

Living with Nature as a Means to Mitigate Negative Impacts and Promote Carbon Sequestration

DR. EDWARD W, (TED) MANNING,
CLUB OF ROME MEMBER,
AND PRESIDENT CANADIAN ASSOCIATION FOR
THE CLUB OF ROME



All ecosystems support a wide range of functions

- ▶ How we utilize terrestrial systems, protect, sustain, or restore them impacts these functions. An important function is sequestration and or release of carbon.
- ▶ Keeping capacity is much easier than restoring it.
- ▶ Examples globally show holistic land use planning (recognizing a full range and sensitivity of environmental functions) can significantly maintain and enhance sequestration capacity.



Most farmland and other lands in the ecumene are owned

- Land use is current and valued
- Competition for valued functions can be problematic
- Change to favor CO₂ removal and storage is often much more of a challenge than in oceans or extensive forests which may not have ownership
- Only the key products tend to bring direct benefits to the owner

- ▶ Owned lands are usually managed to favor particular products or services (foods, fodder, water control)



Okanagan Valley

Lands for carbon sequestration ?

- ▶ A key is to identify potential that can be mobilized compatibly with the other current or potential uses.
- ▶ Small holdings provide individual challenges



Tabasco



Nilgiri Hills

What is known to help?

We can identify methods including the choice of crops and cropping methods which can be done to favor greater carbon sequestration,

In most cases leaving the current areas providing natural carbon removal and sequestration is much more extensive and cost-effective than changing the uses to favor it.

There is rising evidence that work to regenerate past ecosystems such as forests, wetlands or grasslands can have positive effects if done properly.



Ling Marshes Guanxi

Considerable empirical data is available on the differential capacity of crops, reforestation, and other land management approaches in Canada to serve this objective.

Key factors: reduction of cover crops, restoration of some changes to legumes, natural covers, use of biochar, and planting tree varieties which in Canada do the most sequestration after a least 30 years.



Note that capacity and cropping choices are very different in tropical and semitropical ecosystems where positive impacts on carbon sequestration can be much more rapid than in colder regions.

Excellent source : The Evolution of Agrometeorological Research in Canada – Emphasis on Mitigating Climate Change. (Desjardins presentation to CACOR Zoom Jan 17, 2023)

Alberta Canada

Tactics to Consider

Choice of ecosystems to protect, crop mix, species, and cultivation methods

These affect the ability to absorb and sequester carbon.

The most promising approaches are generally holistic relative to the known ecological conditions. and involve agro-forestry and land management.

These can affect other capacities downstream such as wetlands, watercourses, and coastal areas)

Much of this is site specific relatively small-scale environmental engineering with cumulative effects

Mer Bleue Ontario



A Social Science Challenge

- Owners will do what makes economic sense to them or which brings them benefits
- While in some places, incentives exist for land preservation and specific conservation or management systems.
- (as in the Great Lakes)
- These can also enhance the capacity to sequester or limit carbon.



Methods can include information, incentives and disincentives or regulation

The owners have to buy in

Are there any incentives to the owners and managers of land to respect and or enhance the provision of the crops and practices that do provide these services

Enhancement for carbon sequestration (or to preserve existing capacity) is not likely where the land use thought to be most important is negatively affected,

Rice cultivation is not considered to yield net sequestration

Intercropping is sometimes possible



Crops and Practices

Specific crops : grasses, bamboo. olives, nuts, legumes, most cereals. Selected cover crops

Key practices: Zero cultivation, zero-till, buffers



Christophene fields, Trinidad



*Bamboo forest
Chongqing*

Plant and maintain olives and nuts

- ▶ Zero cultivation, planting crops with good soil retention capacity, crop selection for specific or native plants, and reduced chemical use including hedgerows, berms, setbacks, and other means to limit, direct, filter or contain runoff can support other environmental objectives.



There are Success Stories

- ▶ Regeneration of degraded sites is working:



Kalifi Kenya

Improvements in wellbeing for communities and ecosystems result. Valuing sequestration is central to action. Others may provide the resources as offsets for travel or means to demonstrate environmental ethics.

Additional information <https://tourisk.com/>