A deeper dive into Environmental Alteration

In our last article we looked at the broader concept of Climate Change, what it means to you, and the impact it has on your life and the lives of those around you. The term Climate Change is more common, yet today there is often debate into the causes: natural or human induced. Here we place our focus on Environmental Alteration, referring only the impact of human actions on our planetary ecosystem. Anything we do or make that is not a normal part of our planet's natural processes that results in a negative alteration of our environment.

How did we reach the stage we are at today? Who will feel the most impact from climate alteration? What are some options to mitigate it? Our goal is to consider these questions and develop actionable steps to re-establish the balance between humanity and our natural environment, framed as a profitable economic enterprise. To make environmental regeneration economically appealing by creating a link between economics and nature. To get to that, let's start with a look at money and agriculture.

> [A]ccording to FAO, more than 60 percent of the world's population depends on agriculture for survival. So if the population is about 7 billion now and grows to 9 billion in 2015 [sic 2025], 12 percent of the total available land, or about 1.5 billion hectares, would be used for agricultural crops
> http://www.expo2015.org/magazine/en/economy/agriculture-remains-central-to-the-world-economy.html

> Economic advances around the world mean that while fewer people live in extreme poverty, almost half the world's population — 3.4 billion people — still struggles to meet basic needs, the World Bank said.
> https://www.worldbank.org/en/news/press-release/2018/10/17/nearly-half-the-world-lives-on-less-than-550-a-day

Previously we discussed how human actions leading to climate alteration are driven by economics. The development of society, including technology and economy, define how we reached our current stage. Economics is a human concept we choose to allow to direct our lives and actions. Money is a means of exchange of value. It is the most basic form of credit. It allows people to accept payment now in the belief that they will be able to use that money to buy something that they want later. A monetary policy is the control of the amount of money in an economy. Technology is knowledge and information, the skills we use to produce goods or services. We trade technology using money. Technology is a commodity.

During a financial crisis, we often see a return to barter economies, where goods are directly exchanged for other goods or services. The actual goods are traded with no risk related to a currency. Barter economies are said to be inefficient for several reasons, including the challenges of actual goods exchange, and that the goods or resources could be used for production or processes to increase profit while being the backing for a currency.

Modern money began as a finite resource based directly on gold. The origin of the word salary is Sal, the Latin world for salt. In ancient Rome, it specifically meant the amount of money allotted to a Roman soldier to buy salt, a precious commodity. Roman soldiers were actually paid in salt for some time. Salt was essential to life in many cases, it was a precious *and functional* commodity. The gold standard meant there could only be as much money as there was gold stored to support that money. When we chose to create more money than there is or could be an equal amount of gold, we changed from the gold standard to fiat economies. Fiat, in Latin, means an order. Essentially we accept that if a government says (orders) a currency has value, then it does. There is nothing tangible supporting it. Consider Bitcoin. Invented by a small group of people as a new currency for the electronic era. A crypto currency. Again, there is absolutely nothing supporting it or giving it value. No gold, no assets, nothing. It is purely speculative. True value is only found in tangible assets or value services. That is what the money is supposed to represent and be backed by.

Agricultural products are tangible commodities. We can say they are the most valuable commodity in the world because without food we die and nothing else matters. Small farmers can be seen as the most important members of our society because they produce the food we all must have. Agricultural commodities are traded worldwide daily, yet they are also manipulated for economic gain. The small farmers suffer the most from this. Common sense tells us that if our food supply is threatened we can perish. Agriculture fully relies on the planet and a stable environment. So our most valuable commodity is our environment. Climate alteration by human actions threatens that.

The value and importance of agriculture is self evident, yet often discounted. Despite this importance, environmental regeneration is not economically appealing, so all our conversations and best efforts towards it will fall short. It does not make money. It runs counter to the design of our society which is to make profit. Any technology (skills or goods) we may use in most regenerative ventures is not creating economic growth so the technology is generally directed elsewhere. In this same light a nonprofit organization is destined to failure by virtue of its nature. It is not designed to make a profit.

Consider a new view: that nonprofit and for-profit enterprises are no different when we look at what value means. The core purpose of any enterprise goes beyond money to happiness. When we earn money we use it to make our lives better, to be happier. We spend it to be happier. Nonprofits have the same goal: to improve lives, to bring happiness. Nonprofits traditionally rely on cash donations and other contributions to perform. They depend on for-profits, so they technically decrease profits. In this view nonprofits are decreasing happiness. This is not the intent, yet when a nonprofit/charity requests a donation for some cause we may find ourselves pulling back, perhaps feeling pushed to give up some portion of our happiness for others. Altruism is wonderful, but it should not lead to stress or unhappiness. The design of our projects at EarthCorp offer another option where no one needs to donate, and everyone still gets to help. It is based on agriculture for two reasons: our need for food, and because regenerative agriculture is the single most effective way to mitigate climate alteration.

