



A Nuffield Farming Scholarships Trust

Report

Award sponsored by

Jill Willows NSch

**Understanding and
implementing sustainability**

Tim May

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CONTENTS

1. Executive summary	1
2. Introduction and background to my study tour	4
2a. Who is Tim May?.....	4
2b. From understanding land-values to understanding sustainability	4
3. Integrating sustainability into our family business	7
4. What my tour showed me about Sustainability	8
4a. Jacarezinho in Brazil	8
4b. What can I do on my farm?	9
5. Sustainable principles for my business	10
5a. Local Trade	10
5a.(i) Polyface Farms Inc. - USA	10
5a. (ii) International Free Trade.....	12
5a. (iii) How does international trade affect my business and how could local trade help?	13
5a.(iv) What can I do on my farm?	14
5b. Quality leads the way to profit	14
5b.(i) Polyface Farms - USA.....	14
5b.(ii) Leldet seed company ~ Kenya	15
5b. (iii) Hamish Grant ~ Kenya	16
5b. (iv) Albrecht soil nutrition ~ USA	18
5b. (v) What can I do on my farm?	18
5c. Pride	18
5c. (i) Precision farming in Southern Brazil.....	19
5c. (ii) No-Till in Tanzania.....	19
5c. (ii) British conservation	19
5c. (iv) Brazilian Conservation.....	20
5d. Looking after our people.....	22
5d. (i) Jacarezinho - Brazil	22
5d. (ii) Sotik tea out-growers Co operative ~ Kenya	23
5d. (iii) Brookfield Agriculture Pineapple Project –Brazil.....	24
5d. (iv) Polyface Farms Inc. - USA	24
5d. (v) Ranching in Central Kenya	24
5d. (vi) What can I do on my farm?	26

5e. Make the most of what we have before looking to expand.....	26
5e. (i) Polyface Farms Inc., USA	26
5e. (ii) John Landers OBE No Till Association – Brazil	28
5e. (iii) Ulyate family, Tanzania.....	28
5e. (iv) What can I do on my farm?	29
6. Are these principles sustainable?	30
7. Economic Sustainability	31
7a. Twenty first century paradigms	31
7b. A definition of economics	32
7c. Raw Materials Economics	32
7d. Keynesian economics.....	34
7e. Has trade liberalisation in poor countries delivered the promises expected?.....	35
7f. Vincent Vickers	36
7g. The history of prices and values.....	36
7h. Comparative advantage and free trade.....	36
7i. Attacks on price stabilisation	38
7j. Our connection with money and our requirement for surplus energy.	39
7k. Industrial agriculture and oil	41
8. Conclusions and Recommendations	43
9. Life after Nuffield	45
10. Acknowledgments.....	47
Appendix : Recommended reading.....	48

DISCLAIMER

The views expressed in this report are entirely my own and do not represent the views of the Nuffield Farming Scholarships Trust, my sponsor, my family nor of any of the many generous people with whom I was able to meet.



1. Executive summary

My name is Tim May and I am a 4th generation farmer from north Hampshire. I am married with two children and have recently become managing director of our family business, Kingsclere Estates Ltd. We farm 1000 ha of in-house arable land and are additionally involved with commercial and residential property rentals and the provision of venues for external events including weddings.

I originally applied for a Nuffield Scholarship because I wanted to find a direction for our business. I began with the opinion that we would probably have to sell our business at the end of my tenure as there are now so many family members involved. I wanted to look at how I could manage the land to increase its value so that when we did sell it would be worth a fortune.

As the study has progressed I have questioned this opinion and realised that it is possible to keep the business going down the generations, but we need a clear business plan that all concerned buy into.

I travelled to Brazil where there is a lot of investor activity; the US where the land market is fairly mature, and East Africa where I thought the market was going to be less established.

I asked questions around what could be done to make land, and the businesses land supports, more valuable than that of the neighbours, and focused on both the internal management and external macro features. I looked at a whole range of farming situations to find some commonalities.

As I discovered more, sustainability seemed to be a recurring theme, and this is what I have

focused my report upon. In particular I have considered Economic Sustainability because, of the three steams of sustainable development (Social, Environmental and Economic) this seems to be the least discussed, yet ultimately the most needed. This is because Social and Environmental considerations only seem to come into effect once a sustainable profit has been achieved.

