ORGANIC FARMING AND ENVIRONMENTAL MANAGEMENT OF DRY LAND

M Brosnan May 1988

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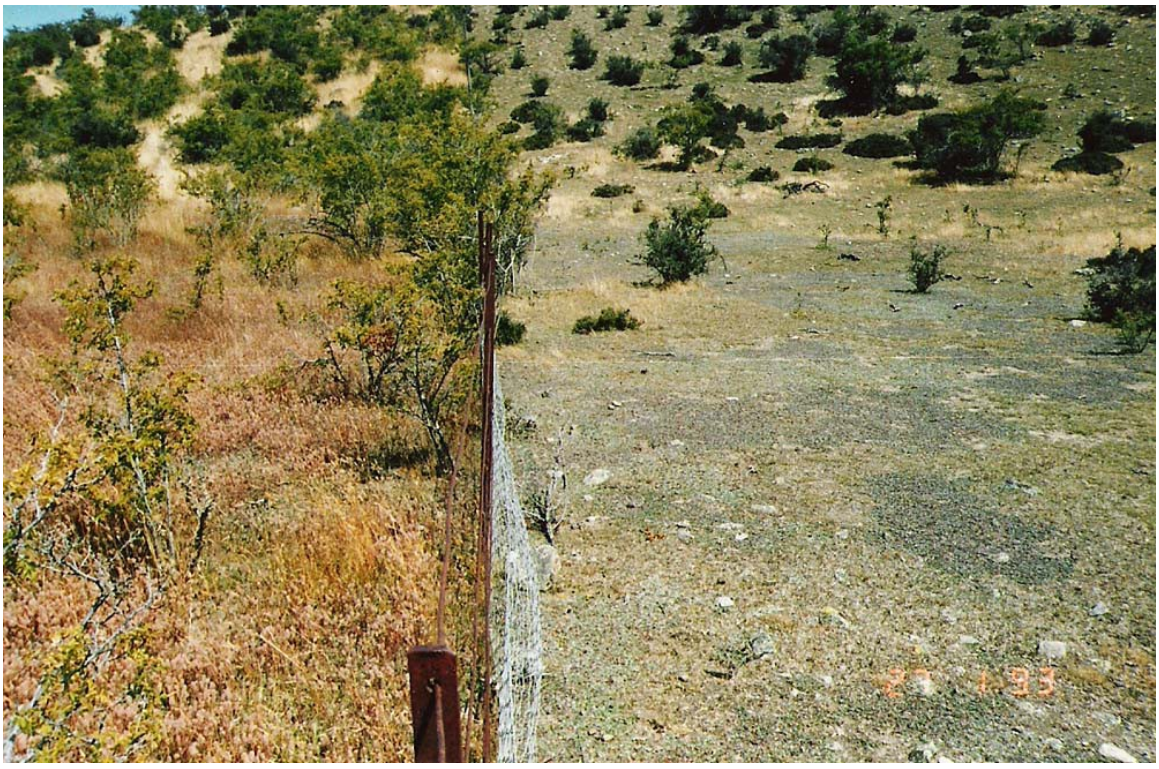

Our boundary, with landform fencing allowing two very different results.

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Note:
You will see some repetition in this paper. The reason for this is, a few months ago, while getting ready to go back to India, my mother Alma took ill, looking like dying. So I cancelled my trip and, having little time, I used some material from the previous paper.

INTRODUCTION

Organic farming: a way of life, a set of theories, a survival mechanism for planet earth. It has to be the latter. The Riverside experiment is an attempt at ecologically sustainable farming of dry land, both in relation to the land resource and as an economic venture. Survival concepts coming from the heart, which leads to the pocket, and on to a life style, An attempt to show that loving and caring for the earth with organic and conservation methods does return a good living and consequently, life style.

BACKGROUND

My family and I came to Riverside in the Hakataramea Valley in 1965, with very little capital. It was a virtual desert, with only 430 mm rainfall and was being cropped for cereals (That year 12 bushels of wheat per acre had been harvested !). Previous to that, it had been devastated by rabbits. The property of 600 hectares, was carrying 1,000 motley sheep in addition to the crop. They were devastating the land even more. There was just a small cottage on the farm and we had to somehow prove to the money lenders that we were the sort of people worth lending money to, as we wanted to build a new house for our family, who were very important to us.

WHAT TO DO?

