Code Red: Climate Risks and Opportunities

Agriculture, food, farming and beyond.

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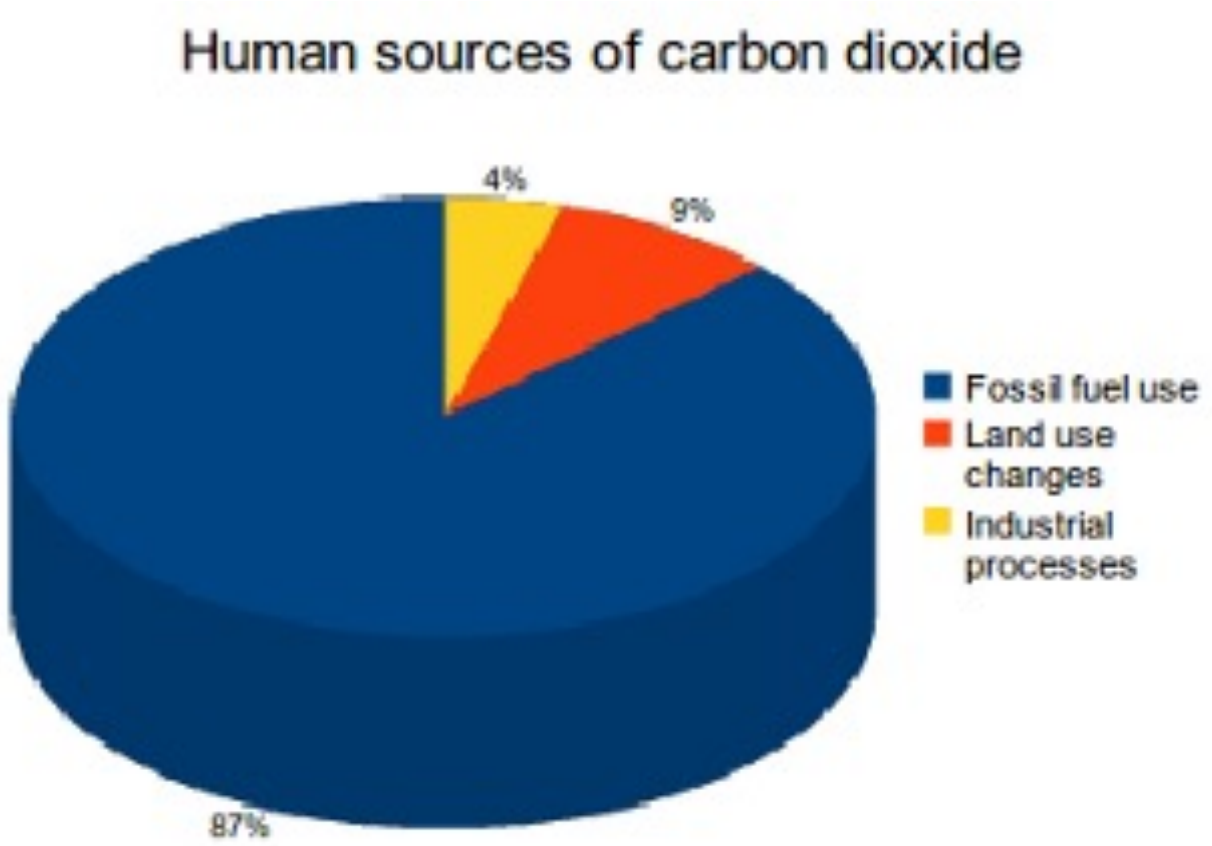
Climate Change is a direct consequence of the use of oil, which tragically, the modern paradigm of 'development' is tied to.

Sri Lanka was an early victim

In 1979 a formal announcement was made linking development to oil "***No oil means no development, and less oil, less development. It is oil that keeps the wheels of development moving***". *Sri Lankan Government* communiqué *1979*

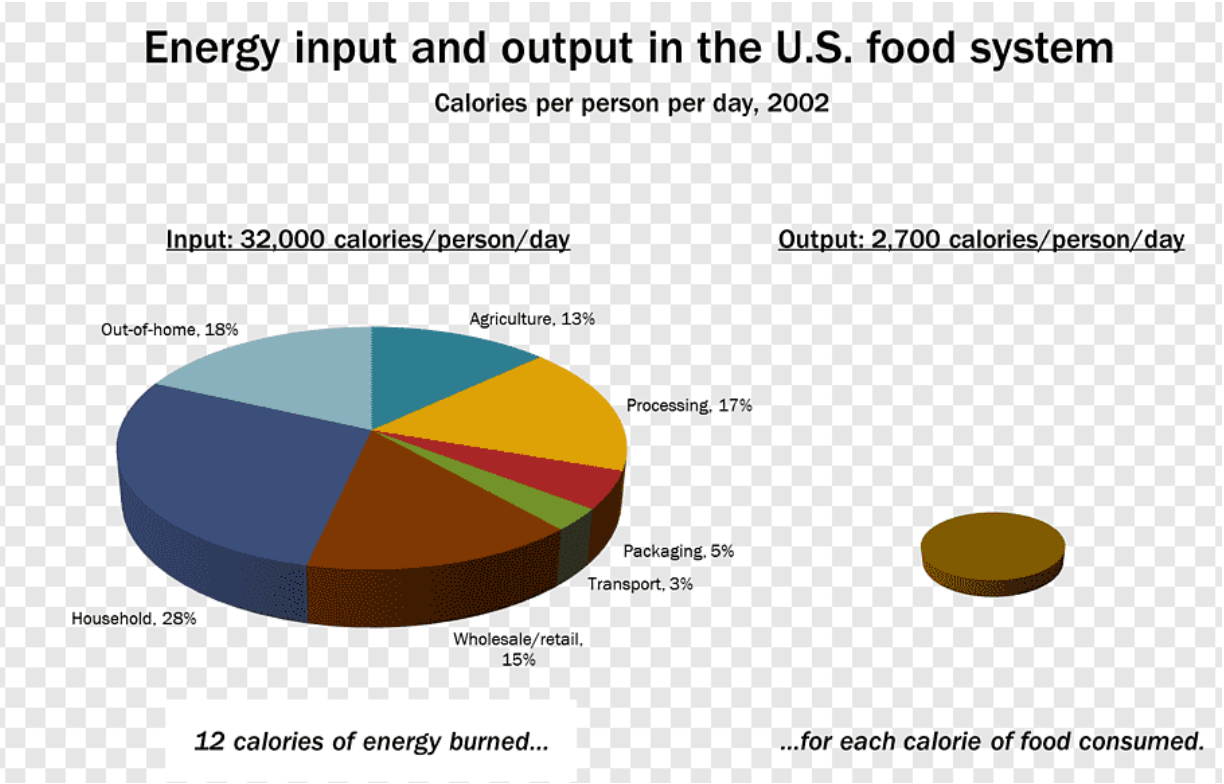
But today we know that it is Growth based on the Consumption of Oil that drives Climate Change

