Australian Nuffield Farming Scholars Association

2004 SCHOLARSHIP REPORT

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Aims/objectives/study goals

Objectives:

To gain a knowledge and understanding of principles and practises of Biological (non Toxic) Farming and ascertain the viability of the concept.

My goals where to look into the reasons for Biological farming, to see if it is possible to fit into current farming systems - perhaps creating a hybrid farming system, where it is still highly efficient and economical, less toxic to the farm workers, the environment and the consumers of our produce.

The study broadened into a whole range of benefits to animal and human health if the produce and fodder is grown correctly and the eating of less refined foods.

Also I wanted to look into a whole range of marketing systems and evaluate the profitability and workability of the different models.

The main driver is seeing if family farms can maintain a presence in the produce marketing systems and can be economically viable while delivering quality of life to all concerned.

Executive Summary

My study topic was biological farming and marketing. I aimed to find out about non-toxic farming: the ideals, economics and practices involved, I wanted to find out how to grow highly, nutritious produce for health benefit of farmers, consumers and the environment while being sustainable economically.

Sustainable farming is combining the “triple bottom line” philosophy, economical, environmental and social, into a whole farm system. It involves balancing ideals with profitability. Triple Bottom line means not only evaluating how your business is going financially, but also making sure your business activities aren’t adversely affecting other people or the environment.

Balance was the main theme that came out of my study, balance in lifestyle/work, and ideals/reality, inputs/outcomes. “Diversity is the key to success”, balance comes through Diversity. The biological farming philosophy is “doing nothing that will harm the soil life”, which is the micro and macro organisms in the soil, ranging from earthworms down to fungi and bacteria. J I Rodale’s, the founder of the J I Rodale Institute, philosophy was “healthy soil, healthy food, healthy people’.

Principally the minerals in the soil have to be balanced, as the limiting factor is determined by the element that is in inadequate supply. Then concentrate on the biological aspect: adding good humified compost is a good way of getting organic matter and microbes into the soil. Then feed and enhance the microbes in the soil: with molasses, fish and kelp are also good food sources for microbes. There is a need to reduce the amount of chemical and acid treated fertilisers or at least buffer them with a carbon source, eg (Humic acid, molasses, fish or kelp).

If the conductivity of the fertiliser added is too high it will kill soil life and can even burn root hairs. In a well-managed soil the humus levels should rise every year or at least be maintained. Over cultivating burns the organic matter up, rather than letting the microbes convert it to Humus.

The beneficial microbes in the soil have to be in adequate numbers to balance out the effects of any pathogens in the soil, they also help in creating air pockets in the soil, which helps give the soil what is known as structure. Plant roots cannot survive without O2. Aerobic microbes from a good compost source are beneficial, most pathogens are anaerobic, so it is of paramount importance to have an aerated root zone and to manage moisture levels if in an irrigated situation as water logging also deoxygenates water.

Different methods of marketing was looked at; from large scale wholesaling with 365 day supply to supermarkets, down to retailing from the farm gate and to restaurants etc, the profit margin in direct retailing was obviously a lot higher than wholesaling although supplying large volumes wasn't an option. This kind of marketing relies on having a close large population, or developing a very good distribution system, which relies on strong alliances down the supply chain.

In the eastern USA it was very successful, as the population density is high, Farmers markets are a common event, so it personalizes the producer to the consumer and gives consumers the confidence (or perception) that they are getting a fresher, cleaner and more nutritious product.

One thing that came up in my study was the health benefits of eating non-processed, naturally grown foods, not so much organically grown but grown so as the fruit and vegetables or fodder animals are fed is minerally dense…. Not just NPK fertilisers but a whole range of minerals, vitamins and enzymes. Calcium is considered by biological farmers to be the king of all nutrients and the building block to life.

Conclusions

Balance is everything. Farmers have to balance ideals and realism. To change to fully biological systems too fast will almost certainly bring economic hardship. Adopting IPM strategies (integrated pest management) is an excellent first step and working to build up soil health by balancing minerals and encouraging biology every year. Building up OCL (Organic Carbon Levels) will help to raise the nutrition levels of our produce, which will in turn be a huge benefit to public health.