I had, as a boy, worked on the property of the late Jim Patterson of Patearoa where he had 80% of his land in lucerne. Riverside looked similar country. This proved to be the case and within four years we had 320 hectares in lucerne and were wintering 3,000 good Corriedale sheep. We started building in 1966. Lucerne had done us proud!

In those first years, we developed forty hectares next to the Hakataramea river, into a gravity, border-dyked, irrigation scheme.

In 1980, a son came home to try farming, so we bought another 100 hectares and went up to 450 hectares lucerne and 5,000 sheep. My son stayed for a couple of years, then chose another career. I felt Riverside was big enough for me. (Why would one person need all that land?). I also felt that land prices would at least level out and possibly drop, so in 1985, I sold the 100 hectares and invested it off farm. Since then this capital has been kept separate from the farm.

I think the ownership of the land or more land, often becomes an end in itself, rather than the cherishing and good husbanding of a smaller area. In my case, if I had kept the other block, I couldn't have done justice to Riverside without employing someone, and I have had difficulties in employing people who have a feeling for organic farming. Those people are nearly always out happily doing their own thing, perhaps on as little as two acres. My interest in this area at the moment is to explore the possibility of share farming Riverside. There is no doubt in my mind that we have done a better husbanding job by having less land. I also proved to be able to make a better profit by having less land.

I have always been concerned about the insidious movement of soil off the drier parts of Canterbury by wind erosion. In 1982, Alistair Shearer, then of the Waitaki Catchment Commission, and I went to the

Grassland Association Annual Conference at Blenheim, where, seeing the conservation work being done in the Wither Hills, we came home and direct drilled large farm scale trails of as many semi-rhizomatous, deep fibrous rooting and/or bunch grasses, legumes and forbs as we could beg, borrow or steal, across the direction of the prevailing wind into the existing lucerne. About this time there was a great upsurge in interest in irrigation. As there is a limited water resource in the Valley, and my border dykes needed upgrading, I decided to spend $70,000 on an automated spray irrigation system which would cover 53 hectares. Hence better utilization equates to less, and more efficient, water use.

In 1984, I spent 5 months overseas, mainly in India. It is a great place to take time out and look at yourself and back at our beautiful New Zealand. It was there I made the major decision that changed my farming style. I would change to merinos, reduce stocking rates, and progress towards a self sustainable, low input cost organic farming system. The philosophy of working with nature was needed, ie to accept the Haka's climate and understand how the land itself works. Farming methods could then be developed to suit this, using nature's technology, rather than, constantly requiring more sophisticated and expensive modern human technology.

There is very little that hasn't changed on Riverside. Whether it be philosophy, economics, management systems, animals, herbage, use of fertilizer, spraying, ploughing, irrigation fencing etc. In 1985, as I was gearing up to arrange this programme, I, like many others in the dry part of the Valley, got caught by the big wind blow which was the start of a two year unprecedented drought, and lost a lot of soil over the hills to the sea. The trial area, however, did not blow away and showed to us the real value of those dryland species.

The blow motivated the people of the Valley to form the Kurow/ Hakataramea Resource Conservation Committee. This Committee proved to be the strongest and most useful group of people I have ever been involved with. A lot has been written about it, but briefly, we set about helping to re-clothe the Valley and surrounding area. We got a 50% subsidy from Government for this. I make no excuse for this subsidy, because, as I always say, we farmers are only custodians of our land for a short time, and it is really the nation's long term asset and so much has been learned from that disastrous drought and blow. The committee works closely with the Waitaki Catchment Board.

At this stage we were running 3,000 Corriedales and 1,000 Merinos. After the big wind blow to heal the land and as we were changing breeds anyway, we sold all the Corriedales and invested the capital, which left us with only 1,000 sheep on the property for a short time.

I must say at this stage, I am not a purist with organics. There's always both sides. I feel that caring for the land as organically as possible, within the socio-economic system of the day, will get us there in the end, while making it pay. Of course, if I want to sell organic produce, I will have to go all the way and once a few problems are worked out, may do this. Since my boyhood, when my parents were involved in natural health systems, the seeds have always been there to work with nature and we are gradually evolving towards this on Riverside.

Riverside now has;

- No poisonous spraying. Just a little roundup for tree establishment and the introduction of the new grasses.
- No artificial fertilizer.
- No irrigation
- No ploughing
- Only enough hay made for maintenance, and as a buffer for drought,
- No drenching for adult sheep and just two or three for lambs.