Agricultural commodities are the highest value of society alongside knowledge. Food, and education, which leads to technology. Absent either we do not survive. In the agricultural sector nonprofits can work hand in hand with for-profit enterprises to increase revenue and social responsibility for both at no cost. Using one system we can bridge the gap that exists between the production and final sale of agricultural goods, generate profit for each participant, and regenerate our environment. A complete circular life cycle. In this case technology would be driven to environmental efforts rather than ventures that produce economic gain without considering their impact on our environment.

This system is a pragmatic approach, enrolling modern science/technology in a functional manner applicable to the immediate needs of society. Scientists operate at the cutting edge of technology, yet their discoveries are frequently too complex for general interpretation, and more often, not *economically* practical, so that science goes unused. These discoveries may hold the potential to solve major issues, while at the same time they are too complex and costly to be applied. It cannot be commercialized.

A good example is non fossil fuel power generation such as solar, wind, and waste to energy. Waste-to-energy provides a key solution to our global waste and energy situations, yet the economic costs are undercut by cheaper fossil fuels.
Solar offers the greatest energy potential by far.

> There's one simple fact that may just change your thoughts on renewable power. In a single hour, the amount of power from the sun that strikes the Earth is more than the entire world consumes in a year.

https://www.businessinsider.com/this-is-the-potential-of-solar-power-2015-9

> Sunlight has by far the highest theoretical potential of the earth's renewable energy sources. [] This theoretical potential represents more energy striking the earth's surface in one and a half hours (480 EJ) 67 than worldwide energy consumption in the year 2001 from all sources combined.
> https://www.sandia.gov/~jytsao/Solar%20FAQs.pdf

The challenge to harnessing this unlimited clean energy is not technological. In the early 1900s, American inventor Frank Shuman designed and employed multiple solar systems around the world that formed the basis of many of today's most advanced systems.

> We have proved the commercial profit of sun power in the tropics and have *more particularly proved that after our stores of oil and coal are exhausted* the human race can receive unlimited power from the rays of the sun.
> — Frank Shuman, New York Times, July 2, 1916

The limitation is economics. Our self imposed restraint. It is cheaper and more profitable to burn coal, oil, and gas than use solar, wind, geothermal, or waste to energy, aside from a handful of countries with very high kilowatt hour costs. Thus, humanity chooses to limit itself based on economics, which in turn has driven our actions resulting in dramatic environmental alteration.

Returning to our focus on agriculture, we can see the same limitations due to economics. Food security is the state of having reliable access to a sufficient quantity of affordable, nutritious food. Despite having plenty of land and advanced agricultural technology, lack of food security is on the rise after declining for many years. In excess of 10% of humanity, over 800 million people do not have food security. Ironically, in wealthier countries a large amount of food goes to waste daily or is used as animal feed. Economics is the controlling factor. For example, animal protein is seen as a status symbol, yet it contributes substantially to greenhouse gasses, deforestation, decrease of food for humans, and excess intake may be detrimental to health. Production of animal proteins is profitable but detrimental to our environment and our food supply. We are out of balance.

Any effective and long lasting approach dealing with alternative energy, food security, or environmental alteration must be based in a realistic economic solution or it will not

succeed. Our proposed agricultural system is designed to be economically profitable while addressing food security and environmental alteration, along with using alternative energies that are affordable.

Agriculture is both king and queen. The most basic needs of all life are food, water, and shelter, followed closely by community, and more recently, technology. 60% of humanity lives at an agricultural self-subsistence level. They rely on food production for their own consumption and any economic earnings.

> Agriculture can help reduce poverty, raise incomes and improve food security for 80% of the world's poor, who live in rural areas and work mainly in farming. The World Bank Group is a leading financier of agriculture, with US$ 6.8 billion in new IBRD/IDA commitments in 2018.
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> Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity and feed a projected 9.7 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors. 2016 analyses found that 65% of poor working adults made a living through agriculture.
> Agriculture is also crucial to economic growth: in 2014, it accounted for one-third of global gross-domestic product (GDP).
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> **But agriculture-driven growth, poverty reduction, and food security are at risk: Climate change could cut crop yields, especially in the world's most food-insecure regions. Agriculture, forestry and land use change are responsible for 25% of greenhouse gas emissions. Mitigation in the agriculture sector is part of the solution to climate change.**
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> The current food system also threatens the health of people and the planet: agriculture accounts for 70% of water use and generates unsustainable levels of pollution and waste. Risks associated with poor diets are also the leading cause of death worldwide. Millions of people are either not eating enough or eating the wrong types of food, resulting in a double burden of malnutrition that can lead to illnesses and health crises. A 2018 report found that the absolute number of hungry and undernourished people increased to nearly 821 million in 2017, from around 804 million in 2016. Adult obesity is also increasing. In 2017, one in eight adults--or more than 672 million people—is obese.
>
> (emphasis added)
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> https://www.worldbank.org/en/topic/agriculture/overview

100% of *all commodities* come from our planet, agricultural or otherwise. Global demand for food is increasing daily as population rises. Major focus is placed on livestock animals which use substantially more resources (water, land, and crops for feed) than direct human consumption of non-animal foods.

