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Your World, Our World: Resilient Environment and Sustainable Resource Management for All



AFRICAN APPROACH TO ADDRESSING GLOBAL WARMING AND CLIMATE CHANGE: *Cocoa, the unsung mollifier*

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AFRICAN APPROACH TO ADDRESSING GLOBAL WARMING AND CLIMATE CHANGE: *COCOA, THE UNSUNG MOLLIFIER*

Striking a balance in the global climate dilemma

Our planet earth is rapidly getting hotter, and the year 2023 reminded the world of having reached the tipping point. By April 2024, global temperatures have hit 1.58⁰C above historical averages, already outstripping the Paris 2015 pledge not to exceed the estimated 1.5⁰C by 2050.

The negative impact of climate change is everywhere, and characterized by extreme weather conditions, heatwaves, wildfires, floods, droughts, melting ice caps, rising sea levels, submergence of coastal towns and seaports, coral bleaching, disappearance of bio-diversities and ecosystems, and increasing the frequency of El Niño, La Niña, cyclones and hurricanes. When these elements of nature strike, not even the technology and resources of the most advanced nations, and not the work of the best professional surveyors, planners, architects, engineers, policy makers, administrators and governments, can withstand. Big countries like the United States, Canada and China have been affected, so is a small country like Ghana suffered from climate change.

Global warming is attributable to the building-up of rare or greenhouse gases (GHG), dominated by carbon dioxide (CO₂). Forests and oceans are the biggest bodies of CO₂ storage. Until burned, CO₂ is caged; burned, it gets liberated into the atmosphere. The most anthropogenic activities triggering CO₂ emissions are fossil fuels and deforestation. Though a source of life, trapping the sun's heat for millions of humans and species, CO₂ is today out of balance and become dangerous to the very lives it has been serving. Global action on climate change is now and not later!



Global action demands cutting down on human activities (i.e., the burning of fossil fuels and deforestation) and adaptation of more efficient, effective, responsible and resilient production systems. This requires substantial investments that the developing countries lack whilst the developed countries are passive to help. The pledge of \$100 billion annually up to 2020 by developed countries to supporting developing countries in climate change mitigation and adaptation, has not materialized.

Both developed and developing countries are caught in a web of dilemma. Whereas developed countries have difficulty in forgoing the use of fossil fuels, their counterpart developing countries, now striving to transform from a predominantly agrarian to industrial economy, cannot progress without causing deforestation. In this dilemma, countries must strike a balance. Every country and every person must act, and act responsibly and collectively.

Ghana's response to climate change is an integrated approach based on three policy objectives, namely, effective adaptation, social development and mitigation.

Ghana's policy framework on climate change

The Ghana National Climate Change Policy prioritizes five main thematic areas:

1. Agriculture and Food Security
2. Disaster Preparedness and Response
3. Natural Resource Management
4. Equitable Social Development
5. Energy, Industrial and Infrastructure Development

The objectives dovetail into the following policy areas:

- i. Develop climate-resilient agriculture and food security systems
- ii. Build climate-resilient infrastructure
- iii. Increase resilience of vulnerable communities to climate-related risks
- iv. Increase carbon sinks
- v. Improve management and resilience of terrestrial, aquatic and marine ecosystems
- vi. Address impacts of climate change on human health
- vii. Minimize impact of climate change on access to water and sanitation
- viii. Address gender issues in climate change, and
- ix. Minimize greenhouse gas emissions

Ghana is largely an agricultural country. Several crops are cultivated including cocoa, oil palm, rubber, coffee, cashew, mango, pineapple, maize, sorghum, millet, plantain, yam, cocoyam, and cassava. In the grassland areas, crop farming is combined with animal rearing. Of all these crops,

cocoa stands out, and contrary to the long-held notion that cocoa is a major driver of deforestation and antithesis to environmental sustainability, this presentation shows that cocoa is an incredible medium for climate mitigation and adaptation in Ghana and a superfood for the world.

Importance of cocoa to Ghana

The saying that “**Ghana is cocoa, and Cocoa is Ghana**” has a deep meaning. Cocoa is the backbone and source of oxygen for the Ghanaian economy.