After all, "healthy soils, healthy foods, healthy people" must provide sustainable healthy returns economically to producers for this to become reality!

The major problem is that the general public (consumer) doesn't put a value on food, prices is the major concern, even if they want clean green produce they still want to pay the cheapest possible price.

If farmers are going to be expected to produce cleaner greener nutritionally dense foods then they must be reimbursed/ rewarded for their efforts, NOT regulated and fired for not doing so.

We need incentive based food safety/quality programmes not… “The big stick” penalty approach.

The supermarket mentality will ensure the functionality and health benefits of our produce remain low, with their idea of wanting to buy food cheaply from the producers and keeping the lion’s share of the profits. Farmers can’t produce good quality organic or even highly nutritious functional foods without being repaid for their own efforts, costs and time (their focus has to be on yields and aesthetics rather than nutrition to stay financially viable.) Farmers are being squeezed and regulated by governments to have a triple bottom line, When supermarkets won’t pay what the produce is worth and end up with most the profits, Government pressure would be best applied to the chain stores, to receive the best environmental and health benefit out comes.

Turning compost in Illinois USA

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Introduction

Biological Farming

Diversity is the key to success,

Balance through diversity.

There are many terms used today to mean something roughly the same as Biological eg sustainable, natural, alternative etc.

Biological farming simply means farming with fewer chemicals, looking after the soil better and with a cleaner environment. The system should be able to be used indefinitely and enhance the soil and the environment and generate viable economic returns without compromising human health. The concept is to do nothing that harms the soil life in any way, to use the principles of nature to grow by and therefore making it self-sustaining.

To enhance air, water and soil quality while consciously trying to reduce the consumption of energy and depletion of non-renewable energy resources, yet still maintaining viable economic returns for produce (crops and Livestock).

Marketing

I also looked at marketing systems and techniques in Spain, USA, UK and Israel. Ranging from:

- 365 day wholesale supply, Way Bright Dairy USA

  Health Fresh Foods UK

  Intercrop Spain
- Wholesale Volume niche marketing, Negev. Israel
- Farm retail with many different scenarios from US, Scotland and UK

The Study

Soil Management

- Mineral

- Biological

- Physical

No matter whether growing livestock, fodder, or fruit and vegetables, our living is coming from the soil, therefore it is of vital importance to have it performing at its peak for broad grazing such as in the Northern Territory.

Mineral

The mineral balance of a soil has to be addressed before any thing else. So a soil test is an essential tool. The Albrehct and Reams methods are both referred to although many thought the Albrehct test to be mainly a mining report telling you the total numbers of minerals in the soil, not what is actually available as it uses a strong acid to dissolve the minerals, where as the Reams testing method was only a mild acid which is said to mimic that of a plants roots to dissolve minerals so it is giving a truer report of what is available to a plant.

Most people I saw recommended using both tests so you know the total amount of nutrients in the soil. These nutrients may be able to become available once the soil biology has built up and also the amount available right now that can be accessed by the plant.

Biological Farming addresses calcium deficiency first and is seen as the “king of all Nutrients” with Phosphorus being the second ”queen”.

All minerals must be in adequate supply as if one element is absent or unavailable it will limit the yield of the crop or could adversely affect the produce quality.

The biological approach doesn’t just address NPK needs but strives to have a whole range of minerals present for the plant to access not just the 12 elements that conventional agriculture recommends as essential in NKP Ca S Mg Zn Ma Fe Cu Bo Mo.

The biological approach isn’t so concerned with PH or calcium raising the PH, the benefit is if you get the nutrition right the biological system will follow and bring the PH to a desired level, available calcium and available nutrients are the main concern not getting a pretty soil test.

Action – take soil test. Test different paddock and soil types. The key is to use a soil laboratory that is not affiliated with any Fertiliser Company, who will offer good unbiased recommendations that test for total nutrients. Then for available nutrients so you know exactly what you are working with and what is the right amount of which element to add.

Deep ripping is useful if the soil is in balance but if not it will revert quite quickly back to how it was, due to magnetic attraction of cations and anions.

Good soil biology (The aerobic zone should get deeper every year)

Biological:

This is the living element of the soil Macro and Micro-organisms eg earthworms, bacteria, fungi, amoebae, protozoa's, nematodes etc.

