

FDI Feature Interview

3 August 2017

Natural Intelligence Farming: Ian and Dianne Haggerty

Key Points

- Natural Intelligence farming uses natural processes combined with modern agricultural technology to produce food and fibre of optimum nutrition and quality while enhancing positive ecosystem development.
- Natural Intelligence farming has the potential to sustainably regenerate the agricultural landscape, restore biodiversity and to sequester greenhouse gasses in the soil as beneficial soil carbon.
- There is a direct link between soil health and human health and there is a growing body of research into this relationship between soil and plant/animal, human and environmental health.
- Natural intelligence farming can be applied to broad-acre agricultural production with only small changes to capital equipment and a reduction in operating costs and increased productivity.
- Once the appropriate logistic infrastructure is available, the produce from Natural Intelligence farming can be market differentiated and priced accordingly for its nutrient diversity and absence of chemicals and other toxins.

Introduction

Natural Intelligence Farming is the term Ian and Dianne Haggerty use to describe the harnessing of the dynamic, natural relationships that exists between all the organisms in the ecosystem and the environment itself, particularly the soil. These relationships are highly complex and versatile. They involve mutually beneficial interactions between the soil, plant seeds and roots, microorganisms, and the ruminants that feed on the plants and cycle dung and microbes back to the soil. Understanding these relationships requires a holistic engagement with the agricultural ecosystem and the body of scientific knowledge supporting this understanding is still incomplete. The key to natural intelligence farming is not to hinder or obstruct the interactions that support and inform these relationships. The Haggerty's aim is to facilitate natural intelligence with modern farming methods to create regenerative agricultural ecosystems that produce optimal food and fibre products.

Ian and Dianne farm approximately 13,000 hectares of land in Western Australia's central wheatbelt, around 190 kilometres north east of Perth. After years of conventional farming, the Haggerty's realised that

their system was vulnerable to dry seasons. Input costs were steadily increasing without corresponding increases in productivity. Soil tests showed adequate nutrient levels, but tissue tests revealed nutrients were not getting to plants in appropriate balance, despite a comprehensive mineral fertiliser program. To top it off, rainfall in recent years had been less than half the annual average often falling in 3 to 5 mm events followed by windy weather, meaning much was lost to evaporation. Maximising crop production in dry years had become a real struggle and hard pans in their soils were severely restricting root growth. So, the Haggerty's started to research biologically-based farming systems with the aim of increasing their soil's microbial population, nutrient availability and moisture holding capacity. What followed was a massive learning curve combining and adapting some of the world's best ecological knowledge with much ground truthing and extension in harsh Western Australian semi-arid agricultural zone conditions.

Ian and Dianne have a life mission to facilitate positive global change by rebuilding soils in semi-arid regions, producing premium food and fibre and supporting the nutritional needs of humanity to optimise health. In this Feature Interview, FDI takes the opportunity to interview Ian and Dianne and investigate what it is that they are doing differently from other farmers and the benefits of their methods for productivity, ecological regeneration and plant, animal and human health.