<h2><i>Importance of Cocoa to Ghana</i></h2> <ul style="list-style-type: none">• “Ghana is Cocoa and Cocoa is Ghana”• Ghana’s cocoa is PREMIUM COCOA, the best and most sought for in the world• It is the backbone and oxygen source of the Ghanaian economy - about \$2 billion export earnings annually; livelihoods of close to 800,000 farm families• Engenders an unmatched broad-based revenue distribution system• To control world cocoa trade to mandatorily curb deforestation as the European Union deforestation free regulation (EUDR) seeks to do by 1st January 2025, is to regulate the oxygen supply to the Ghanaian economy	 <p>23</p>
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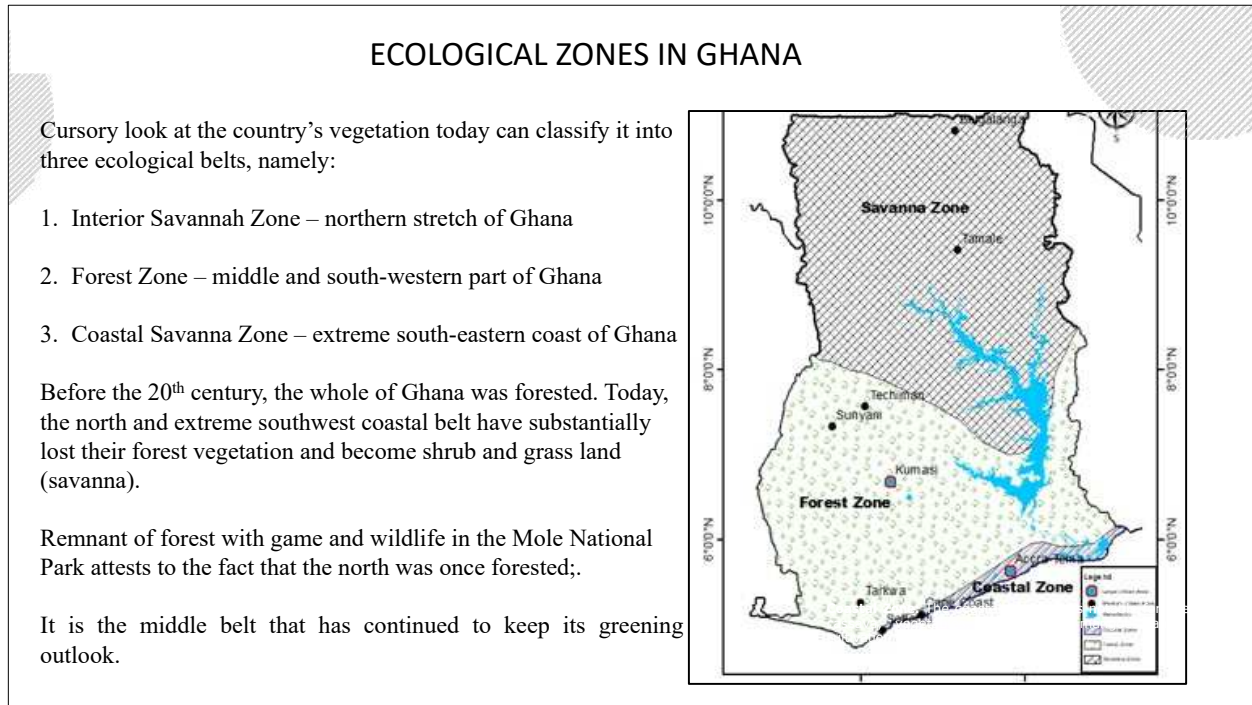
Cocoa generates about \$2 billion annually as foreign earnings. In 2021 alone, the cocoa sector contributed about 10% of the country’s GDP. It supports the livelihoods of 800,000 farm families as well as millions of others in research, plant breeding and multiplication, extension, marketing, transportation, trading and other activities and services. Given its extensive supply chain system, the cocoa sector provides an unmatched broad-based revenue distribution system in the country.

Ghana and Cote d’Ivoire are the two leading producers of cocoa in the world. They account for 60% of total global cocoa beans. In terms of volumes, Cote d’Ivoire is number one in the world market; but in terms of quality and premium, Ghana ranks first. The country’s cocoa is the highest premium, the best, and the most desired for making chocolates in the world.

The greening effect of cocoa farming

Ghana’s total land area of 23.85 million ha can broadly be classified into three ecological zones – i.e. the interior savanna, the middle forest and the coastal savanna. The middle forest zone covers about 8.13 million ha, and the two savanna areas together occupy an estimated 15.69 million ha.

An FAO survey in 2015 shows that 2.6 million ha of the total area in Ghana has been set as forest reserved land. This implies that over 20 million ha of land have been subjected to human activities, led by agriculture. Cocoa farmland occupies close to 2 million ha, out of which 1.38 million ha is currently the productive area. The remaining cocoa landscape of 0.6 million ha is either in a moribund state or affected by the cocoa swollen shoot virus disease (CSSVD).



Although agriculture generally has caused extensive deforestation in Ghana, cocoa has kept green the areas that have come its way in contrast with savanna areas that have lost their forests through food crop farming and bush burning.