These also have to be kept in balance and in sufficient numbers for proper soil plant health. Should be seen in your livestock and treated as such so need food, water, oxygen and comfort.

The biological components of the soil are responsible for digesting residues from the prior crops and cover crops and turning it to Humus, nutrients available for the next crop being grown and Humus CEC and water holding capacity.

There are specific species of N fixing bacteria that can be added either straight to the soil or better still to compost in the composting process and then the compost added to the paddock, to supply a % of the crops Nitrogen needs.

Mychorizial Fungi exude a sticky substance called Glomalin, which glues soil particles together to give the soil structure. It also has the ability to attach to root hairs and bring nutrients from outside the root zone back to the root, where an exchange takes place for the plant exudes secreted from it's roots.

Microbes also all burrow through the soil and make homes, which leave pathways in the soil, which aerate the root zone.

Action:

- Change fertiliser types to more bio-friendly ones with low acid content as acid fertilisers kill the microbial life in the soil.
- Every acid (Salt) fertiliser puts a carbon source with it to buffer the burning effect and for the microbes to feed on eg. Humic Acid (dissolved leonardite coal) either as a solution or granules, liquid fish, kelp or molasses are good sources though not too much as much may do nothing or have a negative effect, by putting the carbon /nitrogen ratio out of balance.
- Add good quality compost to the soil to get a broader range of beneficial microbes in the soil.
- Use a bio soil test once a year to see how the species numbers are going and to ascertain aerobe/anaerobe ratios (Soil food web Laboratories, do such a test) and receive advice on the future management.
- Don't over cultivate as this destroys soil structure and can cause residues to oxidise and burn up before microbes have digested them and therefore losing valuable nutrients supplies.

In Israel in the Negev they band compost at 200m^3/ha for nutrition, biology and moisture retention, in organically grown crops.

Physical

The physical aspect of the soil can be influenced by the mineral content eg Ca flocculates, Mg tightens, and also the biological content. Soil that has structure and will hold together, keeping air pockets so it doesn't become deoxygenated.

Soil Management tools:

- Soil test and recommendations
- Penetrometer-devise to push into the ground to determine tightness
- PH meter 1:1 with water 6.4 to 7 Ph
- Conductivity meter 100 to 400 ergs(uS)
- Deep ripping is useful for aerating soil although if the soil is out of balance it will revert quite quickly back to how it was, due to the magnetic attraction of cations and anions

Water management was crucial to production in the Negev Desert, Israel.

These capsicums would yield up to 80 tonnes to the hectare.

Water Management

Under a bio-system crops have the ability to withstand drought for a bit longer as the soil is more open and roots can penetrate deeper.

In Fairmount Minnesota I spoke with Dan Skow who runs a Ag consulting company called International Ag Labs Inc. He claimed water rises every night in the soil due to the tidal pull and flow of the moon and in a well managed biological system the water can rise right to the surface because of the friable nature of the soil, without hard pans. He said he has walked through a biological paddock of soy that are wet every morning after 50 days without rain, where the “conventional” paddocks crops next door have shut down because of droughting and sustain large yield reductions.

In an irrigated system using some kind of monitoring tools for irrigation scheduling and durations is essential even if it’s only a shovel or hand auger.

Over irrigating leaches nutrients out of the root zone adding to environmental damage to rivers lakes and wetlands and causing yield losses and not to mention extra costs in pumping and fertiliser as well as wasting a valuable resource in the water.

Irrigation management tools

- Daily evaporation readings
- Tensiometers
- Gypsum blocks
- Data logged gypsum blocks
- Capacitance probes

Crop Management

The nutrition side of crop management meshes with the soil management approach, growing the plant steadily with all elements of nutrition in adequate supply. Too much soluble fertiliser will not only kill soil life but will raise the soil solution conductivity too high which will burn root hairs and eventually burn and even kill the crop.

Taking at least 2 leaf samples through the life of the crop is also considered a must. One at flowering (or just prior) and one at fruit fill to make sure nutrition is adequate. Foliar nutrition supplements are also a very quick efficient way of getting trace elements in to the crop and the right mix can be determined from the leaf sap sample.