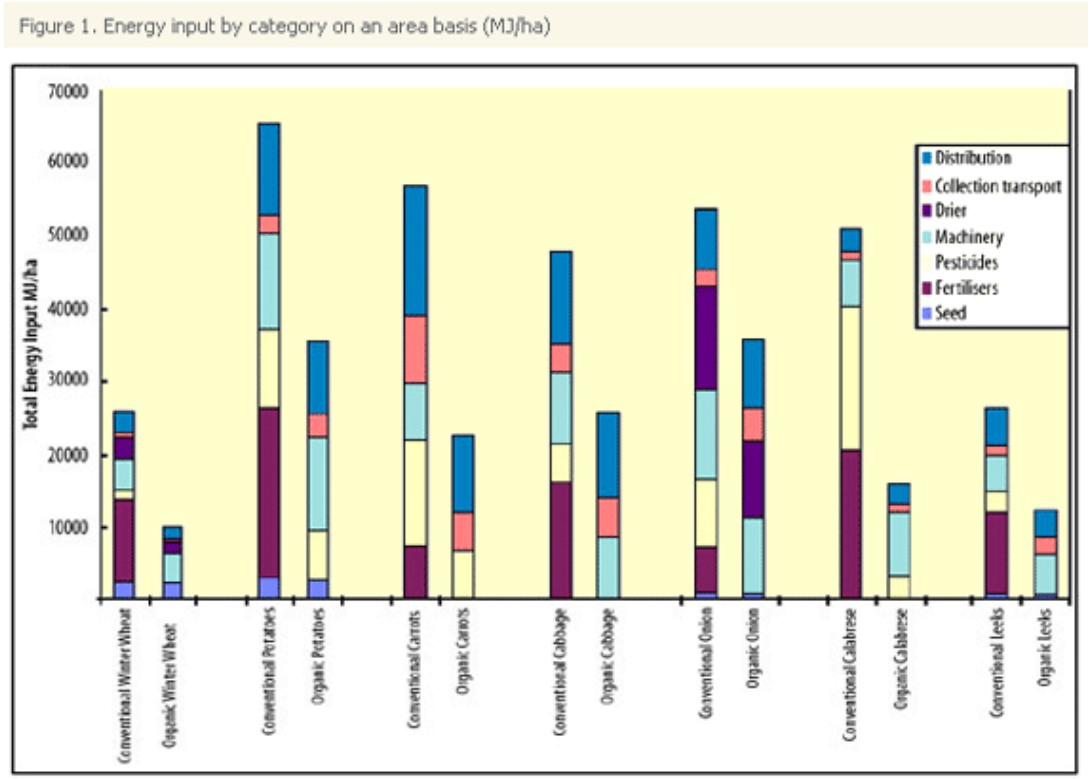
This addiction to oil drives ‘Climate Change’ which is provoked by the burning of fossil fuels which increases the Carbon Dioxide concentration in the atmosphere



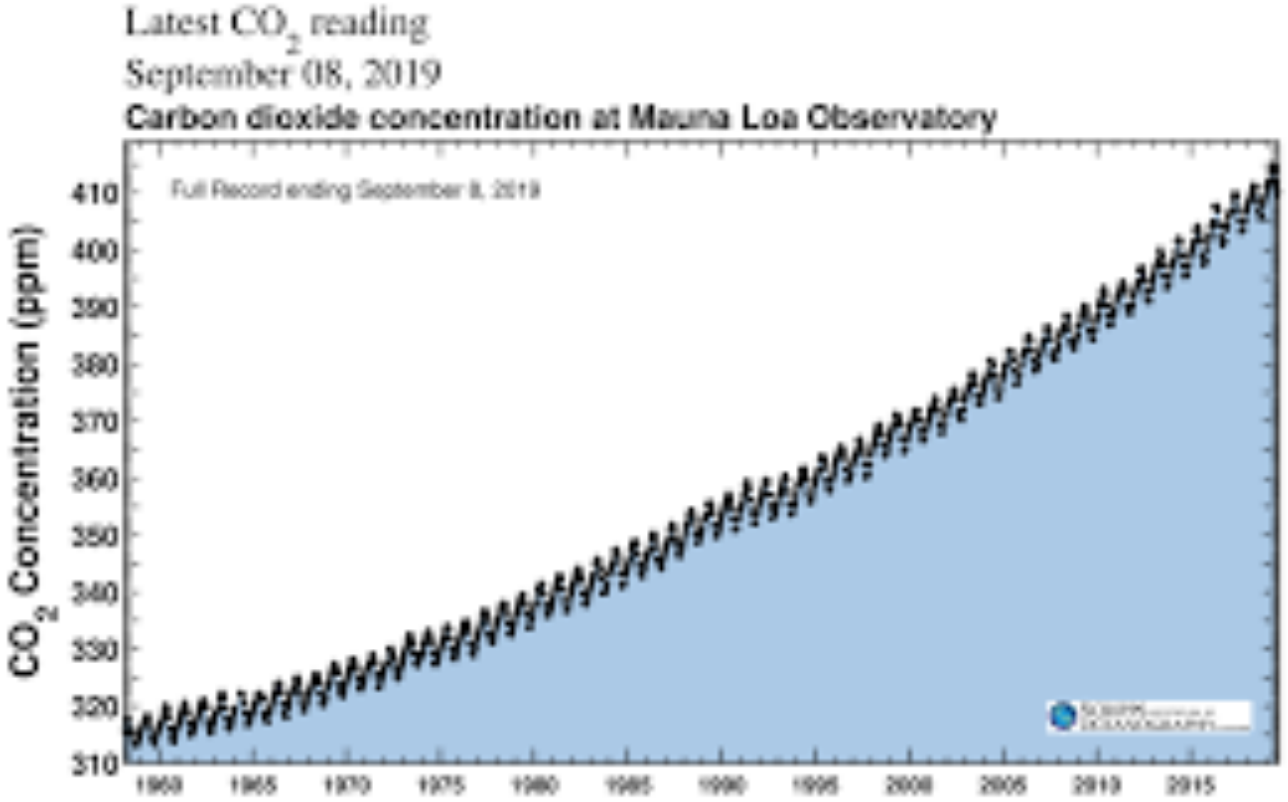
Fossil energy use is not restriced to industry. Agriculture and food production is moving towards fossil energy subsidised systems of production.

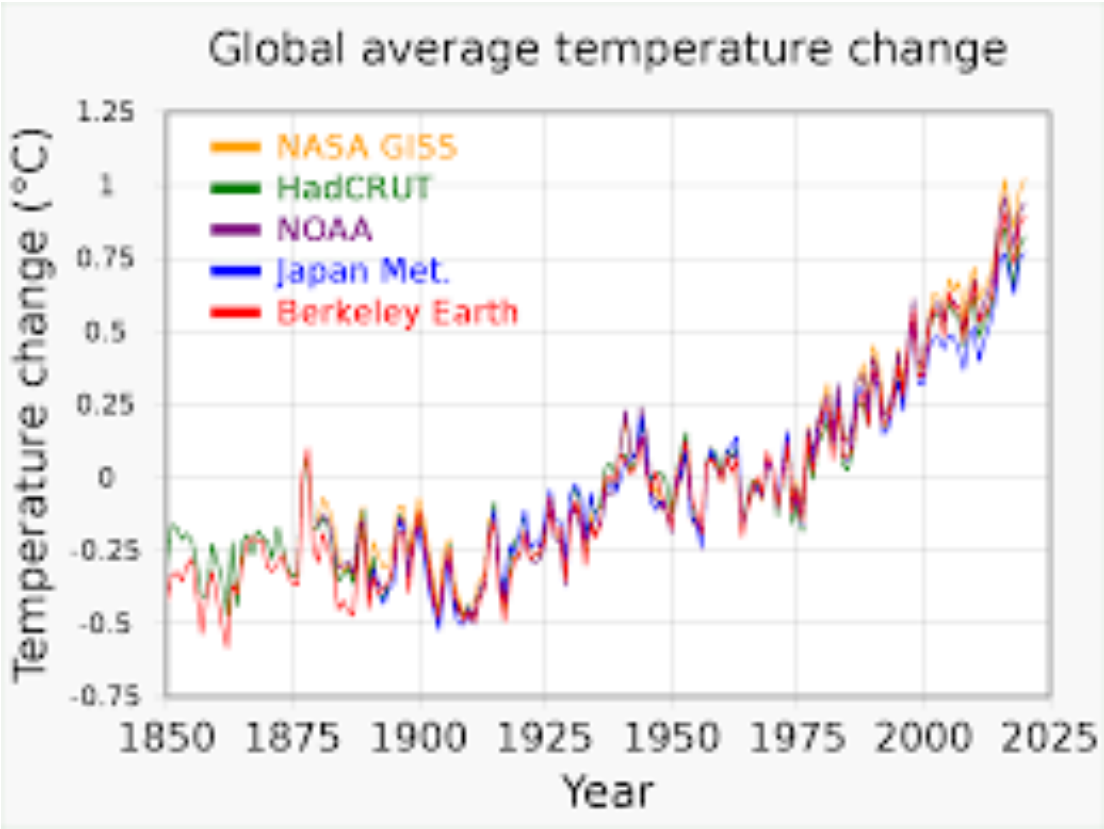
This movement towards industrial agriculture requires fossil energy which contributes to global temperature rise



