono-cropping cereal production where all the hoe and ox culture is found in the same spot.

Tree-Enset-Coffee-maize main mixed production system represents the highland Eastern Africa of Tanzania, Uganda, Burundi, Rwanda and Kenya. The only exception in Ethiopia is replacement of banana by inset-games with banana. Fruit trees like avocado is

common in all countries of eastern African highlands. The system has been adopted by the best modern farmer and environmental activist Mulalem and his wife at cereal growing Ox culture system in Dembecha, Gojam as illustrated below.

Figure Comparative infiltration experimental result by major land use land cover in Enemor and discussion on Enset coffee and shade tree adoption feedback on with Mulualem's garden at Dembecha.



Cont. on p 2

Greta: We must fight the climate crisis and pandemic simultaneously

Source: New Scientist

The world needs to tackle the coronavirus pandemic and climate change simultaneously, and guard against people who try to use the current crisis to delay action on cutting carbon emissions, Greta Thunberg has urged.

The Swedish climate activist, who revealed last week that she and her father are likely to have had covid-19, said the response to the outbreak revealed societal shortcomings, as well as our ability to change in the face of a crisis, but had also proved that we are able to act fast.

"If one virus can wipe out the entire economy in a matter of weeks and shut down societies, then that is a proof that our societies are not very resilient. It also shows that once we are in an emergency, we can act and we can change our behaviour quickly," she said in a conversation on *New Scientist's*.

Some politicians have called for climate action to be put on hold while governments grapple with the coronavirus, with the Czech Republic's Prime Minister Andrej Babiš saying the European Union should "forget about the Green Deal now".



Thunberg said: "People will try to use this emergency as an excuse not to act on the climate crisis, and that we have to be very careful for." She said she understood the emergency the world was facing now, but it wasn't an excuse to shelve action on emissions.

"People don't want to hear about the climate crisis [now]. I completely understand that, but we have to make sure that it's not forgotten. We need to treat both of these crises at the same time, because the climate crisis will not go away," she said.

The campaigner and the Fridays for Future movement, which she kick-started with her first school strike in 2018, have made their weekly protests virtual during the pandemic.

Students have been good at staying off the streets, said

Thunberg, and although young people tend to have milder symptoms of the disease, "we still stand in solidarity with those in risk groups and I think that is a very beautiful thing."

Thunberg has had mild symptoms of covid-19, with some tiredness and a cough, but said that the more intense ones that her father experienced fit with the symptoms of the illness exactly. Neither have been tested, as Sweden is only testing the most severe cases.

2019 was incredible for Thunberg: she was nominated for the Nobel peace prize, travelled to North America and back by boat and addressed world leaders at the United Nations in New York.

The 17-year old said she always found herself going back to the science of climate change in her speech-

es because it wasn't something that could be contested. "It's not something you can have different opinions in, it's just pure science. In that sense, it's very much black and white."

She has focused on the "carbon budgets" put forward by the UN climate science panel in 2018, which attempt to estimate the carbon emissions that can be released into the atmosphere without breaching global warming thresholds, such as 1.5°C and 2°C rises in temperature. She said these budgets are insufficient because they don't account for tipping points, such as the collapse of ice sheets in West Antarctica, but are still the "most reliable roadmaps" humanity has.

Thunberg said she has taken heart from small successes, including the rejection of expanding an airport in Bristol, UK, and rewilding projects. But she noted that the bigger picture of steadily rising global emissions was negative: "Yes, we need to see the victories, but we can't only focus on the victories because we close our eyes to the actual crisis."

Criticism from politicians, including Donald Trump, was a "milestone", she said. "We need to see that as a victory, when they criticise us like that. But also it's just so hilarious when grown-ups like that feel so threatened by children."

Thunberg said she was frustrated that media coverage focused on her rather than the many other young climate activists around the world, but she understood it. Her rise as a public figure has been "very hard" for her parents, she said, because they saw both the positive and negative sides of it. One of their key influences on her was "to always think of others and to be a humanitarian", she said.

On her life after education, Thunberg hopes the world will have taken serious action on carbon emissions so she can pursue a job other than as a climate activist. "All I know is that I want to do something and I want to be somewhere where I can make the most difference, try to make the world a better place, but I don't know where that will be," she said.

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