Many biological farmers believe cultivation to be the only safe, effective way of controlling weeds and use machines such as rotary hoes and ridge tilling equipment. Also they use flame burners just prior to crop emergence to burn off weed seedlings that have already germinated. Timing is crucial using such methods, but I saw the evidence of some very effective controls.

Another school of thought is using Glyphosate at very weak rate (at about 25% of recommended rate, prior to planting as a zero till crop then using a crimping roller to lay the mulch crop, just before seeding into it with zero till seeders.

The down side of non-toxic weed control is it uses a lot more fuel, takes more time and the need for cultivating machines to be built exactly to fit the same width and configuration of the seeders. The upside is that it isn't poisoning soil flora and fauna or leaving chemical residue that can potentially damage the next crop.

Klass Martins in New York State believes Glyphosate makes the weeds proliferate in the following season that it has been used because it has an antibiotic effect that kills soil life, when you plough the crop residue in. One example he gave was Lambs Quarter or Fat Hen, as we know it doesn't like mychorizal fungi, so these are greatly reduced where there are good mycorrhiza levels. He believes Glyphosate reverses that and kills mychorizal fungus, which leaves a soil conducive to Fat Hen, which is suppressed by mychorizal fungi. Whether that's true or not it's something that would have to be learnt from experience, but Klass is a very good producer and his yields are slightly better than conventional yields in an average year. In a dry year his yields are higher than his neighbours because of the moisture retaining attributes of humus. Though in a wet year he suffers a bit because of the same thing - Humus holding the Moisture.

Crop management tools:

- Refractometer: the most commonly used tool whether growing food or fodder. It measures the brix levels of the sap, which are the soluble solids (sugars). The higher the reading the higher the nutrition levels in the food or feed. Ideal is a reading of 12% or higher with a fuzzy line not a crisp straight line.
- One example of high nutrition paying off was in Nebraska. Del Akerlund grows organic corn with consistent high brix readings, he has a neighbour who fattens hogs and feeding them conventionally grown corn he was getting a 3 ½ - 4: 1 conversion ratio on Dels corn he achieved 2:1 conversion rate. 12 bushels/hog down to 7 ½ bushels/hog.
- PH Meter: used for testing sap PH. The ideal level is 6.4 PH if the level is too low eg acid, the crop will be susceptible to fungal attacks and is short of a cation (positively charged ion) eg Ca Mg K. If the PH level is high (alkaline) the crop will be susceptible to insect attacks and is short of an anion (negatively charged irons) most probably Phosphate, Nitrate of Sulphur. Also good for checking foliar spray water of the spray tank - slightly acid is better for most spraying situations and applications.
- Conductivity meter: measures the electrical conductivity of sap and soil solution also foliar spray solutions. Sap should be kept in the range of 2000 to 5000 uS. Foliar sprays at around 1500uS over 2000uS can cause burning.

Pest Management

The best pest management system starts by having the plant in balance, nutritionally with a high brix level. The pH should be at around 6.4 and the conductivity around 500Ec units. Balance minimises pest / disease occurrences.

Talked with Doug Murray on the 19/8/05 who has a masters degree in Entomology and now works with biological controls in a range of crops. Some of the products he spoke about were:

- Neem Oil for aphid control, he claims it kills up to 90% of aphids
- Karanja Oil for Insect control (mixed with Neem Oil)
- Pyrethrum for Broad Spectrum Insecticide

- Mint deters mosquitos
- African Marigolds ploughed in for nematode control
- Aromatic oils (cedar oil ect) disrupts insects signal system
- Apple Cider vinegar for fruit set at flowering %litres in 100l/Ha

Compost tea is another form of disease control – instead of working as a fungicide it has a probiotic effect, breeding aerobic microbes. From a good quality compost in an aerated tank, feeding them with molasses, fish, kelp, humic acids and plant saps like dandelion and Aloe Vera. Brew for 18 to 36 hrs then spray onto the foliage. The beneficial microbes need to colonise the leaf surfaces to out number and overcome the pathogens. Everyone that talked of these sorts of controls stressed that the Sap PH played a big part in a successful control.