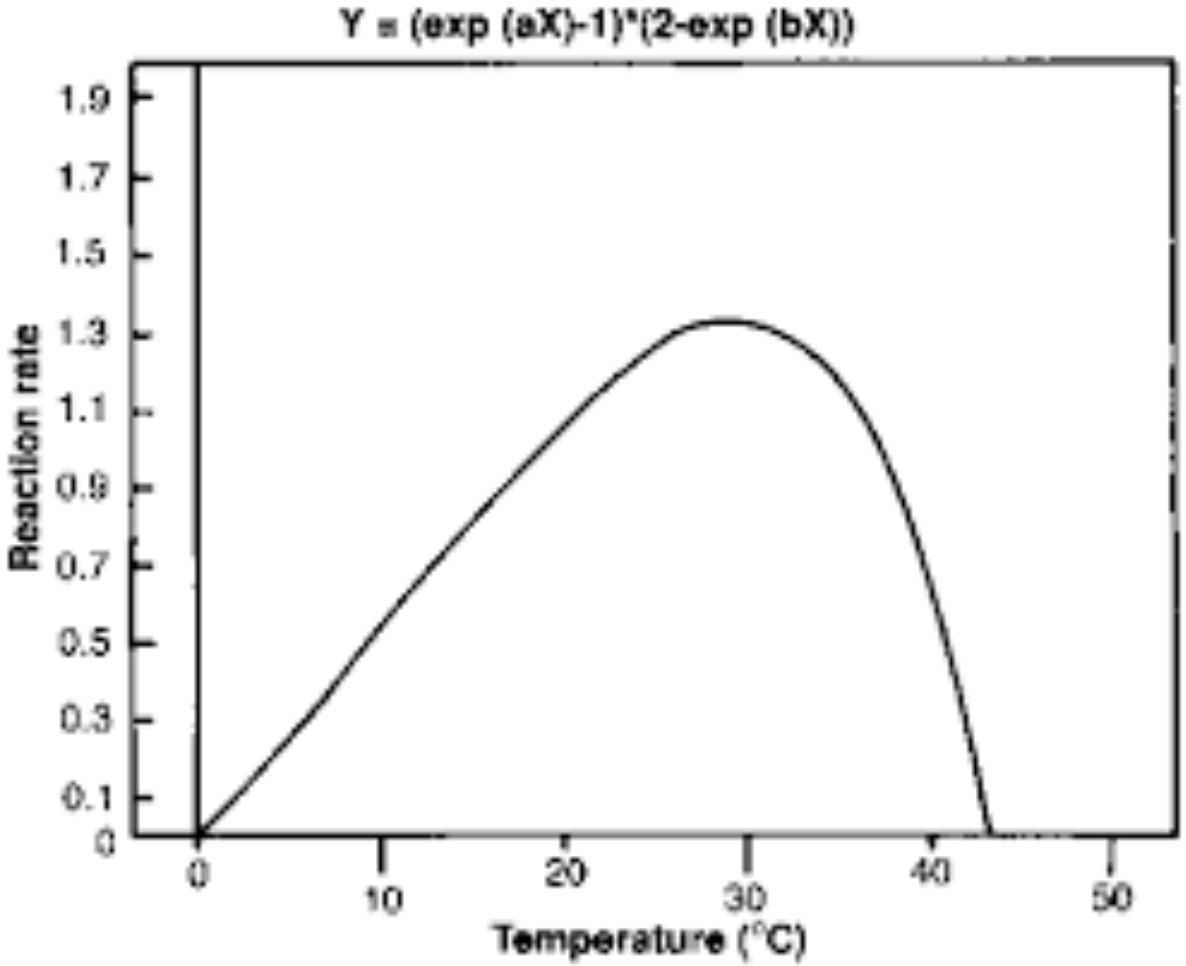


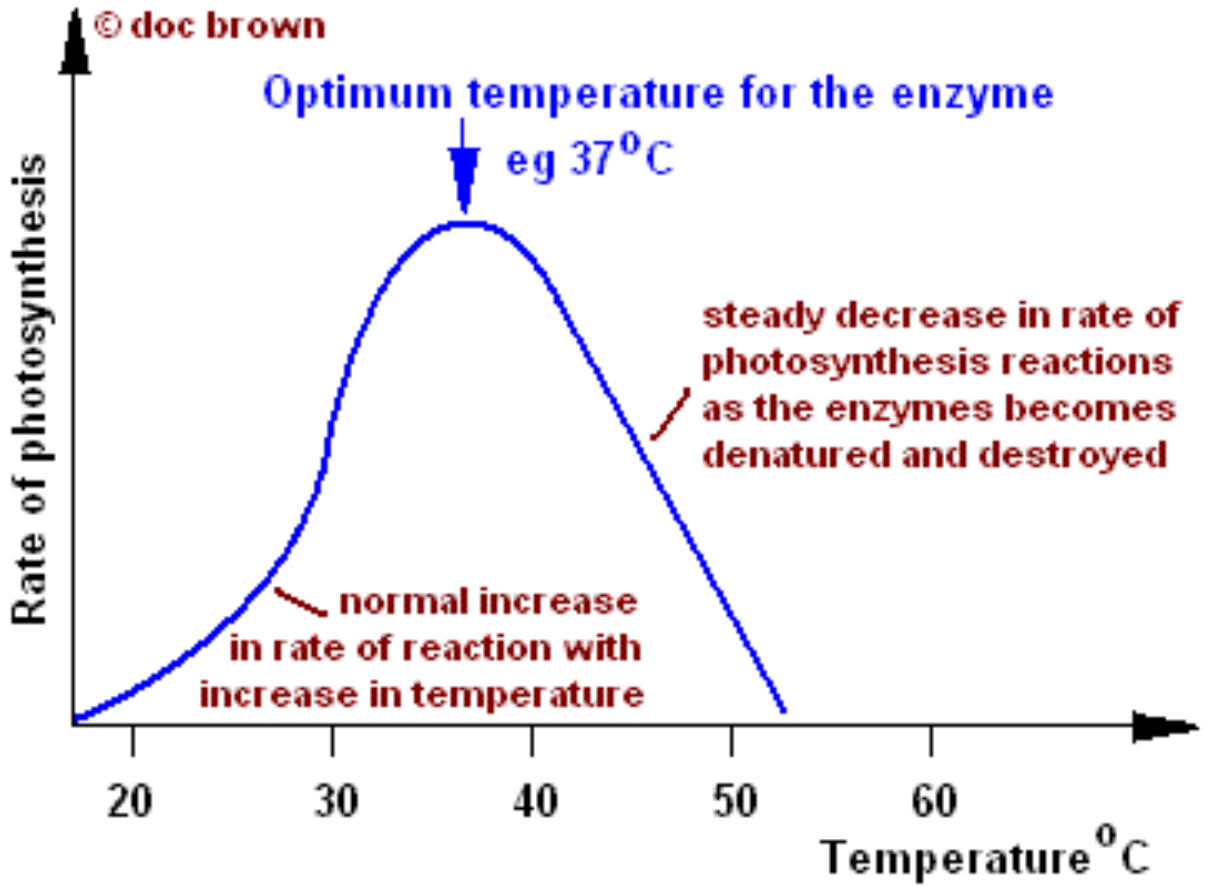
The principal driver of Climate Change is Carbon Dioxide produced by the activity of burning fossil fuels to power the ‘industrial revolutions’, including the green revolution in agriculture





The rise in temperature, driven by burning fossil fuels will affect food production. Chlorophyll has an optimum operating temperature around 37- 40 degrees beyond which there will be reduced agricultural production and finally no food !!