Spraying

In the past I sprayed 200 hectares of lucerne a year for so called 'weeds'.

This was the first thing I stopped (last spraying 1981). This gave a mixture of 'weeds' and lucerne which gave better stock health and ground cover as well. On Riverside, I can find a use for most of these 'weeds'.

Fertilizer

Stopped flying on Super in 1981, a little being spread on the irrigated flats by truck. No super at all for the last three years. In 1987, I put on 15 kg of elemental organically acceptable sulphur per hectare. I am now

evaluating a fertilizer that is acceptable within organic farming criteria. I am paying a lot of attention to soil and herbage testing.

Irrigation

I virtually stopped after the 1986 season and this last year have done none at all. The machine is tied against the willows 'like a great spectre of the past' Again we are trying to prove that even on this dry land we can make a profit by listening to nature. Irrigation, especially spray, is a costly and needs continuous high energy input, which does not attack the heart of the problem; that is a natural low rainfall; but merely compensates for this.

Ploughing

In the past we had about 60 hectares a year under cultivation. No ploughing for the last two years has been done and none is envisaged. The tractor is starting to look like the irrigator! 140 hectares were direct drilled by a contractor in 1986 under the revegetation programme with the Waitaki Catchment Commission, using all the grasses that had shown up well in the trails. This means that many fields on the place are now acting as trials. Species I prefer at this stage are: luna wheatgrass, tall oat grass, Maru Phalaris, Wana and Sarborto cocksfoot and S170 tall fescue (Appendix 11). I have changed to long term herbage management practices that appear to be more self sustaining.

Hay versus Sheet Mulching

In the past, on Riverside, with 400 hectares of lucerne and the subsequent peak of growth in spring, we used to produce up to 25,000 bales of hay, and selling up to 20,000 always against my emerging organic feelings. But what to do with that growth peak? It was high quality hay and economically profitable. However as it took organic matter off the farm I believed it to be wrong. Now we have the answer. We knock it down with stock and return it to the soil.

Eyebrows were raised last year, when in a good season I brought in 5,000 extra sheep and grazed them free of charge to knock down the extra feed. I call this sheet mulching. I know this is better than buying superphosphate or baling hay all night!

LOSSES OFF A FARM

On a property that is constantly being bared off by animals and farmed in the conventional way, it would be interesting to note down what comes off it. To name a few:

- Soil nutrients in water
- Pollution in water from filtrating nutrents
- Poisoned water
- Fast surface run off, assisting floods.
- Soil in air
- Nutrients in air
- Organic matter in air

I am trying to keep most of these things in my own backyard instead of having to replace them with expensive products of dubious value.

CLOTHING THE LAND

It's so common in Canterbury, especially in drier areas, to see farms eaten off bare much of the time and then waiting for rain. A big part of the system on Riverside is keeping lots of cover on the place. People need clothes. So does the land. I am managing my dryland pasture species as a perennial crop to achieve maximum sustainable production. This involves removing no more than 50% of growth at any grazing during the growth season and no more than 70% of herbage after the growing season. To ensure:

1. Large healthy plants with a large active root mass.
2. Large root reserves for times of stress.
3. Rapid leaf regrowth.
4. Early green up in spring.
5. More stable production in variable years.
6. Ability to withstand drought and weed competition.

7. Leaves sufficient dry matter to protect the plant crown and form a mulch on the soil to reduce raindrop impact.
8. Improve moisture penetration.
9. Reduce surface runoff.
10. Reduce wind blow.
11. Improve soil moisture retention.
12. Carbon supply to the soil and stabilization of soil nitrogen maintaining carbon and nitrogen balance[1].
13. Thereby holding back the nutrients from filtering through to the watertable and consequently the river.

SHELTER MICRO-CLIMATE, COMPACTION AND WORMS

Soil compaction, I believe, is one of the biggest problems on much of our drier soils. So ten years ago I had a worm introducing machine made. The fundamental question, 'the chicken or the egg', was whether perhaps I had to create an environment for the worms first. I decided I did and the next year I put shelter belts on every northwest facing fence. On reflection this seemed a very crude and coarse approach, both from the landscape aspect and for total shelter.