In the savanna, farming has centred on the grains (maize, millet, and sorghum), root crops or tubers (yam, cassava and peanuts) and livestock raising. Cultivating food crops alone does not attract long-term investment in Ghana, and the cultivation of root crops amidst burn burning does restrain regrowth of vegetation. Not surprisingly, the savanna ecological zones have lost most of their original forest vegetation. The Pokuase forest grove, spotted on the Accra-Nsawam motorway, is evidence of how the ecology of the Accra plains looked like some 100 years ago.

Similarly, the Mole National Park represents a forest biodiversity remnant in the interior savanna, where wild animals such as elephants, buffalos, antelopes, black and white Columbus moneys, waterbucks, reedbucks, duikers, black and white Columbus monkeys, lions, leopards, jackals, hyenas and crocodiles can be found today. The Mole Park provides a shining contrast between the original forest ecology decades back and the grass and shrub situation today. The park gives an idea about how much forest has been lost in the interior savanna of the northern part of Ghana.

Land Use in the Savanna Zone

- The Mole National Park is a remnant, exemplifies how much forest and biodiversity have been lost in the north.
- Foodcrops-based agriculture alone is not environmentally resilient.



The story in the middle forest belt is different. Its forest ecology has been preserved largely by cocoa cultivation which, in the case of Ghana, is an integrated agroforestry practice.

Cocoa Ecological Resilience in the Forest Zone



As a tropical forest tree, cocoa is a gregarious plant that thrives best in the company of other plants. It has a long lifespan suitable for long-term investment and sustainability that can last for more

than 200 years, giving the regions of cultivation in Ghana a forest image. This image is never lost until attacked by the cocoa swollen shoot virus disease (CSSVD).

Ability of cocoa to improve biodiversity and environmental resilience

The agronomic practice in Ghana is multi or inter-cropping, and not mono-cropping. Because the cocoa tree is a gregarious plant and thrives best under the cover shade plants, a variety of food crops and economic forest tree species are brought to play in the cultivation of cocoa.

Ability of Cocoa to Improve Biodiversity and Environmental Resilience

- Cocoa is a gregarious plant
- Intercropping of variety of shade cover crops and trees
 - Temporary – food crops – i.e. plantains, cocoyams, pawpaw, cassava and vegetables
 - Permanent - economic trees – i.e. *terminalia* *superba*, *terminalia* *ivorensis*, *chloropora* *excelsa*, *kyaya* *ivorensis*
- Cocoa farm is an embodiment of agroforestry for carbon sequestration



Initial stages, 5 months old cocoa farm

The food crops on the farm serve as sources of food and incomes for the farm households, as well as provide temporary shade cover for the young cocoa trees in their early stages, say one to three years. Common food crops that go with young cocoa trees are plantain, cocoyam, banana, pawpaw, cassava, pepper, eggplant, okra, beans, tomato, ginger, etc.

Economic trees often planted to keep company with cocoa include the *ofram* (*Terminalia superba*), *emire* (*Terminalia ivorensis*), *odum* (*Chloropora excelsa*), *sapele* (*Entandrophragma cylindricum*), and *mahogany* (*Kyaya ivorensis*). These trees can grow up to 20-40 metres above the ground, and beyond 50 metres for those in the emergent layer. The economic trees serve as permanent shade cover for the cocoa and as windbreaks throughout the lifespan of the cocoa trees.

Cocoa farms in Ghana, therefore, are secondary forests and, by all standards, agroforests, where considerable amounts of carbon capture and storage are taking place. Carbon sequestration is at its best when there is substantial canopy cover, diversity in the tree species and the trees are young. These are the embodiment of cocoa agroforestry farms in Ghana.



One may ask why development of forest plantations has not been used to drive Ghana's reforestation programme? Farming is generally patronized by smallholder farm families, who lack the wherewithal to make long-term investments. Again, they would want to see some immediate benefits to their labour than to wait for a futuristic benefit. Cocoa farming, which enables farmers to see the fruits of their labor in the short term, appeals to them better than forest plantation.

Sustainability of the industry in Ghana

The future of the cocoa industry in Ghana and the sustainability of production look threatened by four key forces. They are:

- 1) Climate Change and extremes of weather conditions
- 2) Illegal Mining (also known in Ghana as "***galamsey***")
- 3) Cocoa Swollen Shoot Virus Disease (CSSVD)
- 4) Price Volatility and unjust market order

Threat of Climate Change and El Niño to Cocoa Resilience

Climate change is the greatest threat. The cocoa tree is very sensitive to extremes of weather conditions – excessive dryness and excessive rainfall. Cocoa production in Ghana is based on small-holder (2.5 ha) cultivation and rain-fed practice, exposing the sustainability of the cocoa industry to climate change.

From an output of 1,047,000 metric tonnes in 2020/2021, the country's production declined to an average of 600,000 metric tonnes in the ensuing 3 years. The impact of climate change has been

exacerbated the El Niño in the past 12 months, which is likely to seriously affect the country's production.