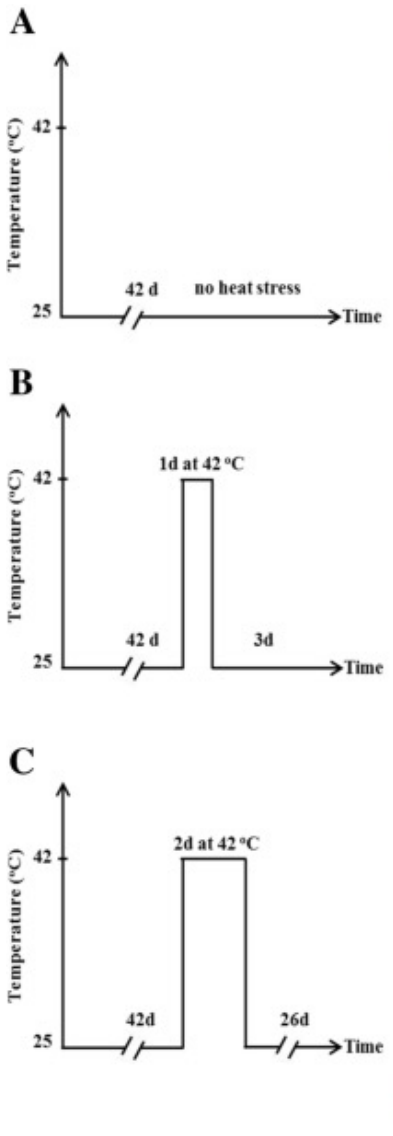


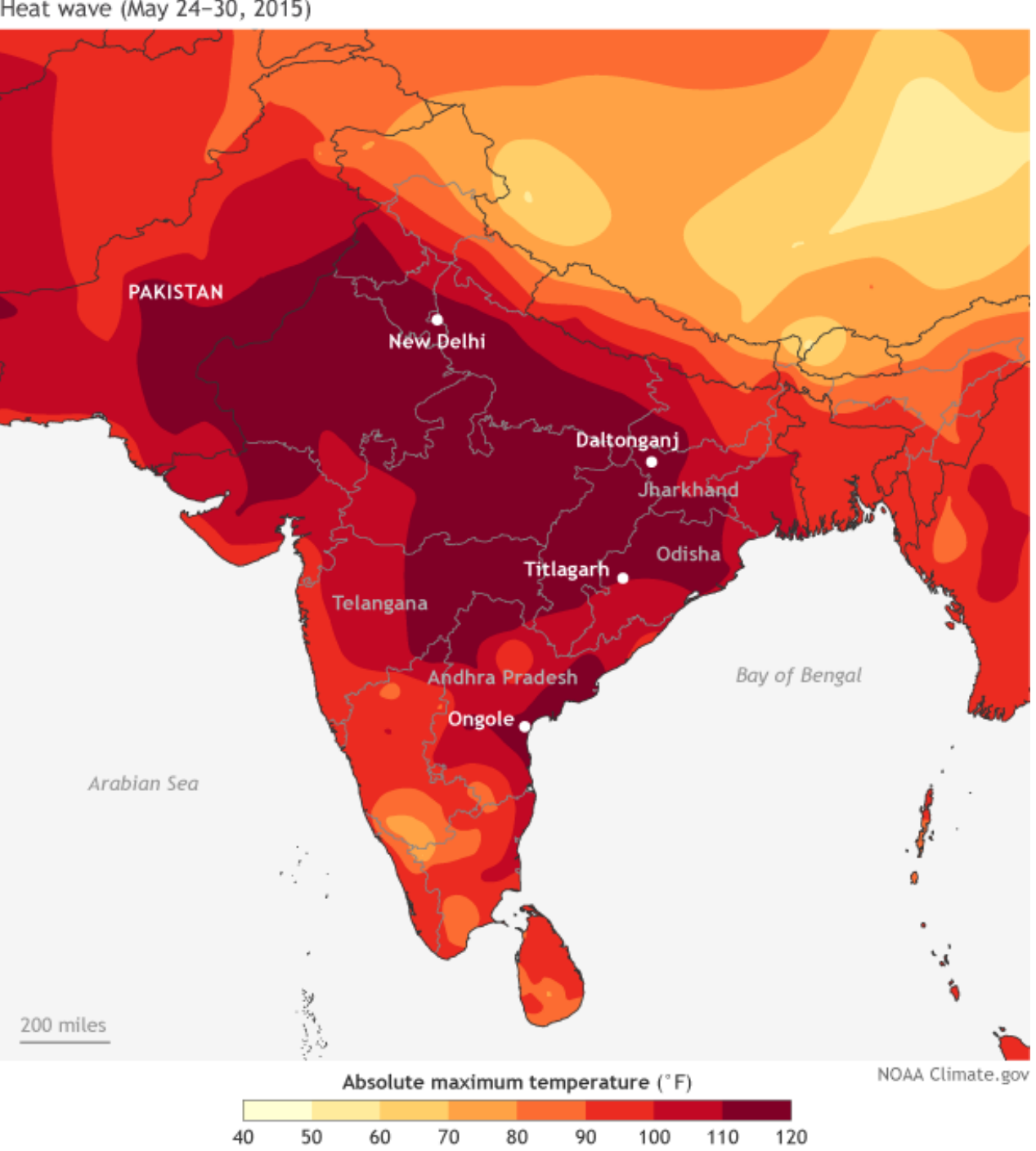


The time of exposure to extreme heat determines its lethality

We are aware that the optimum operating temperature of chlorophyll is at 37 deg C. In a warming world where temperatures will soar well above that, food production will be severely impacted.

Sri Lanka Position Paper : UN Conference for Climate Change (COP21) 2015





One Response would be to develop heat tolerant varieties of crops as a critical action

Another action could be :

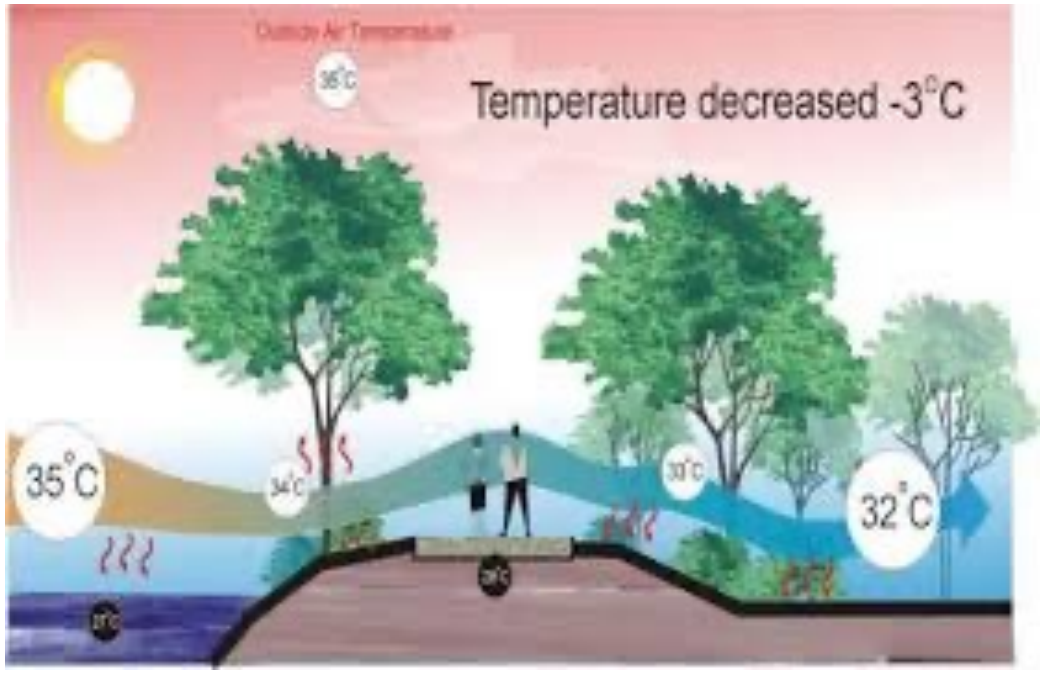
Temperature modification at the landscape level using trees

Photosynthetic transpiration produces cooling in the Ambient Environment

1 Tree = 10 AC units, 120,000 x 10 = 1,200,000 BTU /day, of ambient cooling.

450 trees /ac = 540,000,000 BTU/day of cooling.