In Brazil I found that many companies had a formal mission statement, and had established clear principles for their business. This was in line with the direction I wanted to take at home. I found a good way to start was to work out what is important to me and our business, then put these principles at the centre of the decision making process. Becoming a more sustainable business is the direction we want to take.

I see sustainability as recognising the cycles we are involved in and working to positively influence them.

My travels helped me to reflect and opened my eyes to different practices. I identified some key areas that would help guide us down the sustainability path. These are:

- ❖ Trading locally
- ❖ Quality leading the way to profit
- ❖ Pride
- ❖ Looking after our people
- ❖ Making the most of what we have before considering expansion of our land mass.

The report goes on to describe the experiences that led me to conclude that these areas of focus were correct for our business. I found I needed to:



- ❖ Get involved with the supply chain with a view to trading more locally
- ❖ Use Key Performance Indicators to measure quality
- ❖ Encourage transparency and openness, pursue privately funded conservation, and understand more about our area in order to regain some pride about where we operate our business
- ❖ Talk to our people and find out what they want and work out how to deliver it
- ❖ Measure and increase calorific margin, understand my soils and deal with the limiting factors, plus use environmentally responsible inputs in a bid to make the most of what we already have.

I realised that while these were all fine aspirations, it would be hard to perform a transition without having a reliable source of surplus money and energy. I wanted to understand more about this.

The answers lie in an understanding of economics.

Webster defines Economics as "The Science of Producing and Distributing Wealth".

Via reading around the subject of raw materials economics. I learnt that the economic problems of the UK - and indeed globally - stem from an unbalanced distribution of wealth within the economy and that all new wealth comes from the soil. Further reading described the requirements of balancing the value of raw materials against the value of finished goods to produce economic stability.

Vickers, once a governor of the Bank of England, wrote in his Economic Tribulation: "The world has never possessed a true and honest measure of value" ... and that this was

..."The principal irritant and restriction standing in the way of the world's economic progress, the happiness of its peoples and the achievement of a lasting peace."

I concluded that the only way to create a sustainable economic system - one that supports the population of this country and its environmental wellbeing - is through price stabilisation and the realignment of values within our economy.

Some other insights that I have gained are:

- ❖ ALL Money is a claim on Human Labour.
- ❖ Modern industrialised agriculture is purely about converting fossil fuel into food.
- ❖ Sustainability is a very human-focused activity. It is about understanding and respecting the earth's various cycles, and their interdependence between one another; then working so that we can continue to access the resources to create the surplus energy we need in which to thrive within this system.
- ❖ We exist in an economic system that needs to sustainably produce perpetual growth in a world where the resources required for this growth have been consumed at a rate faster than their natural cycles allow for.

Finally I drew six conclusions from carrying out my study. These are:

1. Principles-led organisations will continue to thrive and provide the answer for sustainable business.
2. There are many examples in global agriculture that give us the answers to sustainable production.
3. A shift in our paradigm* from the industrial revolution to that of the 21st Century is under way in some quarters.



4. Without Economic sustainability Social and Environmental sustainability is not possible.
5. A realignment of values is needed, bringing raw materials back in line with the value of finished goods and services, to provide economic sustainability.
6. Free trade might be the an option for providing sustainable economic conditions but only if there are standard social, economic and environmental regulations across the markets, otherwise free trade will exploit markets where such conditions do not exist.

**Paradigm means core beliefs and values.*



2. Introduction and background to my study tour

2a. Who is Tim May?

My name is Tim May and I am married with two children, Toby and Arabella. I am a 4th generation farmer from North Hampshire and have recently become managing director of our family business, Kingsclere Estates Ltd. We farm 1000 ha of in-house arable land and are additionally involved with commercial and residential property rentals and the provision of venues for external events including weddings.

I have been on the farm since leaving Harper Adams in summer 2004 where I studied Agriculture with Marketing at degree level. Prior to that I completed a Higher National Diploma in Agriculture and Animal Production, which had followed a National Diploma in Agriculture. I went to school at Brymore secondary technical college, a state run school with a strong land based leaning where, in addition to the standard subjects, I completed a GCSE in Agriculture. I guess you could say it's in the blood!

Since returning to the farm I have been busy looking at what we are doing as a company. On the farming side of the business I have been putting ever more emphasis on the health of our soils and have been pursuing



No-Till with varying success. More recently a chunk of my time has been spent working on moving our business from a family farm to a land-based operation: introducing corporate identity, branding, a website, and finally a business plan. Work is ongoing with the latter and initially involved our writing a mission statement. This has been an interesting challenge requiring our whole organisation to focus on what our business is and what we value about it.