Fast forward, policy measures are underway to encourage irrigation-driven private plantations with government and COCOBOD facilitation. The only impediment in the way of irrigation plantation in the country is illegal mining, which is very widespread in the cocoa growing regions.

Threat of Illegal Mining to Cocoa Resilience

Ghana is well endowed with natural resources including land, forests, water resources and minerals of various kinds. Unfortunately, the exploitation of the minerals has almost become a resource curse because of the low give-back to the affected communities against the negative impact of mining generally, and illegal mining in particular, on the environment.

Illegal mining has destroyed tracts of land, forests and bio-diversities in Ghana more than any other human activity. Hardly can any life be found in major rivers like the Ankobra, Tano, Odo, Offin, Pra, and Birim in Ghana, because of the extent of damage. Increasingly, these rivers are getting choked with the effluent and sediments from illegal mining. This portends a very disturbing development, which if left unchecked, can render many of these rivers to extinction by 2050.



The activities of illegal mining are currently the most feared but persistent human threat to the cocoa industry. Survey is underway to get the statistics, but suffice it to say that quite a significant number of cocoa farms have been destroyed or left with no chance to be productive, where the farms are even spared. In all cases, the symbiotic relationship between the cocoa farms and

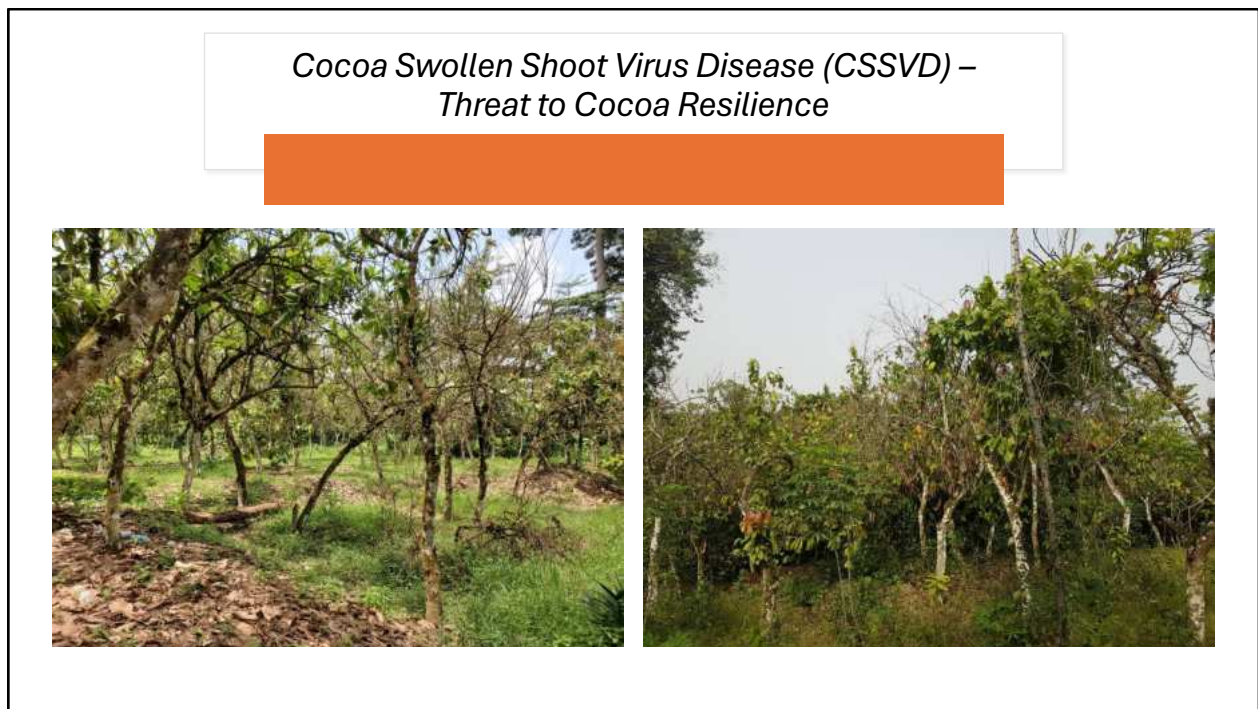
surrounding swamps and water bodies, the corollary ecosystem and local climate, have been destroyed.

Apart from direct damage to farms and the environment, illegal mining has made cocoa farming expensive, putting the future of the cocoa industry at very high risk.

The illegality is defying control because it is highly politicized and tainted with vested interests. The solution to the problem does not lie in the capability of any single political party manifesto or policy decision; it lies in the collective will and interest of the people.

Threat of CSSVD to Cocoa Resilience

The CSSVD poses a serious threat to the cocoa industry in Ghana. Just as the “Witches Broom” once wiped-out cocoa in Brazil, so can the CSSVD ruin the cocoa industry in any country if not appropriately managed. A total of 600,000 ha has been affected, according to the latest survey.