> Twenty-six percent of the Planet's ice-free land is used for livestock grazing and 33 percent of croplands are used for livestock feed production. Livestock contribute to seven percent of the total greenhouse gas emissions through enteric fermentation and manure. In developed countries, 90 percent of cattle belong to six breed and 20 percent of livestock breeds are at risk of extinction. []
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> The livestock sector is one of the key drivers of land-use change. Each year, 13 billion hectares of forest area are lost due to land conversion for agricultural uses as pastures or cropland, for both food and livestock feed crop production. This has detrimental effects on regional water availability, soil fertility, biodiversity and climate change. Furthermore, 20 percent of the world grasslands are degraded; this trend is increasing, mainly due to intensified animal density per area. []
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> ***Globally, there is enough cropland to feed 9 billion in 2050 if the 40 percent of all crops produced today for feeding animals were used directly for human consumption, while available grasslands were more efficiently used as the basis for livestock feed.*** Grassland-based and mixed crop-livestock systems optimize nutrient and energy cycles, while encouraging the use of rare livestock breeds that are adapted to low input and harsh environments. This is crucial in a context of climate change and increasing variability.
>
> (emphasis added)
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> http://www.fao.org/3/ar591e/ar591e.pdf

In only the past few decades we have cleared million hectares of irreplaceable rain forests and other precious lands. We have lost half of our planet's topsoil, the most vital component of our entire agricultural cycle, without which nothing grows. We now apply over *3 million tons* of synthetic agro chemicals and pesticides to our planet each year. Millions of tons of ice are melting each day beyond the norms of past centuries. The list goes much further.

> Deforestation is the permanent destruction of forests in order to make the land available for other uses. An estimated 18 million acres (7.3 million hectares) of forest, which is roughly the size of the country of Panama, are

lost each year, according to the United Nations' Food and Agriculture Organization (FAO).
https://www.livescience.com/27692-deforestation.html

Half of the topsoil on the planet has been lost in the last 150 years. In addition to erosion, soil quality is affected by other aspects of agriculture. These impacts include compaction, loss of soil structure, nutrient degradation, and soil salinity. These are very real and at times severe issues.
https://www.worldwildlife.org/threats/soil-erosion-and-degradation

Over 1 billion pounds of pesticides are used in the United State (US) each year and approximately 5.6 billion pounds are used worldwide
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946087/

Humanity has now increased free carbon and other Greenhouse gases (GHGs) by nearly double in the past two centuries due only to human actions. US EPA statistics clearly outline this:

- Historical measurements show that the current global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide are unprecedented compared with the past 800,000 years [].
- Carbon dioxide concentrations have increased substantially since the beginning of the industrial era, rising from an annual average of 280 ppm in the late 1700s to 401 ppm as measured at Mauna Loa in 2015—a 43 percent increase []. Almost all of this increase is due to human activities.[1]
- The concentration of methane in the atmosphere has more than doubled since preindustrial times, reaching approximately 1,800 ppb in recent years (see the range of measurements for 2014 and 2015 in Figure 2). This increase is predominantly due to agriculture and fossil fuel use.[2]
- Over the past 800,000 years, concentrations of nitrous oxide in the atmosphere rarely exceeded 280 ppb. Levels have risen since the 1920s, however, reaching a new high of 328 ppb in 2015 []. This increase is primarily due to agriculture.[3]

https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases

The single most effective, practical, and profitable way to reduce carbon and other GHGs is through regenerative agriculture. With 80% of humanity already relying on this sector and the inherent ability of nature to harness and store carbon, no other solution comes close, and none can be achieved more easily and affordably, while providing large amounts of desperately needed food for the world, and an equal amount of economic benefit.

Using combined systems of agriculture coupled with realistic, affordable technology we can address all of the key challenges we now face. Increased food production, the creation of jobs and profitable enterprises, GHG reduction, long-term carbon sequestration, and overall environmental regeneration. All scalable, all economically appealing.