2b. From understanding land-values to understanding sustainability

The original study topic for my Scholarship was "Understanding land values", and I intended to travel to Brazil, the US and East Africa to discover more about what different buyer groups look for when making a land purchase. I meant buyer groups such as

farmers, Investment companies, lifestyle buyers, and sovereign wealth funds. I was sure that each of these groups would have their own criteria to put in place when they made a decision whether to buy a piece of land, and how much to pay for it.



I started off in Brazil, a country I chose after doing some research about land investments. Brazil's name cropped up more often than that of any other country so it seemed an obvious place to go to find out what investors wanted from their purchases.

When I got to Brazil I discovered some themes that I found myself relating to more and more. All the investment firms were talking about **Sustainability** – that was the big word. After spending time at the beginning of my Nuffield Scholarship talking about **Sustainable Intensification** as brought to us by the Foresight Report, and then talking to an asset manager from Slaughter and May (prestigious international law firm) about **Sustainable Profits** being the buzz word in *his* industry, it seemed clear to me that there could be something in this word for *my* business as I looked to take it forward.

The premise for my topic choice went something like this: I find myself in a situation where the number of interested parties in our family business looks likely to increase as we move to the fifth generation, and it seems likely to me that the chances of a break up within the family, and therefore of the estate, are growing. If I accept that as fact, the best thing that I can do is to make sure that the process is as managed as possible. Therefore I need to identify what actions I can take to make sure that our family estate would sell for top price.

From that starting point I needed to put a plan together that would deal with growing the value of both the land and the business that farms it. I felt this would not only produce a valuable estate and farming business, but I would also create the opportunity for the estate to be able to carry any extra people it needs to in the next generation. I wanted to put a date on this to work back from so I decided on spring 2041,

at which point I will be 60 and the next generation would be 30 (plus or minus 5 years). This seems a perfect age for the next generation to take control, and for me to concentrate on other areas of interest.

So I was faced with two major projects: creating a business plan for 30 years, and doing a Nuffield Scholarship - what perfect timing!

When studying the companies I visited in Brazil I noticed two common factors: they all had a mission statement, and they all saw sustainability as the key to their future wealth creation. Throughout my travels I have been using land values as the conversation starter, and forming an opinion about sustainability as I have been going along.

The problem with this "sustainability" word is that it has become a bureaucrat's utopia. It is so easy for any person, or group, to bring "sustainable" into a sentence and then attract absolute attention because sustainability is viewed as some kind of holy grail for us all to aspire to. But not many people really seem to understand what it means and, of the few that do, the implementation of the supposed "sustainable practice" often seems to miss the point that it was originally supposed to address.

My best example of this is Countryside Stewardship in its many guises. Apparently it is sustainable to be paid by the government to carry out work that will create and conserve a "sustainable" habitat for the British wildlife. I personally disagree, for one single reason: **the economics do not stack up**. I have no problem with providing a habitat for wildlife and keeping that area designated for its enhancement but, by making this work reliant upon a debt ridden government is in my opinion foolish and completely unsustainable. What happens when the money runs out?



When budgets are tight, one of the first to suffer would surely be the butterflies budget. It is not a vote winner to preserve butterflies ahead of say, the NHS! This was an opinion that I held before embarking on my Nuffield experience so I will not dwell on it, but it does make the point that sustainability is complex.

Sustainability should be viewed as a three-legged stool, the three legs being Environmental, Social and Economic. Any proposal that doesn't address all three legs will ultimately fall apart. In the UK I believe that we have an extremely good understanding of our environmental impact, and the type of management practices that we can adopt. UK Farmers are aware of the advantages of beneficial insects and pollinators, more so than farmers in the other countries that I visited, and I doubt that the reader would gain a great deal from my reciting more of what we already know about environmental sustainability. The remaining two areas (Social and Economic) however, are much less reported in the UK, and these are areas where I hope to be able to inspire some new thinking from the reader.

I will briefly outline my findings on social sustainability from my travels.

Brazil was a particularly good place to visit to see social programmes in action, and what I

saw there certainly made me look at how we behave.

Kenya and Tanzania helped reinforce what I took from Brazil, and highlighted why it is so important to get the social side of development right.