Nutrition and Health

Healthy Soil, Healthy Food, Healthy People

Through out the trip many people talked about Food and Fodder and how it's grown and the effects on animal and human health.

Paul Stitt, Jerry Bruinetti, Sally Fallon (WA Price Foundation), Rodale Institute.

The theories that milk is milk and an egg is an egg came under fire a lot on my trip, with many people stating the obvious like Joe from Organic Valley Co-Op in Wisconsin "it's not common sense to say it doesn't matter how a plant or animal is fed or treated, it's all the same" It raises the question, do inputs have a bearing on the out come?

One of the main things that came out was animals must be grass fed or at least receive 25% of their dietary needs from pasture.

Cattle and Sheep only get CLA (Conjugated Linoleic Acids) from pastures which inturn store in their fat and is a powerful cancer prevention (Amino Acid) in humans is greatly reduced to non-existent in grain fed animals.

Grain fed animals have a higher monounsaturated fat content. Source: Weston A Price Foundation. www.westonaprice.org.

Vitamin A only occurs in grass eating animals not in fruit and vegetables (they only have Beta Carotene) that animals convert in their digestive systems to vitamin A, and then store it in their organs and fat.

Humans can't convert Beta Carotene to Vitamin A without the presence of fat dissolved vitamins and enzymes from consuming animal fats that have been fed on grass pastures therefore Vegetarians have a real need to supplement Vitamin A in their diets.

Vitamin A is needed for:

- Protein Assimilation
- Calcium Assimilation both of the above for proper growth
- Prevention of birth defects
- Proper function of glands
- Proper thyroid function
- Immune system function
- Production of stress and sex hormones
- Eyes skin and bones

Vitamin D is the other main vitamin, which the WAP foundation believes is very deficient in a western diet today, it is created by the sun on our skin and using cholesterol to assimilate it into out bodies. If you are working inside an office you should have full spectrum fluorescent lights, which will help, correct Vitamin D deficiency.

Vitamin A and D sources are, liver and organ meats, fish, fish eggs and shellfish, insects, cod liver oil, eggs, butter, cream, bird fats and animal fats.

WAP Foundation believes we must eat fats and that saturated animal fats are vitally important for maintaining health. 70% of Cholesterol is from polyunsaturated fats coming from vegetable oils, canola, palm oil, cottonseed oil, sunflower oil etc. They believe coconut oil to be the best with olive oil (pure virgin olive oil) next. Jerry Brunetti says cholesterol is an anti-inflammatory agent.

Paul Stitt, Jerry Brunetti and Sally Fallon believe a healthy diet avoids extremes to proteins, vegies, dairy or carobs, but a diet needs many varieties of fish, raw milk products, vegies, meats and unprocessed grains. The human body can't utilise

minerals like phosphorus and calcium without the presence of other substances, particularly fat-soluble vitamins and enzymes.

Jerry Brunetti stated that vitamin D is actually a hormone and is present in every cell of the body and the body can't metabolise calcium without it. He also says (quote) "Balance doesn't come from having one foot in hot coals and one in a bucket of ice." Protein diets, vegetarian diets and carob diets, etc are all extremes and not a way to promote vibrant health.

Paul Stitt says "Osteoporosis is a vitamin D deficiency not a Calcium deficiency" and they all believe that the major reason for heart disease, cancer, arthritis is actually a lack of nutrition principally vitamin A, D, and E, not a lack of pharmaceutical drugs. They also believe people should cut down on omega 6 intake and increase omega 3 intake. Omega 6 is high in vegetable oils, Cod liver oil is an excellent source of Omega 3. Eggs from hens that aren't grass fed are out of balance with the Omega 6, Omega 3 ratios. It is meant to be 1:1, but the Omega 6 can be much higher if they are fed wrongly. The hens also need sunlight. So free range birds that are shedded and fed pellets allegedly don't produce a good quality food source.

Raw Milk: the subject is quite controversial and it is illegal to sell unpasteurised milk, but the WAPrice foundation believes it is really important to consume raw milk for vibrant health and they have many facts and sufficient evidence to back up their arguments. Principally as the USDA's standard is SANITARY and UNADULERATED they claim pasteurised milk is an adulterated product. They claim raw milk contains a whole list of bio-active cultures that can eliminate bad bacteria, and is the safest food on the planet which are:

Lactoperioxidase - seeks and destroys bad bacteria, Lactoferrin. Polysaccharides, enzymes and anti bodies which give immunity for life, as well as medium chain fatty acids (polypeptides).