1100 trees /ha = 594,000,000,000 BTU/day of cooling.



As ambient temperatures increase agriculture will be affected, what should be the design considerations for future agricultural landscapes ?

Industrial Rice production landscape

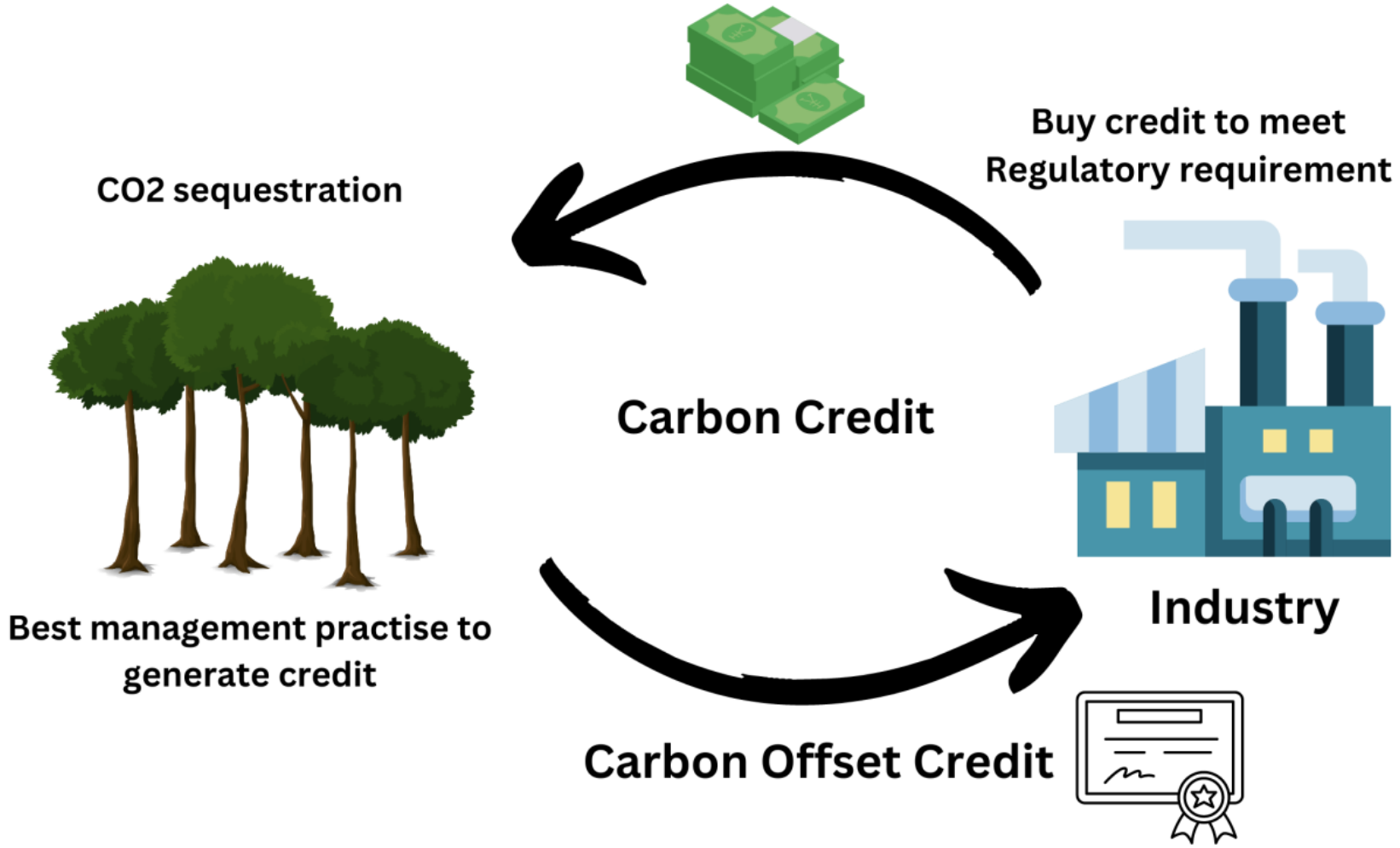
Traditional Rice production landscape

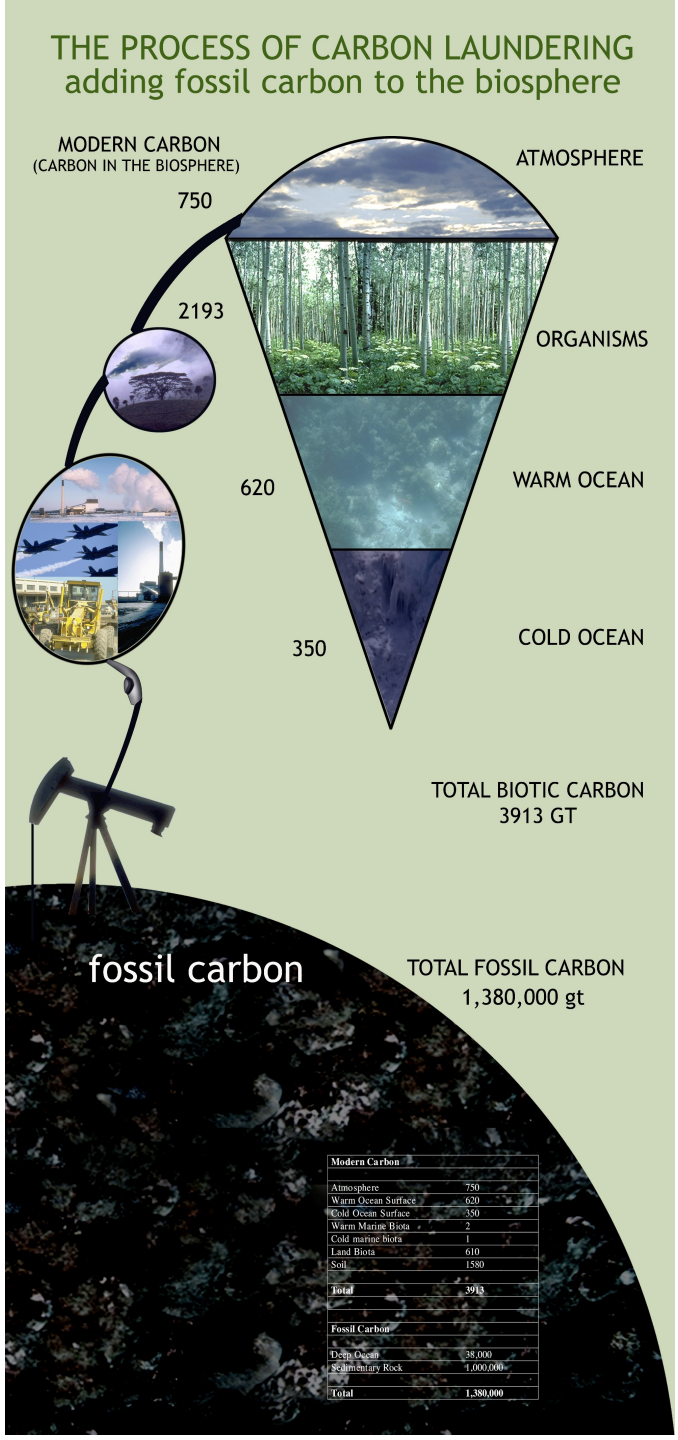
These cimate impacts are a consequence of industrialization using fossil energy

How can we deal with the Carbon Dioxide being produced by fossil fuels which creates climate change ?