The affected farms appear in a state of woodlot that is malignant, and the dying trees lack vigor and luster, and as such lack the ability to sequester carbon dioxide (CO₂).

Rehabilitation is the only solution, that is, by removal of the affected cocoa trees and replanting afresh, which depends on the ability and resilience of the farmer. Ordinarily, a smallholder farmer would spend over 10 years to establish a 2.5 ha cocoa farm, 1 ha in every 3 years. The same stepwise cultivation cannot be followed when affected by CSSVD, lest the treated area gets infested by the virus from the untreated area. For effective rehabilitation, therefore, the farmer will

have to bring all his 10-year life investment into play in 1 year, which many smallholder farmers cannot bear. Still at the smallholder level, rehab is too expensive an undertaking for any individual farmer alone to bear; \$4,000 to re-establish every 1 ha CSSVD farm in 2 years.



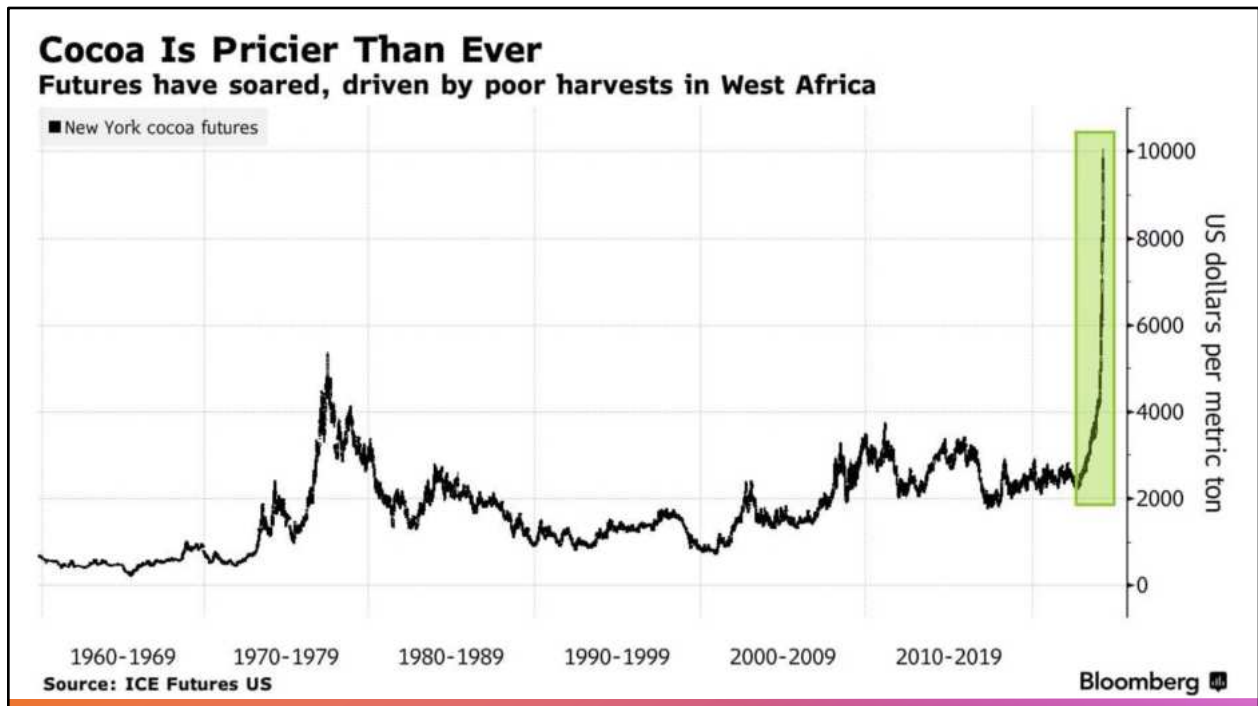
The Government through COCOBOD, and with credit facility from the African Development Bank and the World Bank, is rehabilitating an estimated CSSVD area of 120,000 ha at no cost to any farmer. Rehabilitated farms are an expression of an integrated cocoa agroforestry, in the early stages having young cocoa plants, food crops and permanent economic trees, and eventually taking the shape of cocoa agro-forests.

Threat of Price Volatility and Unjust Market Order to Cocoa Resilience

Cocoa is traded on the London or New York commodity exchange markets, which are structured to subsume producers to **“takers of prices, and not givers of prices”**. It is a market, where the buyer has control at the terminal and not the supplier. Ghana and Cote d’Ivoire, which contribute more than 60% of total world cocoa beans, enjoy less than 5% of the market value of \$120 billion annually.