They claim that pasteurisation either inactivates or reduces all the beneficial microbes in milk. But leaves a few pathogens, so there is a void in which the pathogens can proliferate. They also claim that from feeding experiments on rats the main thing they 1st noticed was the rats temperaments changed and they were calmer and more docile. Sally Fallon said parents have said the same of their kids when fed Raw Milk, www.realmilk.com and westonaprice.org are some interesting web sites.

All the people I talked to claim huge amounts of minerals were lost in processed foods and the less refined the better.

WAP foundation had some disturbing facts about soy that can probably be viewed on their website.

Cayenne Pepper: is considered by Paul Stitt to be excellent for reducing pain of any kind and improving circulation, dissolving blood clots and clearing arteries and veins therefore reducing cholesterol, healing wounds and curing stomach ulcers. Stomach ulcers, he claims are caused by bacteria not acid food. It doesn't react with other medicines and can be taken in capsule form if you don't like chillies. I actually went off Warfin on the trip and started taking cayenne and natlokinase tablets and had no DVT reoccurrence.

Key people that I visited:

Paul Stitt: A biochemist and co founder and owner of Natural Ovens Bakery. Has written a book 'The real cause of heart disease…is not cholesterol'. Paul and his wife Barbara have introduced a healthy foods programme into schools and have seen the kid's behaviour change dramatically and believe good foods, good hydration and exercise is the right formula.

Jerry Brunetti: Agronomist and animal intuitionalist, was diagnosed with Hodgkin's Lymphoma 6 years ago and was given 6 months to live. He refused the conventional treatments and cured himself through his diet and lifestyle. Jerry does a lot of public speaking and has a DVD available entitled 'Cancer, nutrition and healing, a personal odyssey'.

Sally Fallon: President of the Weston A Price foundation and author of the book 'Nourishing Traditions'. The WAP Foundation was set up by Weston A Price a dentist who travelled around the world looking at the co-relationship between diet and tooth decay principally. He then noticed a correlation with diet and health, he wrote a book 'Nutrition and Physical Degeneration'. The foundation now actively promotes wholesome dietary habits and its health benefits.

Rodale Research Institute: has a research farm that has long-term experiments running with conventional and biological/organic farming methods. It also has a printing press where it publishes a lot of books on biological and organic farming and educational literature.

It was founded by JI Rodale who lives in the city and had failing health so he shifted to the country to grow healthy food and through his printing press promote healthy living. Because he wasn't a scientist he received no credibility so he employed scientists to work his research farm. His philosophy was "Healthy soil, healthy food, healthy people". They are now principally educators through the printing press but continue to trial new bio-control ideas and have replicated trials that have been going on for many years. They have been recently asked by the United Nations to advise them on organic production worldwide.

Marketing

The 2 main marketing systems from farms are, wholesale and direct retail with many different variations on each system.

Wholesale

Wholesale was either supplying, markets or retail supermarkets, with produce either seasonally or niche or some producers suppling 365 days and having farms in different growing regions to ensure supply.

This system relies on massive turnover for low margins and it is a lot easier to compromise on quality, as the focus is on tonnage and aesthetics rather than internal quality, flavour and nutrition. It is also risky if climatic conditions go against the producer in the growing season. As seen in Spain in the 2004/2005 winters where they had snow on the southern beaches and a bad run of consecutive frosts. Big companies supplying the UK supermarkets had to buy fruit in from California at a huge cost to themselves just to ensure their own market share for the season.

Economics is obviously the governing bottom line, but supermarkets are now demanding environmental assurances from producers because it makes their consumers feel good and there is a lot more paper work and recording required to stay in the market place.

The only incentive for farmers in Europe is they can keep selling their produce, though the Government for Environmental Protection subsidises them.

Farmers markets in USA

Retail – direct to the public

This system does really well where there is high population and the producer is in a close proximity to it. In most cases the consumer knows the producer or the product is personalised in other ways, photos, newsletters and pamphlets.