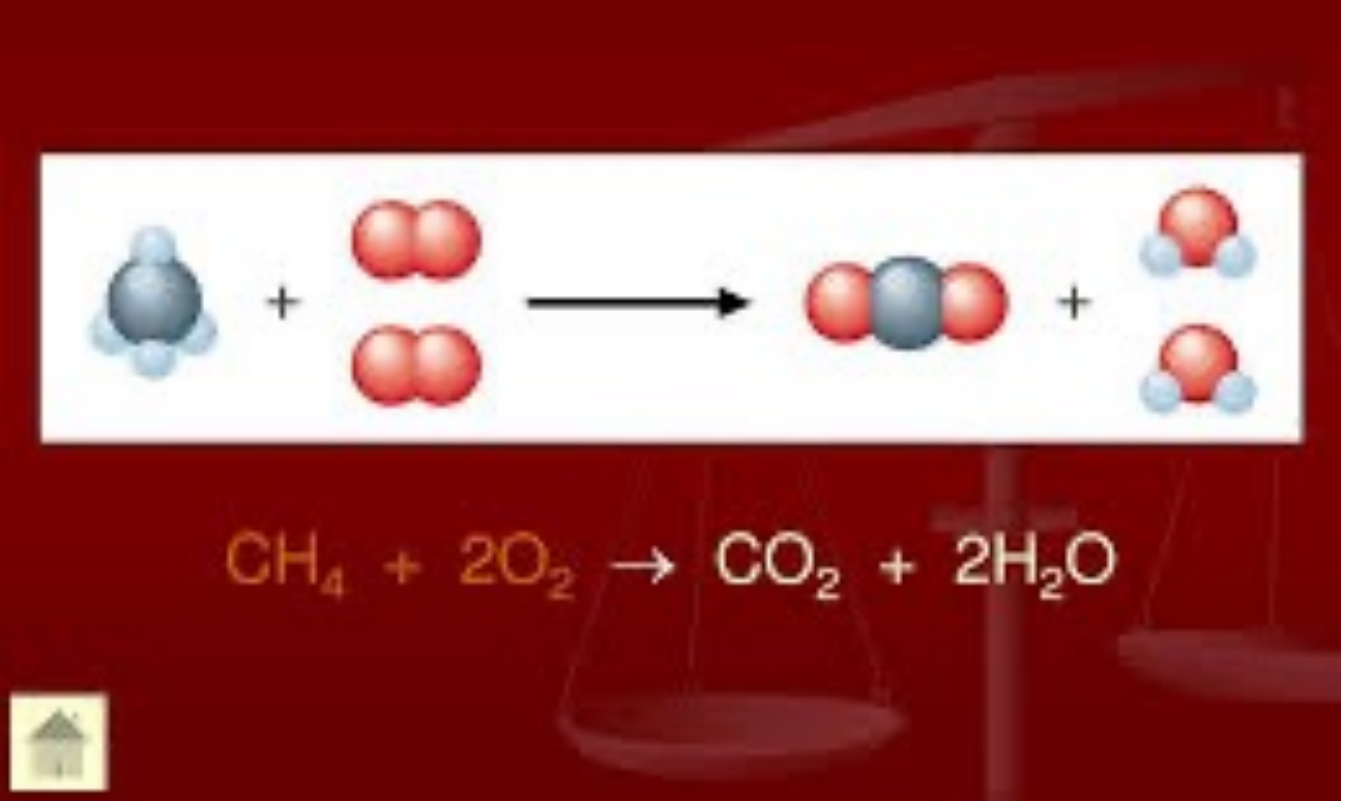
The Great Carbon Scam

The myth that this fossil Carbon can be 'neutralized' by planting trees.





Fossil Carbon is 'sequestered' for millions of years. Trees sequester and store Carbon for a thousand years at most. When the tree dies all the stored carbon will go back to the atmosphere

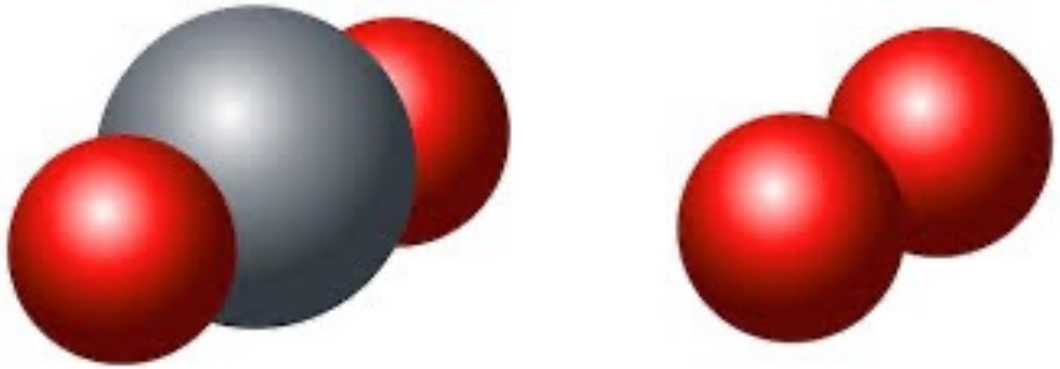


Fossil Carbon is over 100 million years old and cannot be put away for a similar time to make a process Carbon 'neutral'.

But the Oxygen that was used to burn it can be replaced in real time to make the process Oxygen 'neutral'.

To create the Carbon Dioxide one atom of carbon has to be joined by 2 atoms of Oxygen

***f*CH4 + *b*O2 -> *n*CO2 + *n*H2O + e**

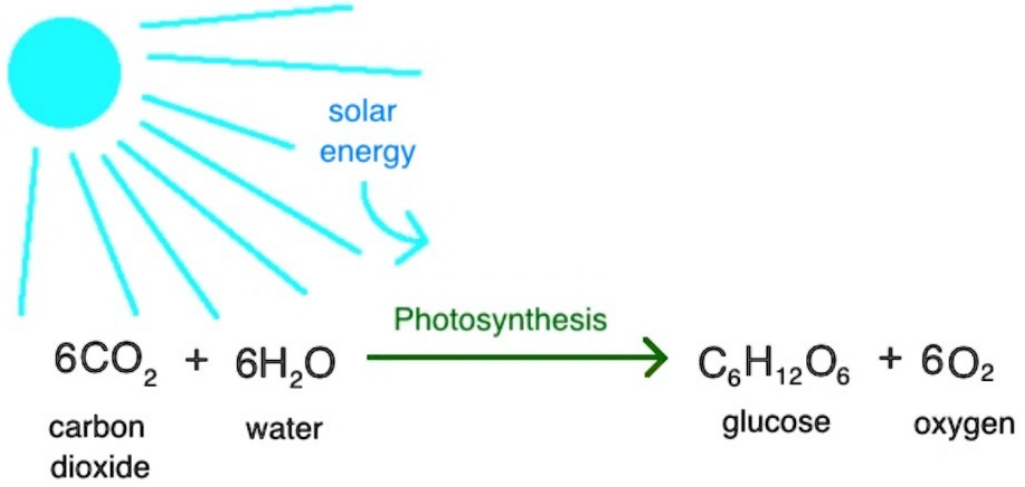


Co2

O2

What creates Oxygen ?