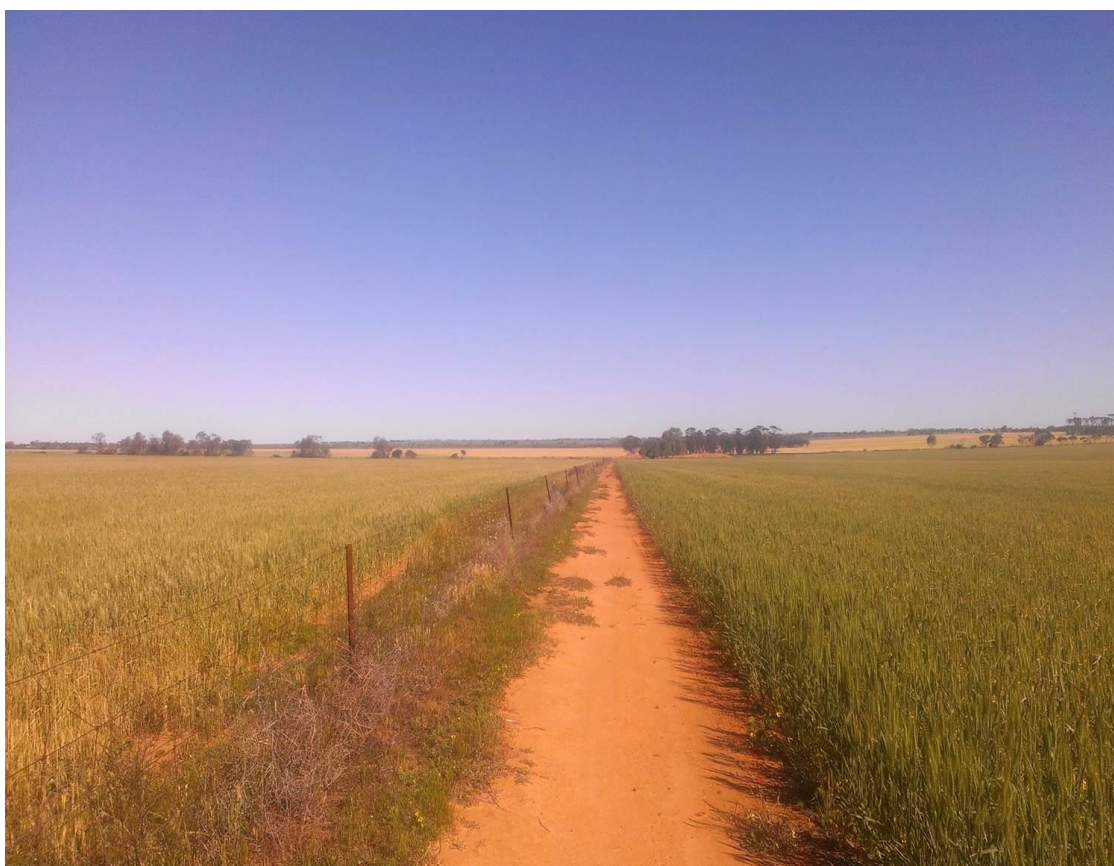


Figure 1. A visual comparison between Ian and Dianne Haggerty's property to the right of the track and a neighbouring property to the left during hot, dry spring. *Source: The interviewee.*

Interview

FDI: As an introduction to this Interview could you give us a short history to your association with agriculture and the land?

I&DH: While coming from long family backgrounds of farmers, neither of us was fortunate enough to inherit a farm so we purchased our own 660ha property in 1994 next door to Di's parents. It was in the years immediately prior to purchasing our farm, while owning and operating a roadhouse in the Kimberley that we were exposed to some interesting ideas on land management through our contact and friendship with Robyn Tredwell of Birdwood Downs Station (Robyn was the 1995 ABC Rural woman of the year). Her

views on using livestock as tools to “Feed, Seed and Weed” the land, penetrated deeply into our psyche even though we were not involved with a rural enterprise at the time.

Purchasing a farm took all our capital reserves so for the first few years we share-farmed our land with Di’s father and worked in return for use of his machinery to grow our crops.

While successfully farming conventionally in the 1990s, and slowly beginning to piece together a working range of plant machinery, it didn’t take long for us to realise that moisture in the soil was key to profitability and that hanging onto that moisture was critical to make a viable crop out of a poor spring. This fact, along with a questioning mind and noticing that there were discrepancies between soil test and tissue test results, sparked a drive for real answers. Reducing risk and increasing profitability year in year out were key goals for the business to progress.

In 2001, we embarked on learning how to improve soil health and productivity in the cropping program. Dr Elaine Ingham’s message of the miracle work of soil microbiological communities in providing optimum balanced nutrition to plants and prevention of disease and insect attack through soil health resonated with us. At the same time, we consulted with Jane Slattery of South Australia to develop an understanding of ruminant nutrition, intuition and interconnectedness with landscape health. Working on both the soil and animal health aspects concurrently enabled some wonderful synergies to express and assist with fast tracking the ecological progress of the farm.

Dr Arden Andersen’s message of the direct link between soil health and human health outcomes rang alarm bells for me [Dianne] as an Occupational Therapist, practising Early Intervention Paediatric and Aged Care occupational therapy as the preventative model for health care which was firmly entrenched. A keen awareness of responsibility as food producers ensued. This was the beginning of an intense learning curve where we pursued the knowledge of many other international and national scientists, leaders in the field of soil health and its relationship to animal, human and environmental and global health.

In 2009 and 2010 we were privileged to be introduced to Dr Christine Jones, Dr Maarten Stapper and Walter Jehne who had considerable knowledge on working soil health principles in Australian agricultural environments. Dr Jones’ “liquid carbon pathway” answered many questions of what was happening within the soil to improve its friability and moisture holding capacity. This was confirmed with deep soil carbon testing in 2012 that confirmed observations with sound figures. On similar soil types to neighbouring properties, soil carbon was improved by 10t/ha on our cropping land, an increase of 41.46% in the top 30cm of soil.