This is very successful in the eastern USA as it is densely populated so producers are never far from their consumer base. Farmers markets are common, for around 20 to 30 weeks of the year producers will come and sell their produce direct to the public, the public believes they are getting something more for their dollars, be it fresher, cleaner, organic or just more personal.

Some farmers I met used this to their advantage and had set up a box ordering system, where they would supply a box of mixed produce each week at a fixed price. Their customers would collect the box from a pickup point on a given day.

Depending on the scale of a producer they might use all the systems, with their bulk going to wholesale markets and then selling to specialty shops and restaurants as well as farmers markets and box order systems.

One such business was Harmony Valley Farms in Wisconsin USA, they grew a whole range of organic fruit and vegetables in an isolated valley and would sell wholesale to stores but only to ones that would educate their customers about the product, so they knew what they were buying and would pay a bit more for it.

They also went to Farmers Markets in Madison and Chicago once a week as well as running a Box Order System. They would store vegies to keep this running for as long as possible.

They would run a weekly newsletter for their Farmers Markets and box order customers containing recipes and information and nutritional value about their product. They believed in making the newsletter a light and fun education to their products not preaching to people.

Another example is from Ein Hatzera in the Negev Desert in Israel where I met a private farmer Nahum, he grows 1000 ton of Galia Melons in 2 by 1 month time slots per year, he exports 70-80% to Europe and sells the next grade to Israeli supermarkets with the 3rd grade going to the traditional markets. He has a flock of sheep in sheds so they eat any throw outs. There is no waste. His market is simply a niche time slot. Producing when the supply in Europe runs short.

Some other examples in Retail Marketing, I saw was in livestock. Ron Gargasz from Western Pennsylvania USA grows organic grass fed beef, had them butchered and cryvaced into individual labelled packages and sells them at farmers markets. He claims he received $2250 US/animal (approx $3000AUD) because of his marketing technique.

Joel Salatin from Poly Face Farms, Virginia USA grows organic chickens and butchers and packs them himself with family members employed. In the USA it is legal to kill up to 20000 chickens per year without being an abattoir if it is sanitary and unadulterated which the authorities have to determine. They pre-pack chicken

meat and sell direct to the public and to restaurants. His big advantage is high population. I believe Virginia is the most densely populated state in the USA.

Both systems have advantages; the deciding factor is where the population base is.

Conclusions and Recommendations

Balance doesn't come from having one foot in hot coals and the other in an ice bucket.

- To change to biological farming straight away will be really hard, economics must outweigh ideals or you won't be in business.
- Need to take it slowly, start by using a consultant or analytical lab that uses both the Albrecht and Reams method of soil testing, start using less acid treated fertiliser and more natural or high quality Fertiliser products.
- Work on conserving and building organic carbon levels in the soil by cultivation and timing methods.
- Producers need to be rewarded for high quality produce not only penalised for not complying.
- Governments need to reign in retailers who are profiteering not lean on farmers to clean up the environment, when the profits aren't.
- Reaching farmers pockets. Profits are staying with the retailers who want to pay less all the time for produce, forcing farmers to concentrate on yields and aesthetics rather than the functionality of foods and how it is affected by how they are produced.
- Good functional foods should be the best and most efficient health dollar spent, instead of going to farmers to do the job right it is going to pharmaceutical companies to treat a whole host of symptoms generated by poor diet and nutrition.
- Successful marketing gives people what they are looking for, either by niche time slots, or by having something that appeals to different mindsets, be it organic, fresh, or personal.
- Having the produce is one thing, to be paid a fair price for it is another thing and will become increasingly challenging as the world markets become more saturated with produce and dominated by chain retail outlets.
- To grow superior produce and not market it properly, defeats the purpose, it needs to repeat sales and personalising one's own produce is probably the easiest and most cost efficient way of ensuring consumers recognise your product and repeat purchase.
- The Environmental Assurance Legislation that is in primary stages in Australia concerns me because Australian Farmers have no environmental subsidies like all of Europe and USA. We are being fed the rhetoric that it's "an even playing field", but sadly what I became aware of, the more I travelled was that the scales are tipped against Australian Farmers.