

Diversity is the answer to our environmental issues

Fiona M Ellmers BVSc



Healthy Rivers Proposed PC1

Plan change needs to be developed in collaboration with national policy around water quality.

All New Zealanders are guardians of the land and waterways – all resources to be treated in sustainable manner.

Agriculture is the big player in our economy and farmers will be hugely impacted by PC1 as it stands now and the follow on effect to communities and the economy will be enormous.

Fortunately we have all the answers to farm sustainably with huge environmental benefits.

I am a mother, a biological farmer (who raises beef cattle on steep country in the North Waikato) and a holistic veterinarian. I focus on disease prevention

Diversity in all our ecosystems will provide the environmental solutions we require at a subcatchment and an individual farm level.

The integrity of our planet (and our country) depends on functional ecosystems (a community of living organisms in conjunction with the non-living components of their environment, interacting as a system). Non intensive livestock on our steeper country are not the problem. They are part of the solution.

Understanding the biology in nature is necessary to see how the environmental problems we have are a result of faulty management processes of the land and the animals.

Photo synthesis is the process that naturally removes CO₂ from the atmosphere, replaces it with life- giving oxygen, supports a robust soil microbiome, regenerates topsoil, enhances the nutrient density of food, restores water balance to the landscape and increases the profitability of agriculture.

Carbon in the soil is a sponge and diverse pastures grow this sponge.

Exudates from living roots are the most energy rich of the carbon sources. Microbes in the vicinity of the roots and distant microbes connected by fungi networks receive liquid carbon from plant root in exchange for supplying minerals and trace elements to the plants.

Microbial activity also drives the process of aggregation, enhancing soil structural stability, aeration infiltration and water holding capacity.

Many of days farming methods have severely compromised soil microbial communities, significantly reducing the amount of liquid carbon transferred to and stabilised in the soil.

The functioning of the soil ecosystem is determined by the presence, diversity and photosynthetic rate of actively growing green plants, as well as the presence or absence of chemical toxins (negative impact of “icides”)

Soil can act as a carbon source adding carbon to the atmosphere or a carbon sink – removing CO₂ from the atmosphere. A highly active carbon cycle is part of nature.

Solution – to deteriorating soil function lies in adoption of management processes that increase stable levels of soil carbon. Increase in carbon levels corresponds to increased levels of organic nitrogen (less need for artificial N) and the ability of soil to hold water. (C holds 4-20 x weight in water)

Carbon and microbial secretions form stable soil aggregates and soil structure is enhanced – Reduced runoff and minimised erosion.

Principles to improve soil health and sustainability and address issues that Proposed PC1 is looking to regulate

- 1) Plant diversity
- 2) Keep plants growing to feed the soil – Photosynthesis drawing down carbon. Green is good and year long green is better. Living root in soil
- 3) Disturb soils less
- 4) Keep soil covered – natural armour (protection from wind and water erosion. Prevents water evaporation
- 5) Microbes matter – in order for soil to be well structured it must be living. Glues and gums form aggregates allowing moisture retention. Supply elements that provide resistance to pests and diseases and resilience to climatic extremes. Limit chemical use
- 6) Animal Integration

WELL STRUCTURED SOILS ARE LESS PRONE TO EROSION AND COMPACTION AND FUNCTION MORE EFFECTIVELY AS A BIO FILTER.

Nitrogen management

- Individual Farm Level
- Overseer not ideal – doesn't take into biological interactions in soil or those in rumen
- Farm leachate measuring – River watch NZ – 5 probe water tester
- N excretion in cattle urine is determined by soil health, pasture nutrient levels and rumen microbial function.
- Visual soil assessment and pasture nutrient density
- Milking cow N excretion – MUN
- Biologically friendly fertilisers and lime to produce nutrient dense forage
- New Technologies

Phosphorus

- Lost to waterways in association with soil particles
- Minimise erosion with increased soil carbon and diverse pastures

Pathogens

- Healthy soil is a natural soil bio filter
- Low diversity land and soils support more opportunistic bacteria
- Lake pathogen levels important
- E coli DNA typing
- PC1 preparation had a number of water sampling sites with no E coli data

Sediment

- Erosion is the main cause. Recommendations made from observational study
- Slope is not the problem
- Lack of carbon and biology
- Koi carp responsible for sediment – resource to be harvested.
- Pinetrees are not the answer

Slope

- Restriction of animals from hill country slopes greater than 15 degrees is not based on science. Basher claims that the introduction of large

numbers of grazing animals are a cause of accelerated rates of erosion – this is not substantiated in the two references referred to.

- Rainfall initiates slips of soft rock country in north island (over 15 degrees) – seen in east coast , Inland Whanganui , Taranaki and Manawatu)
- Need animals involved in maintaining healthy soils – (grazing stimulates soil carbon sequestration, along with feeding microbes)
- Diverse pastures and bio friendly fertilisers is what is needed to stabilise land

Stock Exclusion

- Desirable but not practical on steep hill country and is cost prohibitive
- Not proven that fencing on steep non intensive hill country will result in improved water quality

Farm Environment Plans

- Subcatchment and individual farm testing to determine contaminant discharges
- Leachate testing, soil assessment, pasture diversity reviewed
- Farmer ownership
- Incentives for farmers using biologically friendly fertilisers
- Input from qualified people in the area of biological farming and regenerative agriculture

Conclusion

- Consideration to linking to unambiguous national policy around water quality .
- Other players in this field need to do their part also (point source discharges, roading and bank erosion, river level fluctuations and erosion in relation to river use for electricity generation

We are the caretakers of the land we inhabit. It is up to all New Zealanders to treat the land and its resources in a sustainable manner.

We need to get this right.