It was this knowledge, along with an interest in using livestock to better “feed, seed and weed,” that first motivated us to embark on what has become a life-long passion to farm, together with natural processes, while maintaining a profitable farm business and improving natural capital.

FDI: What are the benefits of your agricultural practices?

I&DH: Our agricultural methods can make a significant contribution to improving global trends in environmental management and human health. There is an existing and growing body of scientific research supporting a wide range of benefits associated with our farming methods. We believe that natural intelligence farming can make a positive contribution in the following areas:

- Carbon sequestration while producing optimal food and fibre production.
- Increased biodiversity, particularly microbiological biodiversity in soil.
- Nil chemical residues tested in grains grown.
- Nutritional balance in foods grown
- Decreased or elimination use of synthetic fertilisers.

- Increased microbiome, the number and diversity of microorganisms in an ecosystem such as the digestive system.
- Production of fully pasture fed meat that is high in omega-3, conjugated linoleic acid, vitamin E and has greater mineral diversity.
- Greater reliability in grain crop yields.
- Crop disease resistance resulting in decreased or eliminated use of fungicides and pesticides.
- Lower energy requirement for agricultural production.
- Improved equity.



Figure 2. Seed/microbe intelligence at work. Wheat seed on right has focussed significant energy into engaging soil microbes to develop effective rhizosheath at very early stage, even prior to photosynthesis occurring. Seedling on the left was taken from acid soil (pH 4 – 4,5). The thick protective microbial sheath enables the plant roots to penetrate otherwise unproductive soil conditions. The sheath ensures uptake of the correct balance of nutrients, excludes toxins rapidly rebuilds soil structure, and enables increased rooting depth to access greater water and nutrient resources. Source: Interviewee.

FDI: *How have you done this?*

I&DH: To best answer this question we will discuss the cropping and grazing areas of our methods separately. It is important to note, however, that the two areas are complementary, mutually supporting and mutually beneficial.

Cropping

To grow cereals, we use a process of direct drilling of grain seed, supported by application of natural fertilisers, based on high grade worm liquid and compost extract at a cost of \$30 a hectare.

Seeds are microbiologically coated before sowing. Ian has integrated a low-pressure liquid fertiliser circuit into the seeder so that the microbiologically coated seed is drilled into a microbial environment stimulated by the liquid fertiliser. This ensures that the plant is supported from germination to early growth. By

supporting and encouraging the soil/plant root microbiome (the number and diversity of microorganisms in an ecosystem), the plant's immune system is strengthened so that no fungicides or pesticides are necessary.

When Ian digs over a shovel full of heavy red soil in the paddock it becomes obvious how each plant growing in it acts as a carbon pump. The plant root growth has broken up sub-surface hard pan in these heavier soils affected by earlier farming methods. By not providing water soluble fertilisers with the seed, extensive root system growth is stimulated, and the plant is able to reach wider and more deeply for moisture and nutrition. The thick rhizo-sheath on the roots enables the crops to penetrate acid subsoil and enable positive regeneration.

Similarly, observation of root growth in the poorer sandy soils in other paddocks being cropped shows the extensive root growth which adds carbon and nutrients to the soils. These roots and associated microbiology hold the soils together, improve soil structure, air and water penetration. The improved soil carbon levels then enable this water to be retained in the soil for longer periods along with nutrients to be available for plant growth.

Crop quality is checked by periodic testing of tissue nutrient levels. We find this is a more reliable measure of what is available to plants from the soil, rather than testing the soil itself.



Figure 3. Sheep raised for wool and meat, fully pasture fed with no requirement for intestinal parasite control are an integral part of the natural intelligence farming process. Right: Sheep manure engulfed by fungi demonstrating appropriate rumen conditions facilitate beneficial microbial interactions. *Source: Interviewee.*

Grazing

Once grain is harvested, the stubble of the crop grown in this high microbial environment provides nutritious grazing fodder for the sheep. Enhanced microbial activity in the soil, and the use of specially-bred sheep as the 'farm machinery' above the surface, has lifted the resilience and fertility of the land, improving the soil function, structure and water-holding capacity and continuing to value-add to the productivity of the landscape.

In due course, remnant stubble is trampled down and is digested by fungi to add to the organic carbon in the soil. The cycle is completed with the return of nutrients and microbes to the soil via the sheep manure and urine.

We have carefully bred our line of sheep to be adapted to the local environment. Through a combination of our breeding and grazing practices, including short, controlled periods of grazing in individual paddocks, the

sheep are resistant to stomach parasites and do not require drenching. We have also selectively bred our animals to be free from skin wrinkles. This ensures that our merino lambs do not require mulesing.

