

Extracts from a paper by Walter Jehne
Showing causal link to climate Change from forestry removal.

11. The increase of CO₂ levels indicating the onset of global warming occurred from 1750. Based on its low C¹³ ratio the CO₂ must have come from old stored carbon (13). Contrary to assumptions the initial emissions could not have come from human use of fossil fuels as this increased substantially only from 1900, some 150 years later (14). Consequently the initial rise in CO₂ levels could only have resulted from the extensive de-forestation and associated substantial degradation and losses of soil carbon over the preceding centuries.

12. Only the deforestation of 6.3 of the earth's 8 billion hectares of primary closed forest prior to 1750 plus the associated degradation of soils and soil organic matters could readily account for the initial CO₂ increase (15). The deforestation could also readily account for the inability of the earth to adequately bio-sequester and stabilize the CO₂ levels as the Vostok ice cores data confirms such processes had done in previous inter-glacial cycles (16). It is this impairment of the natural bio-sequestration capacity that is likely to have caused the CO₂ increase and global warming. Consequently the CO₂ increase needs to be seen as a symptom of, as well as masking, this impaired bio-sequestration capacity and cause of global warming.

13. The critical causal role played by this impaired bio-sequestration ability is demonstrated by the seasonal variation of CO₂ observed in the Hawaiian and Cape Grim data. Whereas CO₂ is emitted constantly throughout the year and readily equilibrates in the atmosphere, the annual 'sawtooth' variations in CO₂ confirms that it is the difference in bio-sequestration rates in the northern and southern hemisphere summers that govern the CO₂ levels, not their emission per se (17). Large emissions of CO₂ have also previously resulted from forest fires, volcanoes or methane releases. These did not trigger climate chaos while bio-sequestration was adequate (1). It is only now that deforestation has impaired this bio-sequestration capacity that CO₂ emissions, including from recent fossil fuel use, can not be sequestered adequately thereby increasing atmospheric CO₂ levels and the risk of climate chaos.

14. To date we have released some 300 GTC (billions tonnes carbon) from burning fossil fuel.

Comparatively over 2000 GTC may have been released by deforestation and soil degradation. Historically these forests may have bio-sequestered some 300 GTC/an (15). Restoring just 5% of this prior bio-sequestration capacity (ie 15 GTC/an) should enable us to balance the 7 GTC/an we are currently emitting plus sequester some past emissions to re-balance the global climate. Practical and profitable options exist for doing this.

15. However we may now not have enough time for just relying on this carbon component of the bio-sequestration process (6). We now may have no choice but to rely on other, much more important, processes; integral to forests to restore the earth's prior heat balance.

16. In addition to changing the global carbon cycle, the extensive deforestation would also have greatly reduced global transpiration and through that cloud formation and rainfall. This reduced transpiration invariably reduced the transfer of water and heat from the earth's surface to form clouds thereby lowering the reflectance of incident heat and the transmission of latent heat back out into space. As these processes can govern over 50% of the earth's heat balance, their impairment due to deforestation can directly increase surface temperatures (18). Temperature differences of 10 degrees C can occur in adjacent forested and cleared areas because of such cooling water effects (19). Consequently the extensive past deforestation, by reducing water and heat transfers, may have had a much more significant effect in triggering regional and global warming than the CO₂ component of the greenhouse effect.

17. Deforestation may also be reducing the natural cooling capacity of large parts of the earth. Forests, because of their leaf area index, are often far more effective per unit area in transferring water into the troposphere and heat back out to space than areas of open water. This is consistent with evidence that the earth is warming differentially depending largely on how local natural water and heat dynamics may have been altered. For example temperature increases are higher in the more deforested land based northern hemisphere than in tropical regions or the southern hemisphere where deforestation has been less and oceans dominate (17). The dry centre of Antarctica may be cooling while coastal regions are warming. Cleared urban 'heat islands' also have higher temperatures than nearby forested areas with natural water and cooling heat fluxes (17). Such variations in regional temperature effects are inconsistent with the assumption that CO₂, which rapidly equilibrates and would be similar over these regions, could be the primary factor governing this variable warming.

18. Consequently we need to question assumptions in climate models that changes in water dynamics are not important in global warming and that humans could not have influenced global water and heat balances. Through their extensive deforestation humans could have significantly reduced global water dynamics and through that the transfer and dissipation of heat that previously cooled the planet. Indeed, the changes that deforestation caused to global water dynamics may have been the dominant factor in disrupting key processes in the earth's heat balance and in increasing global temperatures. Accepting and counteracting these realities may now be our only option for mitigating global warming, hopefully in time.

19. Restoration of the earth's natural water and heat dynamics may not only be our only option to avoid dangerous climate chaos but also the most feasible, effective and beneficial. Whereas reductions in CO₂ levels may take decades to have an effect, the restoration of global water dynamics has effects within days of restoring natural clouds and cooling processes. Reforestation should enable us to safely restore these natural water and heat processes. For example, by enhancing global cloud densities by 3%, reforestation could increase albedo reflectance of solar radiation back to space by some 1%. Theoretically this would have an equivalent global cooling effect to reducing CO₂ levels back to pre industrial levels (20).

20. While there are details that we do not yet understand fully, we have sufficient knowledge of how forests influence terrestrial water dynamics, cloud nucleation, cloud albedo, rainfalls and the re-radiation of surface heat back out to space to safely use reforestation strategies to rapidly re-balance the natural water and heat dynamics of the planet. We also have sufficient knowledge on reforestation and forest management options. However first we need to accept that reducing future CO₂ emission is now no longer adequate to mitigate global warming. We need to recognize that the above inescapable facts now provide us with our only chance to mitigate dangerous climate chaos, hopefully in time.

Being natural such reforestation represents a no risk win-win strategy, particularly as the forests will also deliver major synergistic benefits in enhancing; carbon bio-sequestration, soil restoration, soil water retention, the resilience and bio-diversity of bio-systems as well as in providing material and energy feedstock for sustainable industries. The reforestation can be integrated with and enhance sustainable grazing and food agro-ecosystems and be profitable.

Such reforestation can also be initiated regionally with minimal capital or infrastructure pre-requisites. The benefits from such reforestation should be able to be captured locally by the responsible communities through improved material, fuel and fiber and eco-system services, particularly the development of a more resilient, buffered and still livable regional climates.

The challenge is are we prepared to critically look beyond the status quo, face the realities of global warming and its imminent consequences and consider more effective response options.

The above inescapable facts may help in this regard. Either Homo sapiens uses its intelligence to urgently restore these natural climatic processes or nature will do it for - but without us.