

CASE STUDY 3: Atmospheric CO₂, Global Temperature Change and the ability of Humus Rich Soil to buffer such effects.

Presented by Alex Podolinsky at the 1983 Annual General Meeting of the Bio-Dynamic Agricultural Association of Australia

I would like to say something about weather, which has nothing to do with cosmic factors such as Indigo Jones or Lily Kolisko worked from. It has to do with more physical aspects, which, as of recent years, in the present and apparent near future, are of a particularly powerful and direct influence on weather.

As you may know the atmospheric CO₂ is very much on the increase. It is on the increase for one, because of the fossil fuels we are using. Before combustion the considerable amount of CO₂ contained in oil, gas, coal and wood was stored mainly underground, ie it was attached to Earth's body. Furthermore large areas of forest have been cleared in more recent times, more lately particularly in Brazil. The CO₂ held in the carbonaceous part of trees therewith entered the atmosphere.

Both these sources of atmospheric CO₂ are today widely considered by scientists, meteorologists and glaciologists in their research as to the effect of this CO₂ on the weather pattern. However a third and very widely reaching source of CO₂ in the atmosphere is hardly recognised. This is the organic matter loss in soils poorly farmed.

Late in 1982 I asked Peter Medling [formerly a Senior Agronomist with the Victoria State Agriculture Department (who requested Professor Leper, at Melbourne University, to check his figures)] to work out the CO₂ tonnage my soil held when, originally, the organic matter level at 0 – 4" (0 to 10cm) was 0.9%. This amounts to 64 tonnes per acre. After six years bio-dynamic farming, the organic matter level in this zone had increased to 11.4%, decreasing to 2.4% at 40" (110cm) depth. Soil of such organic matter reserves holds 1050 tonnes CO₂ per acre.

You know the vast areas of Australia that are poorly farmed – constantly grazed areas included, where roots recede. I can assure you that the same applied to other areas of Earth proportionally due to prevailing climate and soil conditions.

I have not had time to further research this particular subject area, but from the figures provided above you will appreciate the enormous contribution to atmospheric CO₂ caused by poor farming methods.

The CO₂ level in the atmosphere in:

1930-40 was 4¾%

1950-60 was 8½%

1975 was 13¾%

1980 was 15½%

At that rate of increase it is anticipated that in 1985 it will be 18%, in 1990 22% and in 1995 31%.

What is the effect of this on the weather?

The atmospheric CO₂ surrounds Earth like a mantle. The sun's warmth penetrates through this mantle which holds heat inside itself, ie. the warmth is not allowed to leave the night shaded part of Earth as would have been the case before the CO₂ and general pollution mantle increased to such proportions. Due to this the temperature average in the tropical and subtropical region of Earth is increasing. This causes above average evaporation and transpiration. The excessive moisture falls as rain in these regions of Earth where the sun's warming power is low, ie. the polar regions. Extra ice build up is thus caused. This influences the polar zones of Earth, which are becoming cooler¹.

It is true that due to the atmospheric CO₂ build up the "average" temperature of the whole of Earth is increasing. It would be wrong however to deduce therefrom that this will cause polar ice to melt and the oceans to rise. The dynamics of the total process must be understood and checked.

You may have noticed the reports of extreme coldness in the temperate zones of Europe and America. Scotland has experienced little of summer warmth, neither have the vast farming areas east of the Urals in 'Russia. Canada's wheat crops have been threatened by cold summers. Whereas these "temperate" zones in recent years have experienced very cold and enduring winters.

This is caused by the ice increase of the polar regions.

Furthermore the incidence of enormous, never before registered, bursts of rain in tropical, subtropical and mediterranean areas of recent is caused by the extra evaporation and transpiration in these increasingly warmer areas.

The increasing variation of temperature between polar and tropical zones causes the perilous wind storms registered in recent times in those areas of Earth lying between the "highs" and the "lows" of tropics and poles. This temperature stress and other aspects not discussed here also causes extra volcanic activity. The variation of temperatures likewise will cause weather pattern changes, ie. temperate and mediterranean regions will have more changeable climates: extreme cold spells, extreme humid spells, extreme local rain bursts.

Glaciologists speak of a 28-30,000 year cycle of glacial ages. In glacial ages the present temperate zones, like central Europe, ice up. Then the "temperate" zone lies in North Africa. In such glacial ages the polar regions encroach on and take in the current temperate zones.

¹ This is described in more detail in "Bio-Dynamic Agriculture Introductory Lectures Volume 3 – Lecture 3", Podolinsky.

Ice ages are caused by a reduction of vegetation all over Earth. This reduction in turn is due to the exhaustion of the available supply of minerals essential to plants. (Artificial fertilisation” after all is new.) Because of the reduction in vegetation on Earth the CO₂ formerly held in plants forms a CO₂ mantle around Earth.

Glacial activity (the lakes in Bavaria, Austria, Switzerland, Northern Italy are mainly glacially cut out lakes) cause vast areas of Earth to be – kind of – ploughed, ie. rock is cut, crushed etc. and new minerals are “freed” to the surface. The extra volcanic activity likewise provides extra minerals. Whilst the storm activity mentioned distributes those minerals around Earth. (viz. The dust storms affecting jet planes). [Only tropical forests and vegetation are more constantly enduring. Tropical and subtropical soils – once cleared – are very poor and deficient. Tropical forests do not require new sources of minerals, they are self-maintaining.]

An “ice age” begins to end when the renewed availability of minerals caused by glacial ploughing permits plants to regrow. A gradual process, both into and out of, a glacial period.

At present we are heading for an “artificially” caused, premature and very speedily occurring ice age.

In the Western World none of the major food producing areas – all situated in the temperate or mediterranean regions – has totally failed. The vast Russian farming area East of the Urals has been affected to a degree. (Russia exported more wheat up to 1917 than the US, Canada and the Argentine together – before “Colchouse” farms and weather effects.)

It is predictable that current increases in atmospheric CO₂ will cause crop failures in major western food producing areas. The consequences would be alarming.

The mediterranean and subtropical regions will be responsible as major production areas.

Earth at present is very highly populated, certainly much more so than during natural ice ages of the past. The CO₂ situation facing us with the resulting possible shortage of food poses a most pressing problem.

The atmospheric CO₂ increase process could be halted by bio-dynamic soil management. The “dynamic” aspect also comes to extra significance. Bio-Dynamics is not particularly dependent on “outside” minerals but sufficient warmth and water are requirements.

The moral and practical responsibility of bio-dynamic farming receives extra light within the context of these contents.