**BIO-AGRICULTURE UPDATE**

In this update we have included links to a variety of publications and some observations on bio-agriculture and climate change.

**EMISSION REDUCTION TARGETS**

One of the things we have noticed in our communications with people involved in the field is that few people are aware of what emission reduction targets really mean.

For example, Australia has committed itself to an emission reduction target 5% below 2000 levels by the year 2020. Most people don’t realise that this commitment involves reducing our emissions by far more than 5%. Before we even start the 5% reduction, we have to first get our emissions back to 2000 levels. The estimated growth of emissions with business as usual (BAU) between the years 2000 and 2020 is 42%. Therefore a 5% reduction by the year 2020 actually requires us to cut emissions by 47% (5% + BAU increase of 42%) Doubling our target to 10% is then just a relatively small increase in total emission reductions – from 47% to 52% (an actual increase of 10.7%). This means that if our emission reduction target is doubled from 5% to 10%, the second 5% will only cost 10.7% of the first one.

**INTERESTING READING**

The Soil Association which is a major British organic farming organisation has produced a paper titled [***Soil carbon and Organic Farming***](http://www.soilassociation.org/Whyorganic/Climatefriendlyfoodandfarming/Soilcarbon/tabid/574/Default.aspx) (2009) which is a detailed survey of scientific research into the carbon sequestration potential of organic and biodynamic agriculture. The conclusions they come to are very similar to what our research has come up with.

Organic farming produces an estimated average of 28% more topsoil carbon per hectare than non-organic farming in Northern Europe and 20% more for all countries surveyed. Biodynamic farming showed even more carbon being stored – 25% for all countries surveyed.

The paper goes into a lot of detail, giving answers to many of the questions that are raised in discussions about bio-agriculture and soil carbon sequestration.

Another interesting paper is[***Soil Carbon Sequestration Potential: A review for Australian agriculture***](http://www.csiro.au/resources/Soil-Carbon-Sequestration-Potential-Report.html) ***(2010)*** produced by the CSIRO for the Australian Department of Climate Change. This review looks at different options for changed land management to increase soil carbon levels.

There is a lot of detailed scientific explanation of the mechanics of soil carbon sequestration. The paper also suggests organic farming as an option with great potential.

**THE MISSING LINK – soil carbon measuring**

When discussing the implementation of carbon sequestration programs, both of these papers suggest the way to determine the amount of carbon that has been stored in the soil is by using average sequestration figures for different farming techniques. For example, say a farmer is growing wheat using a particular organic method of farming. Research on that farming method will have shown average rates of sequestration for that method in different climates and soils. This average sequestration rate would then be used to determine how much carbon the farmer is sequestering. As long as he can verify he is using that farming technique he would earn carbon credits estimated on that basis. Almost all discussions on soil carbon sequestration programs suggest either using this method of estimating carbon levels, or else they say that the whole idea is too impractical to implement; that it is too complex and it is impossible to know if the carbon that is estimated to be in the soil will actually be there in reality. The main reason for these conclusions is that up till now measuring soil carbon has been a very complex and expensive process. (An example of this complexity can be seen [here](http://www.v-c-s.org/docs/SALM%20Methodolgy%20Final_%20validation.pdf) in the methodology for a World Bank project for carbon sequestration in African farms.) You can imagine the enormous scientific and administrative workload to follow this procedure for each small African farm.

Very few people involved in the field seem to be aware that advances in soil measuring technology have changed how soil carbon sequestration programs could be implemented. There is now commercially available measuring equipment that has been tested to be accurate and cost effective enough to base a program on actual measurements rather than on estimations that may or may not be correct.

Our company sees this lack of knowledge about advances in measuring technology as one of the main missing links in the wider acceptance of agricultural soil carbon sequestration as a solution to climate change and in turn for the acceptance of bio-agriculture as possibly the most effective way of sequestering carbon.

**A *ROADMAP FOR ACTION: AGRICULTURE, FOOD SECURITY AND CLIMATE CHANGE*** *was released at the* Cancun climate conference*.* Among those present were Prime Minister Meles Zenawi of Ethiopia and **Robert B. Zoellick, President of the World Bank Group**.

The Roadmap outlines concrete actions linking agriculture-related investments and policies with the transition to climate-smart growth. It advocates getting policies and programs in place that will increase farm productivity and incomes; make agriculture more resilient to variations in climate and make the sector part of the solution to climate change by sequestering more carbon into the soil and biomass. (See [article here](http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0%2C%2CcontentMDK%3A22786407~pagePK%3A64257043~piPK%3A437376~theSitePK%3A4607%2C00.html) and [roadmap](http://www.afcconference.com/) [website here](http://www.afcconference.com/))

**DESERTIFICATION AND LAND DEGRADATION** is "the greatest environmental challenge of our time" and "a threat to global wellbeing", according to the UN's top dry-lands official, Luc Gnacadja, who says people must be paid via global carbon markets for preserving the soil.

The better known issues of climate change and loss of biodiversity are both rooted in the global loss of fertile soil, said Gnacadja, as the soil harbours a huge stock of carbon and the health of creatures living in the soil underpins global food production and forest growth.

See <http://www.unccd.int/documents/Desertificationandclimatechange.pdf>