The term Climate Smart Agriculture (CSA) eoncomopasses much of our process, and is embraced by the UN SDG-17 goals and all 194 UN member nations that ratified them. Sadly, we are not even close to attaining the goals as agreed.

> One report focuses on G20 countries, which make up two-thirds of the world's population, more than three-quarters of greenhouse emissions, and almost all of global GDP. There is a wide variety in the efforts and commitments expressed by these governments. After conducting a survey to gauge how strongly the SDGs were integrated into institutions and policy, the US ranked right at the bottom. Just ahead of it was Russia.
> https://qz.com/1328895/un-sustainable-development-goals-the-us-and-russia-are-doing-the-least-among-g20-nations/

Climate Smart Agriculture interlinks and advances each of the SDG17 goals.A detailed analysis can be seen here: http://www.fao.org/3/ca6043en/ca6043en.pdf .

Using older, proven technology that may not perform as well as the newest offers an affordable answer that can also be managed by parts of society that do not yet have the technical skills or money to handle higher tech.

Our program focuses on the lower income levels of our society, which are actually our most important because they are the foundation that all the upper levels depend on. Any level depends on the ones below it. The wealthiest countries, businesses, and people all depend on the working classes of society. When we elevate and stabilize the lower levels, all those above are elevated. We do not propose a model of socialism or

communism. Our invitation is to create a capitalistic circular economic cycle around agriculture that extends into every other aspect of our lifestyle and economy. Bridging the gap between production and retail profit so that everyone sees increased economic gain. This is what we mean by saying we will make environmental regeneration economically appealing.

Every level of society will feel the impact of a changing climate, either natural or human induced. The poor will feel more due to decreased food supply and increasing temperatures. The current velocity of increasing temperature, waste production, dwindling resources, loss of topsoil and forests, and similar changes indicates we are in a global climate emergency as declared in November 2019 by over 11,000 scientists from around the world.

> Exactly 40 years ago, scientists from 50 nations met at the First World Climate Conference (in Geneva 1979) and agreed that alarming trends for climate change made it urgently necessary to act. Since then, similar alarms have been made through the 1992 Rio Summit, the 1997 Kyoto Protocol, and the 2015 Paris Agreement, as well as scores of other global assemblies and scientists' explicit warnings of insufficient progress (Ripple et al. 2017). Yet greenhouse gas (GHG) emissions are still rapidly rising, with increasingly damaging effects on the Earth's climate. An immense increase of scale in endeavors to conserve our biosphere is needed to avoid untold suffering due to the climate crisis (IPCC 2018).
> https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biz088/5610806

The consensus of the scientific community is that we are already seeing substantial changes, and serious impact in fifteen to twenty years, with dramatic irreversible changes in twenty five to thirty years. Some scientists have said we are already unable to reverse much of the alteration now. Public statements from NASA and the US EPA detail these facts:

> Because human-induced warming is superimposed on a naturally varying climate, the temperature rise has not been, and will not be, uniform or smooth across the country or over time. [] The length of the frost-free season (and the corresponding growing season) has been increasing nationally since the 1980s, with the largest increases occurring in the western United States, affecting ecosystems and agriculture. Across the United States, the growing season is projected to continue to lengthen.[] Droughts in the Southwest and heat waves (periods of abnormally hot weather lasting days to weeks) everywhere are projected to become more intense, and cold waves less intense everywhere.
> https://climate.nasa.gov/effects/

Greenhouse gas concentrations in the atmosphere will continue to increase unless the billions of tons of our annual emissions decrease substantially. Increased concentrations are expected to:

- Increase Earth's average temperature
- Influence the patterns and amounts of precipitation
- Reduce ice and snow cover, as well as permafrost
- Raise sea level
- Increase the acidity of the oceans
- Increase the frequency, intensity, and/or duration of extreme events
- Shift ecosystem characteristics
- Increase threats to human health

These changes will impact our food supply, water resources, infrastructure, ecosystems, and even our own health.
https://19january2017snapshot.epa.gov/climate-change-science/future-climate-change_.html

People over the age of 30 to 40 may not be around to see severe changes at this rate. No one really knows. The heavy toll will be on our younger generations, 25 and under, and all future generations. They are being given a planet seriously damaged by human actions that may not recover for hundreds or perhaps thousands of years, if at all. No one knows. What we do know is that these events are occurring, humans play a measurable role in much of them, and we have the technology and ability to mitigate them. Our resistance to action stems from economics. When we choose to make environmental regeneration economically appealing that resistance will be gone.

In our next article we will take an in-depth look at the economic disparity that exists between global agricultural production, export value, and retail sales, and how we can close that gap to increase profits at all levels. We will explore how circular economy based in regenerative agriculture is a 4x win for small food producers, retail sellers, consumers, and the planet.