The sheep thrive on cereal stubble and native shrubs and grasses as their rumen flora is totally adapted to maximising nutrient extraction from roughage. The livestock do not receive any grain supplementation. The sheep are shorn every eight months and produce lambs at a rate between 90 and 120 per cent per annum. We couldn't afford to replace our ewes. They have developed into hardy, efficient producers with minimal artificial support and highly adapted to our local environment. The sheep produce high quality, 17-20 micron, wool (8kg average per fleece adjusted for 12 months growth) and premium grade fat lambs. Some of our stud rams have been sold to other farmers who are looking for robust, economic performance.

The grazing operations are integral to the whole. The cropping and hay production contribute to our production of premium wool and lamb, but the sheep are playing their part in fertilising the land and working the soil for us. Enhancing animal health and soil health conjointly facilitates a positive epigenetic spiral in this agricultural ecosystem.

FDI: Where do you hope and plan to take this in the future?

I&DH: We are confident we have a product that is superior to that produced by current standard farming practices that utilise chemical fertilisers, pesticides and fungicides. We can consistently demonstrate that our produce, be it grain, meat or fibre, is free from these chemicals. Grain testing via National Measurements Institute and AMA Laboratories. We also believe we can consistently demonstrate that our produce has greater nutritional and microbial diversity. We have established that there is a market for our product and that market is prepared to pay a premium for it due to it being an achievable and readily scalable alternative to organic produce. There are, however, obstacles. Currently, we do not have the necessary infrastructure to segregate our product in the logistic chain that transports the produce from the farm to the consumer. Successful agricultural production is based upon a sound business model and we believe that market segregation will justify the required infrastructure funding.

We have set ourselves five goals:

- To further expand large scale broad acre commercial enterprise, demonstrating natural intelligence agriculture and the associated positive outcomes.
- To establish the logistic chain for a segregated market initially for grain, meat and wool.
- To establish a system to engage other farmers to expand production using our production model.
- To develop partnership ventures to add value to our products such as food and fibre processing.
- To establish a research and education centre on our property. This will provide education on a new perspective, with agriculture's positive climate and health impacts and its environmental outcomes. It will be a centre to see, dig, taste and experience natural intelligence food where they are produced.

Our farming system comprises a new and highly innovative agro-ecological approach to modern farming. Importantly, it is applicable to broad acre agriculture and, therefore, well positioned to capture premium markets while delivering enormous health, social and environmental benefits.

About the Interviewees:

Ian and Dianne are the co-founders of [Bio-Integrity Growers Australia](#) and the Prospect Pastoral Company. With their son James, they run a holistic and integrated program of cropping and grazing. The program is underpinned by their shared deep commitment to the regeneration of the fertility of the marginal soils of their area. This is achieved through use of natural fertilisers, minimum tillage and the consequent growth of healthy cereal plants to deliver high tonnages of premium grain per hectare. The healthy ground cover of the cropping and pasture also provides the key to maintaining high levels of soil moisture and ensuring weed control.

Over the years, Ian and Dianne have developed their own Merino stud and a working sheep flock from local and South Australian bloodlines. This indigenous flock has been bred to be totally acclimatised to the land they farm.

Their production area is now spread over several holdings equalling 13,000 hectares of their own property, leased land and share-farming enterprises. This diversity has enabled more effective management across various landscape conditions and rainfall availability.

In 2010 Ian and Di Haggerty were the recipients for the A&K Hill Green Agriculture Innovation Award, an award founded by Dr Christine Jones that recognises outstanding leadership in the adoption of farming practices that build carbon-rich top soils, foster secure and resilient agricultural production and improve food quality. In 2012 the Haggerty's received the National Carbon Cocky Award for Industry Development awarded in Dubbo, New South Wales by Carbon Farmers of Australia. In 2015 the Haggerty's received an inaugural Soil Restoration Leadership award, presented in Dongara, Western Australia by award patron Rhonda Wilson.

Ian and Dianne are keen to speak with potential partners to achieve goals of segregated marketing of produce and potential value adding processing to bring food direct to customers at a national or international level.

Any opinions or views expressed in this paper are those of the individual interviewee, unless stated to be those of Future Directions International. The views of the interviewee are his personal view as author of the book and are not of his current and past employers.

Published by Future Directions International Pty Ltd.
80 Birdwood Parade, Dalkeith WA 6009, Australia.
Tel: +61 8 9389 9831 Fax: +61 8 9389 8803
E-mail: info@futuresdirections.org.au
Web: www.futuresdirections.org.au