Photosynthesis. It is the activity of of a leaf performing the act of primary productivity, that of produces Oxygen, fixes Carbon and cleans water



But, *Under the current economy, the leaf has no value. Only the fruit has value and only after it is plucked and sent to market*

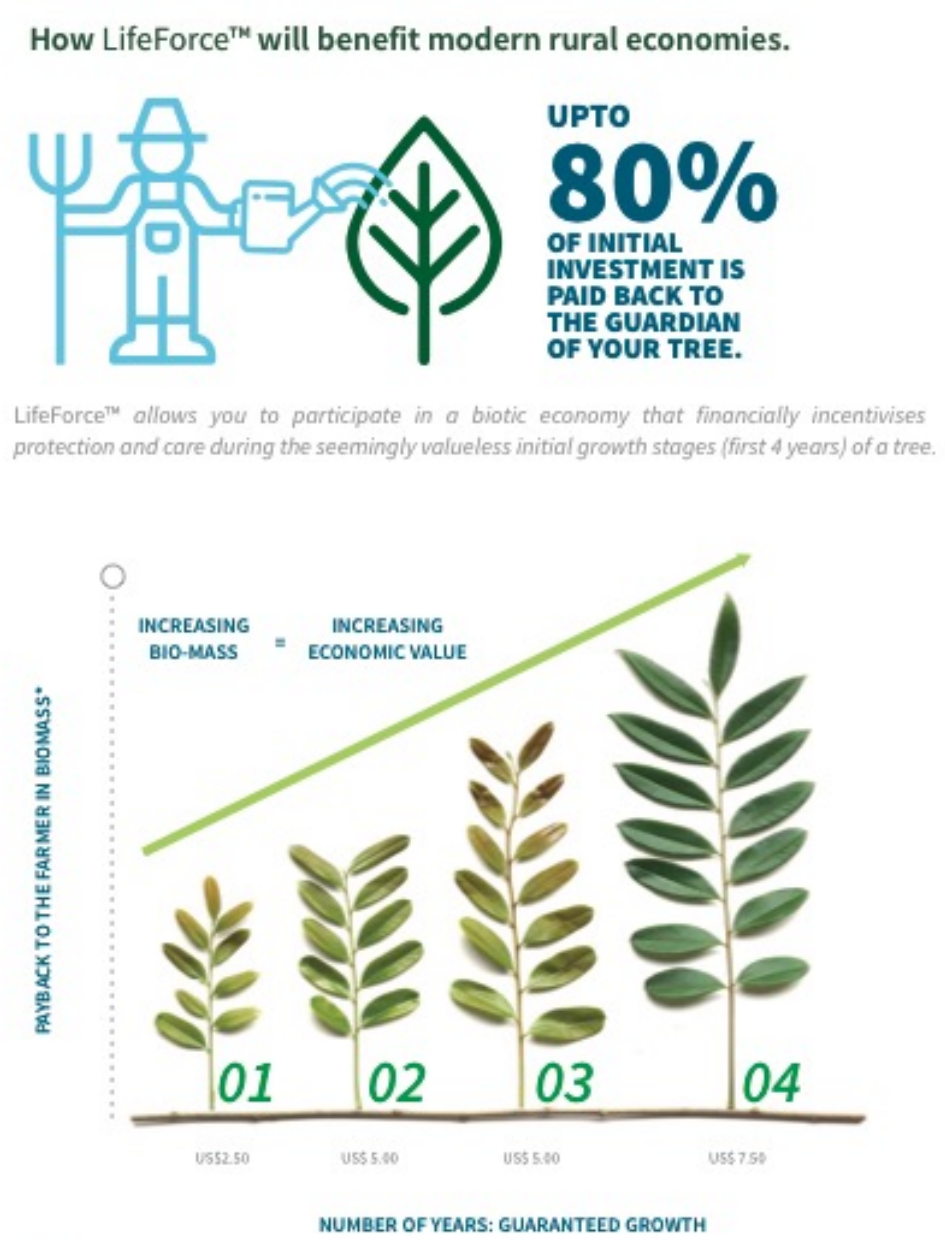
Under the proposed economy the leaves too have value but can retain value only as long as it is living and providing Ecosystem Services.

A leaf on a tree, can maintain value as PB only as long as it is carrying out the activity of photosynthesis. Pluck that leaf and the activity ceases and so does the value.

Sri Lanka Position Paper : UN Conference for Climate Change poi (COP21) 2015. Pointed this out :

We are aware that the critical Ecosystem services such as; production of Oxygen, sequestering of Carbon, water cycling and ambient cooling is carried out by the photosynthetic component of biomass. This is being lost at an exponential rate, due to the fact that these Ecosystem Services have not been valued, nor economically recognized.

A Sri Lankan company has responded to this call by creating value Life Force units, which represent contracted PES (C-PES) production



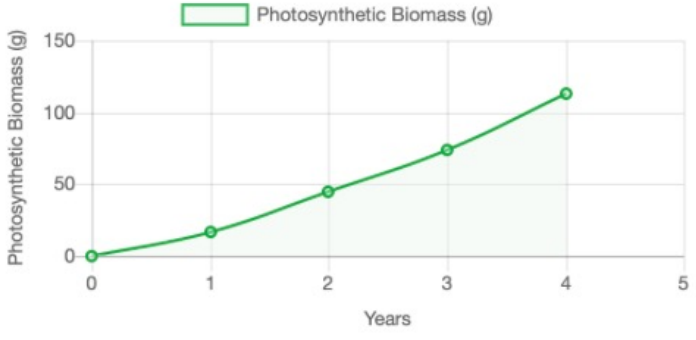
EarthRestoration

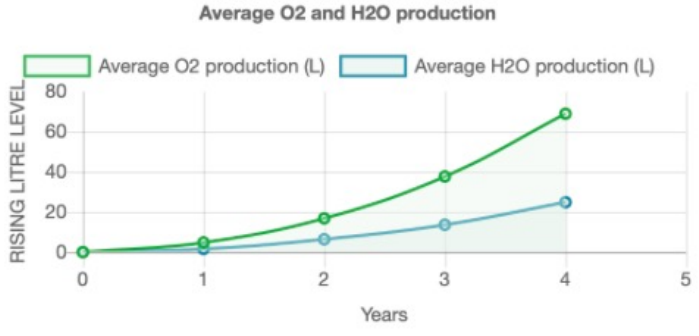
www.restore.earth

Smart Contracts - A Life Force unit in operation, where the PES produced as a Monitired Recoded and Verified (MRV), quantity has been transacted into the Global Commons