The price factor is always influenced by extremes of weather conditions. El Niño-triggered shortages of cocoa beans from 2013 to 2016, ramped up cocoa prices beyond \$3,000 per tonne. Immediately conditions normalized by early 2017, prices declined by 30 per cent, forcing the Government of Ghana through COCOBOD to subsidize prices for farmers in the country. For three consecutive years, between 2017 and 2019, COCOBOD borrowed \$500 million a year to insulate Ghanaian cocoa farmers from the world market shocks.

The return of El Niño in 2023 once again triggered another global shortage, propelling cocoa prices to rally well to over \$10,000 records high. With El Niño retreat and weather conditions about to improve in May 2024, it is predicted that the soaring prices will soon start tumbling.



In response to this unfair market order, Ghana and Cote d'Ivoire entered a strategic bilateral cooperation on cocoa, dubbed Cote d'Ivoire Ghana Cocoa Initiative (CIGCI).

This Initiative is to enable the two countries harmonize their policies, programmes and strategies, to manage production and marketing, exchange knowledge on challenges and research findings, all aimed at securing a better price for their producers.

One great achievement of the Initiative is the **Living Income Differential (LID)**. The LID enjoins buyers to pay an extra \$400 per tonne on top of the world terminal market price of cocoa beans, exclusively for producers in Ghana and Cote d'Ivoire. LID is not a premium. It is to secure equity, to close the gap between the terminal and the real market price that will guarantee a decent and remunerative earning for the producer.

Even though buyers have been maneuvering to undermine the LID since its introduction in 2019, the strategic bilateral cooperation between the two countries has enabled all purchases to be invoiced with the LID and secure its stay. The Initiative will have to be strengthened and sustained to guarantee the sustainability of the cocoa industry.

Adoption of climate-smart programmes

In Ghana's bid to have cocoa resilience and environmental sustainability, farmers have been introduced to several climate-smart farming practices. For example, instead of the traditional slash-

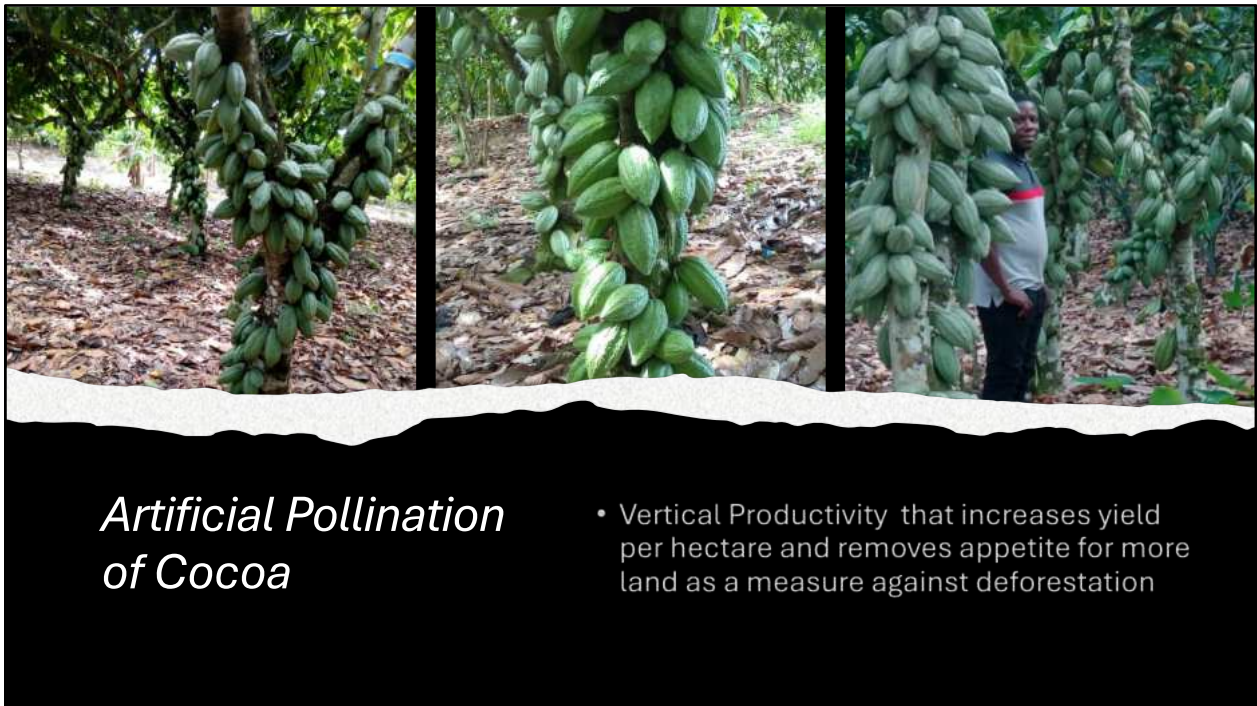


and-burn practice, which destroys the biomass on the farm including the soil micro and macro-organisms, farmers are being encouraged to adopt regenerative organic cocoa farming.

