

The Secretary
Senate Standing Committee on Murray Darling Enquiry

Rural and Regional Affairs and Transport
Parliament House
Canberra ACT 2600

Submission to the Murray-Darling Senate Enquiry

25th September, 2008

- One of the major issues with the irrigation areas of the Murray Darling farming systems is the loss of soil organic matter and humus, due to the use of artificial fertilisers, herbicides and insecticides, over irrigation and soil compaction.
- Poor farming systems that have over time reduced the soils of the Murray Darling area to compacted, land that has loss soil structure and soil biology and total lack of water holding capacity.
- Monoculture and expectation of continued water use for irrigation.
- Any water that does flow now runs and rushes over the land, instead of infiltrating and gradually seeping its way back to the rivers and lakes of the area. (See the work of Peter Andrews – Natural Sequence Farming – "Back from the Brink" book on this topic)
- **To bring health back to the major water system of Australia**, we need to bring the soils back to life. This is where Biodynamic System of Agriculture can help in partnership with good organic practices.

Biodynamics is a method of farming that works to stimulate the increase of soil biology in the top soil and sub soil of the farming land.

By increasing soil biology – bacteria, fungi, protozoa and beneficial nematodes, we are able to :

- **Increase water holding capacity** of the soil (increased porosity, increased humus levels, increased earthworms, prevention of erosion and leaching of nutrients etc). Biodynamic farmers in all aspects of agriculture, from dairying, viticulture, horticulture and market gardening all observe that their irrigation needs are 50% less than their non-Biodynamic neighbours or what they used to use. They also note that in heavy rain, there is no run off of water until the soil's holding capacity is full, then their dams can start to fill with clear water, not run off of soils. In a river catchment basin like the River Murray (1,057,000 square kilometers), a 2% increase in humus would equate to an increase in water-holding capacity of 33,824 gegaliters of water.
- **Increased soil organic matter (OM)**– for example 4% soil organic matter in the top 180mm has around 17,500 kg of OM per hectare. This contains about 5.25% Nitrogen (N), equivalent to 920kg of N per hectare. At 5% release rate per growing season, this organic matter and soil biology could supply 46kg of N to the crop. There is no run off or leaching to the

waterways, as the soil biology holds the N in available and unavailable forms to release as required by the plants. (A. Hancock – Town and Country Farmer Vol25.#3, Building Soils for Better Crops)

- **Naturally increased soil nutrition** – Soil biology is able to produce Nitrogen, phosphorus, make calcium and all other minerals and trace elements available. Soil tests would need to be carried out to bring the major nutrients back to balance, but these minerals are held and utilized in the soil by the soil biology in the humus and not leached.
- **Building soil structure** – increased soil aggregates around the root zone, increased root systems – all assist soil holding and water and nutrient holding for the plants. Saves soil erosion and salinity problems. Increases moisture retention by up to 75%. Contribute in cutting CO2 in the atmosphere. Sequester carbon in the soil with higher levels than 'carbon neutral'
- **Reduction of prolific weed species**- increased soil nutrients and best organic practices, such as green manure crops, composting, rotational grazing, balanced nutrient applications with compost all assist the soil biology to build and lessen weed infestation. (weeds are a sign of nutrient imbalance and poor soil conditions, such as compaction or loose and fluffy and uncovered and low soil biology)
- **Increased yields in drought and over wet years**- trials in Switzerland at FiBI Projects <http://www.fibl.org/english/research/soil-sciences/bio-dynamic.php> showed that due to increased soil biology and organic matter and humus, crops yielded better than conventional crops in years of lower or higher rainfall. See these trails at:
 1. Effects of biodynamic preparations, fertilisation and reduced tillage on crop yield and soil fertility ([project description in the Organic Eprints Database](#))
 2. Development of soil during the conversion to biodynamic farming, Rheinau ([project description in the Organic Eprints Database](#))
- **Decrease of costs to farmers** – Biodynamic Preparations and other organic practices negate the need for expensive artificial fertilisers, herbicides and water. Many of the additives required for Biodynamic/organic production can be made on farm or bought locally, such as compost, seaweed teas and Fish Emulsion.

How do farmers change their systems over to this method of production?

- **We can teach farmers**- in conjunction with CMA's, Landcare, and via other farmers in the area who are already practicing these methods. There are many Biodynamic Farmers already on the Murray Darling region who have found they can still stay on their farms and have increased their income and capacity by the use of Biodynamics in all aspects of agriculture- from dairying to horticulture and viticulture.
- **We have Private Consultants** – who can individually visit and support farmers to change over their systems, with minimal stress.

What would be required to change systems:

1. Willingness to change systems
2. Understanding of how the soil biology works
3. Soil tests – then use of required minerals in compost to aid soil uptake.
4. Make or buy and apply compost to cropping and horticulture areas.
5. Use of the Biodynamic Soil and Atmospheric preparations as well as Seaweed and Fish Teas in sprays used monthly to begin program. Cost is about \$2-\$4 per ha.
6. Use of green manure crops and compost or rotational grazing (for cattle grazing) to increase organic matter
7. Gradual reduction of use of chemicals in all aspects of agriculture, so herbicide strips in orchards are turned into green cover crops. Pasture cropping instead of no-till with herbicides.
8. Reduction of irrigation as the soils improve.
9. Government of CMA/Landcare assistance through funding courses or Consultants and maybe change of equipment. Eg compost turners for an area.

We suggest to the Committee that the use of alternative farming systems, that work with the soil biology and increase organic matter in the soil and increase the carbon sequestration of the soils and that work with natural systems of agriculture are the solution to many of the problems of the Murray Darling River. We also suggest that as the carbon/humus/organic matter levels increase in the soils and that with increased tree growth in the area, that rainfall will also increase. Deserts are made from removal of native trees and depletion of soil humus which reduces rainfall to these areas.

We thank you for your time and energy that you are giving to this problem. We hope that Biodynamic Agriculture can become part of the solution.

Yours sincerely,

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**Addendum to Submission to the Murray-Darling Senate
Enquiry**

25th September, 2008

The problems in the Lower Lakes are caused by overuse of nitrogenous fertilisers from the two river systems as well as the other problems outlined in Part 1 of our submission.

The acid nitrates referred to in detail in “A Restoration Plan for the Murray – Darling River basin” (25 August 2008; sent to the Inquiry Officer Trish Carling and forwarded to the Minister of Water and Climate Change and the Prime Minister’s office) have filtered downstream and collected in the Lower lakes.

This problem has been exacerbated by the over-irrigation of farmlands adjoining the 2 rivers.

Solution Outline

Biodynamic processes, sprayed aurally, can be used monthly to remediate the problems without the need for Ocean water flooding of the lakes or elaborate and complex water buy-backs from farmers.

The biodynamic practices (described in Part 1 of the submission) have been used successfully world-wide for over 80 years.

We refer the Inquiry to the “A Restoration Plan for the Murray – Darling River basin” for a more detailed description of the remediation process.