The brain ticked over and I decided to come lower to the ground and got into a browsing shrub program. More thinking, and why not come right down onto the soil with our micro-climate changes and progress to large scale drilling into the lucerne of bunch grasses. Grasses that act as their own shelter and create their own micro-climate.

So, shelter belts down to shrubs, shrubs, down to bunch grasses. I am at this stage looking at getting the worm machine going again as I feel the soil environment is now more conducive to their success.

SUNNY FACE TREATMENT AND BROWSING SHRUBS

In conjunction with the Waitaki Catchment Board we are doing a one off, subsidized, 5 year land use demonstration, part of which is fencing off all the sunny faces from the flats. (Dark faces having been fenced off earlier). Trails with shrubs planting machines and direct seeding of shrub species have been started.

Land form fencing : Here, I think I need to elaborate on this, a term we have had to make up, as with many of the systems on riverside. The whole farm is being fenced up into all the different land uses. As I say, a lot of the wind erosion in dry land comes from sheep feeding on the fertile flats, and camping on the sunny faces, transferring the fertility, baring off the face, hence the NW wind rises, and fertility and soil are blown out to sea. Also sheep don't like the dark south faces, and the fencing can control them onto this with good growth results

Landscape values are an important consideration in the program. We are trying to incorporate both the planting and fencing patterns with the general flow of the land.

The main reason for this program is that 90% of the feed grows on the flats and 10% on the sunny faces. Sheep graze on the flats, then camp on the sunny faces. Much of the fertility is transferred to the sunny faces. They are then bared off so dung and soil gets blown away. In the past more super was then put on the flats. And so the cycle of depletion goes on.

Other reasons for the shrubs are that they provide:

1. A canopy giving continuous shelter from the winds.
2. They trap moisture around their roots and the surrounding soil.
3. Their deep root systems help to transfer nutrients to the topsoil. Grasses and shrubs work together as a team to help and protect on another. Habitat for wildlife and insects that attack pests.

From a farming perspective, this system has many advantages. If one can establish a grass and shrub cover together, one not only integrates feed and shelter, providing that simultaneously, but also radically

1 Hogland J H, Grazing Intensity and Soil Nitrogen Accumulation, Proceedings of New Zealand Grassland Association. 1984.

increase the feed potential by using the shrubs themselves as browsing fodder. During the 1985 major drought in the Valley, good grass growth could be found only in the shelter of matagouri, briar or coprosma shrubs.

A mixture of appropriate legumes, grasses, herbs palatable shrubs and shelter trees are producing standing "hay" for the August/September feed deficit. They provide:

- a warm sheltered site following pre-lamb shearing or for lambing,
- fodder for bees,
- habitat for wildlife and pest predators (including ladybirds for those aphids),
- protection for the onsite soil and
- protection offsite by allowing the adjacent terrace lucerne paddocks to be destocked during the critical spring wind blow danger period.

The amount of cover will also inhibit rabbit populations. This factor seems to have been overlooked in the current rabbit control debate.

SUMMARY

So we had bought land that had been raped. Got out of cropping into lucerne and more sheep. This then became a mono-culture of lucerne and sheep which was still not right for the long term sustainability of the land, animals and people on it.

My growing concern for the environment and particularly the land I was responsible for led me to seek knowledge of low cost sustainable farming, a way of farming that works along with nature, rather than imposing our will upon it. I now feel that I am well along the road to a self-sustainable organic system and at a time when I hear so much of the economic problems of farmers this enterprise is returning a very good profit.

I have talked about lifestyle. I employ virtually no labour apart from contractors and am not happy if it takes me more than an average of four days a week to work Riverside. I should say though that there is often some interested traveler staying at Riverside and this can be a big help.

I want to say, at this point, that I feel strongly that organic farming requires, more than anything, a high degree of management skill. I keep stressing the word management. I mean that instead of relying on the pocket or the muscles we put more emphasis on the brain. In the past if we had a problem we threw a spray at it, or super phosphate, or ran more sheep.

So I just hope you don't go away from this weekend, as perhaps some of you came, thinking you would be given all the answers.

The rewards of organic farming I think are great.

- Profit through sustainable land use.
- For our lifestyle.
- The environment.
- Survival of the planet.

The costs: as distinct from the past, when we went along and asked a so called expert what to do, we now need lots of our own mental inputs into our own land while learning to manage along with nature.

There are many people attempting organics you can talk to and there's masses of reading, as organics is older than man.

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