The country has also embarked on a policy of compensatory rehabilitation programme for all farms affected by the cocoa swollen shoot virus disease (CSSVD). All rehabilitated farms take the form of cocoa agroforestry (sic).

Landscape arising from an integrated cocoa agroforestry practice in Ghana, is a forest. The FAO definition of a forest refers to any land area of more than 0.5 ha, with a tree canopy cover over 10 % and trees reaching a minimum height of 5 metres. In Ghana, where the average size of cocoa farm is 2.5 ha, tree canopy cover is more than 80%, and cocoa trees grow up to 8-10 metres and economic trees reaching 30-40 metres, they more than qualify as forest.

As part of the cocoa resilience and climate change adaptation measure, cocoa farmers in Ghana have been introduced to productivity enhancement programmes (PEPs), which entail increase in the number and variety of shade cover crops, pruning, effective pest and disease control, artificial pollination and adoption of organic fertilization of soil. The PEPs are to engender vertical instead of lateral productivity.



Vertical productivity implies economizing land, intensifying land use and increasing yield per hectare. Clinical pruning and artificial pollination, for example, can enable farmers achieve up to 100 pods or more per cocoa tree instead of the conventional 20-30 pods per tree. This serves as a disincentive for famers to look for more land for agricultural expansion before increasing their productivity. PEPs and vertical productivity measure have been put in place to save land in cocoa growing areas from further deforestation. In effect, it is a good measure to deal with climate change and adaptation.

Health Benefits of Cocoa

What most people know about cocoa is chocolate, as a treat. Little is known about its mollifying role in deforestation and climate change, and still little is known about its secrets for human health and nutrition.



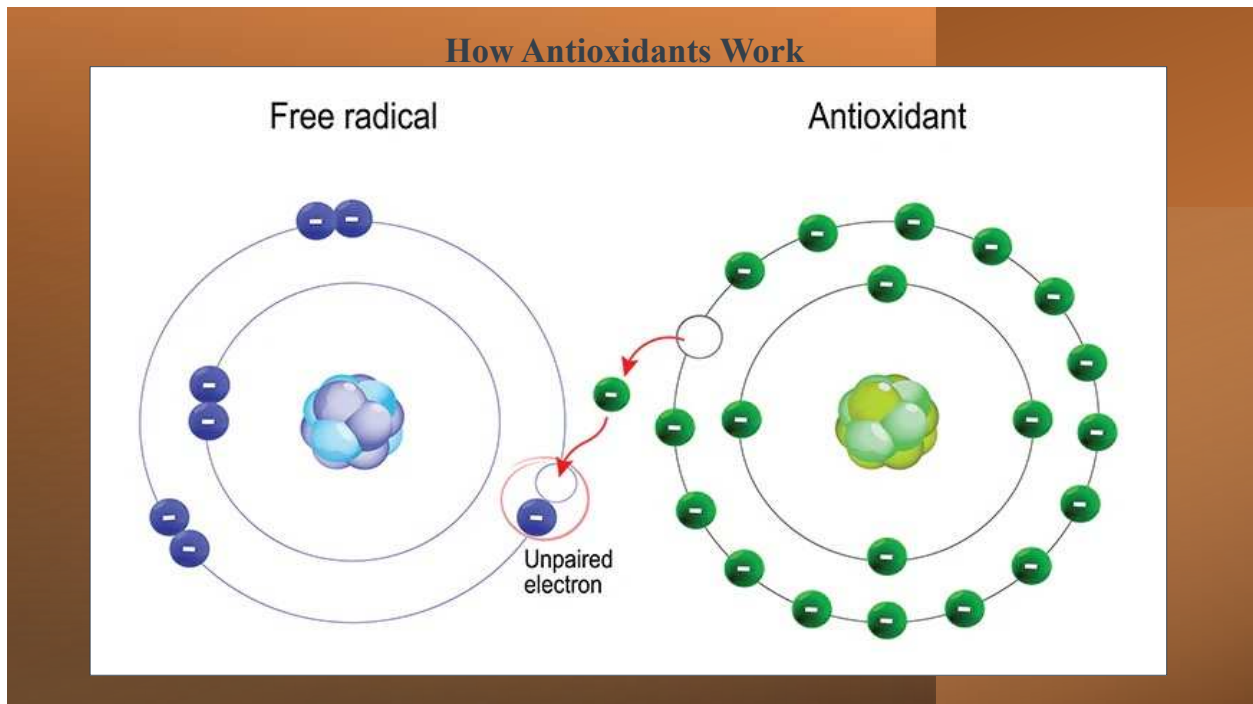
The botanical name of cocoa, *Theobroma Cacao*, is the Greek term for “**food of the gods**”. The attribution connotes immortality, which must not be construed to mean that by taking chocolate or cocoa-based product, one would become immortal.