ER 94 UP 004 - Shirani and Nandana Wijekoon

EarthRestoration





EarthRestoration

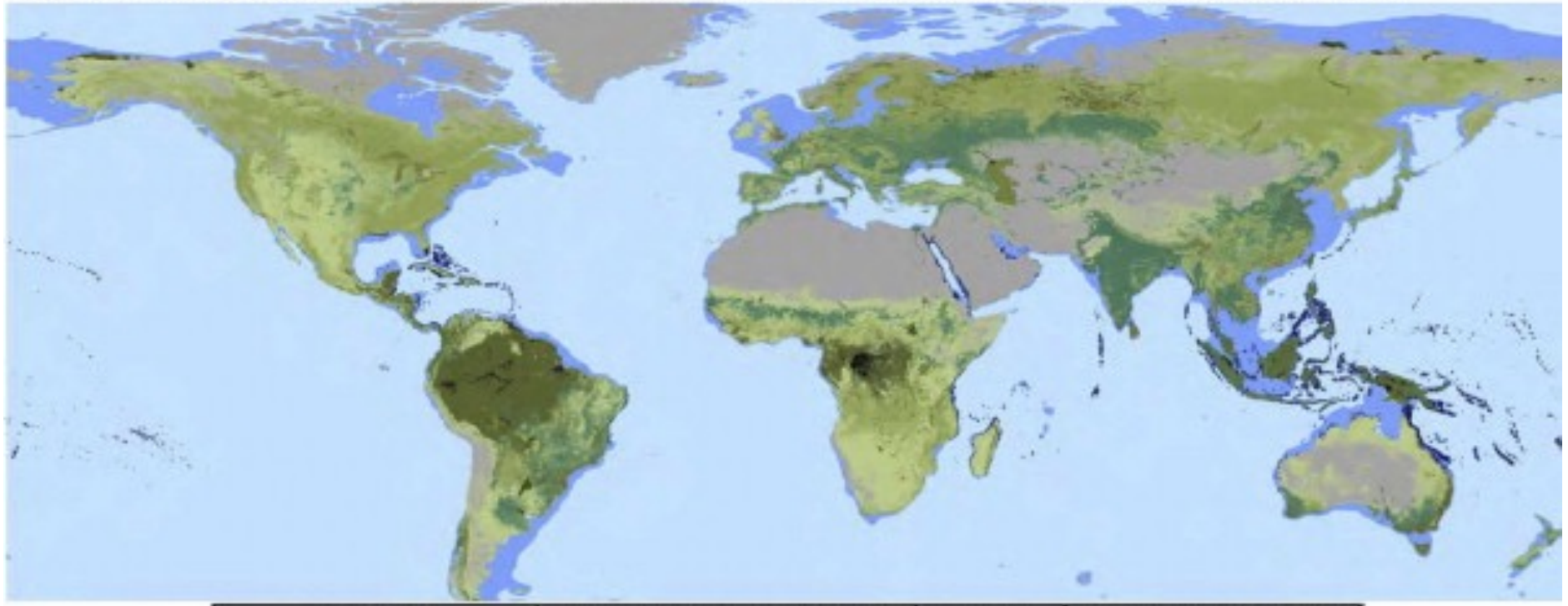
LifeForce™

QUANTIFICATION OF PES PRODUCTIONS FROM CHEDDIKULAM PROJECT
LIFE FORCE PROJECT
EARTH RESTORATION FOUNDATION

Farmers Name	ER Registered No	Species	No of ER Units	Servicing Year	PES Productions at the end of year 2021 by considering the mean PES production data values	
					O2/Liters	H2O / Liters
Pakiyaraasa Pushpawathi	ER/094/NP/001	Artocarpas hetrophylus	10	3	1,382.80	494.00
Selvarathnam Sithambaram	ER/094/NP/002	Artocarpas hetrophylus	10	3	1,382.80	494.00
Selwarthnam Vijayakumar	ER/094/NP/005	Mangifera indica	1	2	41.76	16.46
Navarathnasaami Poomani	ER/094/NP/003	Artocarpas hetrophylus	10	3	1,382.80	494.00
Somasundaram yogeshwari	ER/094/NP/020	Artocarpas hetrophylus	1	2	64.66	23.10
		Mangifera indica	2	2	83.52	32.92
Peter Nalini	ER/094/NP/004	Artocarpas hetrophylus	10	3	1,382.80	494.00
Premalingam Chandraleka	ER/094/NP/054	Artocarpas hetrophylus	1	1	10.22	3.65
Total			**45**		**5,731.36**	**2,052.13**

The value of Global Ecosystem Services

Figure S1. Map of global annual ecosystem services based on 2011 land areas and 2011 unit values



LandCover	Flow Value per Hectare per year	Legend	Area (millions of hectares)
Desert	$0		2159
Tundra	$0		433
Ice/Rock	$0		1640
Open Ocean	$491		33200
Marine Shelf	$2,222		2660
Grass/Rangelands	$2,871		4418
Temperate/Boreal Forest	$3,013		3003
Lakes/Rivers	$4,267		200
Tropical Forest	$5,264		1258
Cropland	$5,567		1672
Urban	$6,661		352
Swamps/Floodplains	$25,682		60
Tidal Marsh/Mangroves	$193,845		128
Coral Reefs	$352,249		28

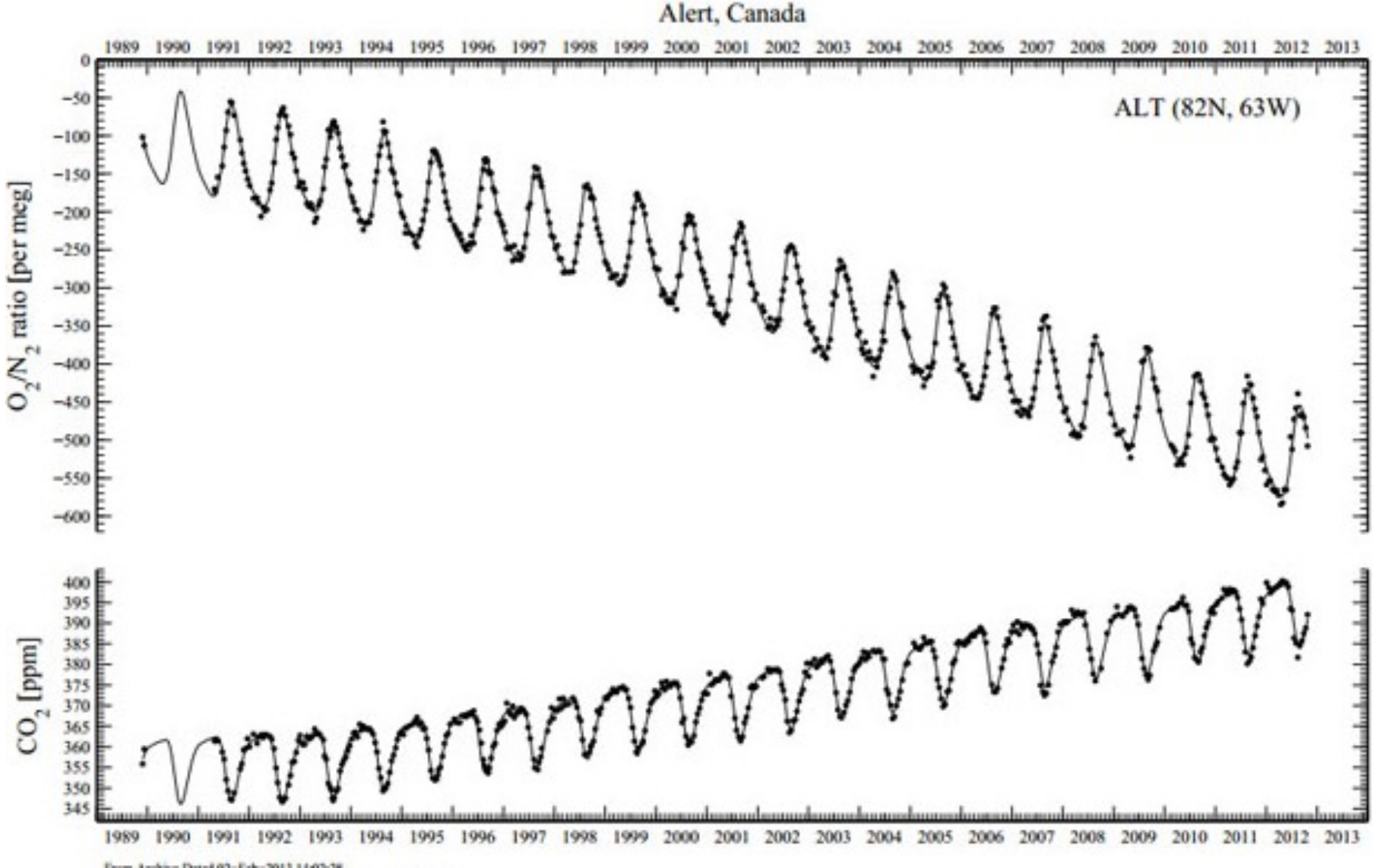
total global ecosystem services in 2011 is $125 trillion/yr (assuming updated unit values and changes to biome areas) and $145 trillion/yr (assuming only unit values changed), both in 2007 $US.

contracted Primary Ecosystem Services (C-PES) is one way of capitalizing this value

Currently only the apples have value to the city. while the Ecosystem Services of the farm has no value. Creating a market to capitalize on the value of Ecosystem Services and provide high quality ecosystem services to the urban sector will actualize the true value of the contributions of the rural sector.

The free Oxygen in the atmosphere is 1.2×10^{15} tonnes (12,000,000,000,000,000 t)

Turnover rate 4000 years. This maintains a dynamic equilibrium around a mean of 21.9 % in the atmosphere. But it has begun to fall.



The creation of a market for contracted Primary Ecosystem Services (C-PES) will move us towards an Oxygen Economy. An economy based on the value of the Free Molecular Oxygen (FMO) bank of the Global Commons.

The Global Commons of Air, is a thin layer over the planet whose blue colour is generated from sunlight bouncing off Oxygen, This is the bank from which we draw and deposit molecular Oxygen. As discussed, this loss has begun to increase, we can make a difference by investing in contracted C-PES as a step towards an Oxygen Economy