The reality is that the cocoa bean is rich in flavonoids and polyphenols, which are **anti-inflammatory, antioxidant and anti-aging**. Cocoa is also said to be loaded with several compounds and minerals including, manganese, magnesium, iron, phosphorous, potassium, iron and zinc.

A major problem with all humans is oxidative stress. When the human body comes under oxidative stress, it means there is an imbalance between the number of free radicals and antioxidants in the cells. The condition is said to be the cause of many fatal diseases including diabetes, heart diseases and cancer.

To counter, antioxidants are compounds in food that scavenge and neutralize free radicals in the human body. An antioxidant serves as electron donor to pair a reactive unpaired electron in an oxygen molecule. Cocoa is known to have more antioxidants than even highly rated grapes and green tea. The Kuna Indians have exceptional cardiovascular health, which scientists believe may

come from their particularly high consumption of cocoa. They drink up to five cups per day, a similar habit to some Brits and their regular tea consumption, or Americans and their coffee!



Several studies have indicated that regular intake of cocoa (that is, natural cocoa or dark chocolate) can help enhance vasodilation and endothelial functioning in the blood vessels and brain blood barrier, and make one less predisposed to cardiovascular diseases and neurodegenerative disorders (dementia, Alzheimer's disease and Parkinson's disease), malaria, hypertension, stroke, diabetes mellitus, cancer, persistent coughs and hiccups.

Other studies indicate that cocoa carries brain power, aphrodisia, improves bone mass, eye and hair pigmentation, boosts body immune system and provides energy and vitality, elixir for body relaxation and sleep. Recent COSMOS studies give indication that consumption of chocolates can stimulate the production of stem cells, underscoring the anti-aging properties of cocoa. Cocoa, therefore, is a superfood that is important for everyone, young and old, and men and women.

Any food made with a cocoa recipe is a chocolate. The more cocoa content in it, the more it is chocolate. Those who think that cocoa butter substitutes can be used to produce chocolate are deceiving themselves and shortchanging consumers. Those substitutes cannot provide the rich nutritional and health benefits that cocoa carries.

The richest chocolates are not the ones drenched with sugar and cream; but with little or no sugar. It must, therefore, be noted that the healthiness of cocoa chocolate is in the bitterness (theobromine).

Misrepresentation of cocoa in Ghana as a driver of deforestation

Studies in Ghana do not support the conventional belief that cocoa is a major driver of deforestation. Professor Polly Hill, a Cambridge-educated economist and anthropologist, and Professor George Benneh, one time Vice-Chancellor of the University of Ghana, Legon, both acknowledge that cocoa only played second fiddle to timber logging and lumbering in the deforestation of the country.

Early cultivation and spread of cocoa around the 1900s, coincided with growing interest in tropical forest wood by local and European timber merchants. After World War II, there was a greater demand for tropical red wood (mainly, mahogany) for the reconstruction of Europe. It was the loggers and timber merchants who, well-equipped and well-resourced, reduced and opened-up the rain forest in Ghana. The farmers only followed their tracks to cultivate cocoa as the timber loggers and lumbers moved from one forest frontier to the other. Indeed, there was no way the ordinary farmer equipped with only a machete and axe could subdue the monstrous tropical rain forest. The timber loggers made it possible.

The inversion of the narrative today is unfortunate. Whereas one activity (i.e. timber logging and lumbering) destroyed the primary forests in Ghana, another (i.e. cocoa cultivation) stepped in to restore lost forests. And today, cocoa continues to restore forest cover in Ghana and mitigate climate change.

Conclusion

As the world battles global warming and climate change, no mitigation or adaptation measure of any country is insignificant. Contrary to the conventional notion that cocoa is a major driver of deforestation and antithesis to climate change, it has been demonstrated in this presentation that cocoa rather has a strong dexterity in reforestation, agroforestry, environmental resilience and climate mitigation. The regenerative agroforestry practice in Ghana enables cocoa to restore deforested and degraded forestland, mitigate climate change and foster environmental resilience.

Its importance to developing economies like Ghana and its enormity in nutritional and health benefits are even the more reason why the sanctity of cocoa must be preserved and sustained.

The foregoing notwithstanding, the sustainability of the cocoa industry in Ghana is seriously being threatened by climate change, illegal mining, the CSSVD and an unjust world market order with attendant price volatility. All these problems are anthropogenic, and the country has put in place policy measures to address them.

In sum, cocoa is a superfood for the health of the earth, the health of developing economies and the health of humans. Rather than give it a bad name to demoralize its sustainability, cocoa must be cherished and supported for it to continue to be a good friend to the environment, the economy and humanity.