The US was a fascinating experience where I saw a perfect example of how to get people involved with food production on a farm. Potential employees were interviewed to become interns, whilst 10 minutes up the road the farms couldn't manage to get people to work for them even if paid.

It was also in the US that I got an insight into what Economic Sustainability could look like. As this is the area where I will be showing us in the UK to be most lacking in knowledge or implementation, the majority of this report will cover this subject before finally making some practical suggestions for UK farmers.

If I can get this right and create something that is applicable then I feel the result will positively affect the value of my estate, and furthermore provide the foundation for the next generation to continue to make a living from the wonderful legacy that has been left to us by previous generations.



3. Integrating sustainability into our family business

During my Nuffield Scholarship year I have also been involved in a succession plan within our own family business. As part of this I felt that it was going to be extremely helpful to go through the process of creating Mission and Vision statements for our company. This would help me define a strategy for my tenure as Managing Director.

It is hoped that it will provide transparency within the family enabling them to see the direction of the company and feel some ownership of that direction.

This is something that I have wanted to do for a while, and after reading around the subject previously I found that some in-depth exploration needed to be carried out to discover the company's paradigm (core beliefs and values) before working out what sort of business we want it to be in the future. I understand this approach to business planning to be called Principles-Led Business Planning whereby an organisation steps back and sets itself some guiding principles that will help form the direction of the business. I first came across this idea after reading Steven Covey's *"Seven Habits of Highly Successful People"*.

We came to the conclusion that sustainability is going to feature strongly in our businesses

in the future and I found that many of my core principles were already in line with my understanding of sustainability.

As I travelled on my study tour I saw some great examples of sustainable practices, and I found that the businesses doing well had a clear vision of where they were going and what they wanted to achieve. Since working to gain an understanding of both sustainability and our economy, I have drawn two conclusions:

Sustainability is a very human-focused activity. It is about understanding and respecting the earth's various cycles, and their interdependence between one another, and then working so that we can continue to access the resources to create the surplus energy we need in which to thrive within this ecosystem.

We exist in an economic system that needs to sustainably produce perpetual growth in a world where the resources required for this growth have been consumed at a rate faster than their natural cycles allow for.

I will now detail some of the points I learned during my study tour.



4. What my tour showed me about Sustainability

4a. Jacarezinho in Brazil

It seems obvious to me that moving to a mentality that recognises cycles is a sensible direction to go. As soon as I started to look I saw these cycles everywhere.

My first visit in Brazil was to a company called Jacarezinho. This company had two holdings: one of 17000 ha in Sao Paulo state, and one further north in Bahia state which I visited. It was 24000 ha and ran 27000 head of cattle. The managing director of the company was Ian Hill, a man who moved from Berkshire to Brazil after finishing his studies in the UK. He fell in love with Brazil as soon as he arrived. Whilst working as a manager for a multinational landowner he got the feeling that there were better prospects for him and his family so he approached a neighbouring landowner with his vision for the Jacarezinho brand. At the core of his vision was sustainability, and you can see the nub of his argument illustrated in the graphic on the next page.

See graphic on next page, headed "Sustainability"

The business is run with massive attention to detail, and the management team repeat his mantra: "If you can measure it you can monitor it". The farm which I visited was focused on high quality bull production. Ian was sure that if he increased the quality of his herd, and increased the output per ha he would end up with a more sustainable system. He was not happy with the Brazilian classification system for beef cattle and particularly breeding bulls, so he invented his own called Delta G.

The key point in this system that Ian wanted to impress upon me was that there were thresholds in place. He didn't want to just keep going for bigger and bigger at the expense of other factors, he wanted to go for these thresholds and then concentrate on other factors. Temperament was an example. Ian had achieved the ideal bull in many terms. Now he wanted to work on temperament, as he saw that calmer animals were easier to handle, requiring less labour and they also had a better conversion ratio because they spent less time being stressed. This approach to measurement and monitoring seems very much in line with that required for measuring the sustainability of a business, as it deals with more than one variable.

Jacarezinho was a very people focused organisation. This was the first time that I had been exposed to an organisation that looked after its staff to this degree. All staff had to attend medical and dental checks each month, all the children were educated up to the age of 16 and they were given 1 litre of milk per day for children up to the age of 6. Jobs were found for the workers' wives cleaning and feeding the single men. Points were given for the best garden and tidiest house, which were then converted to money that could be spent on household goods or training. All staff went through an appraisal process, which also resulted in points converted into *Jacarezinho* money.

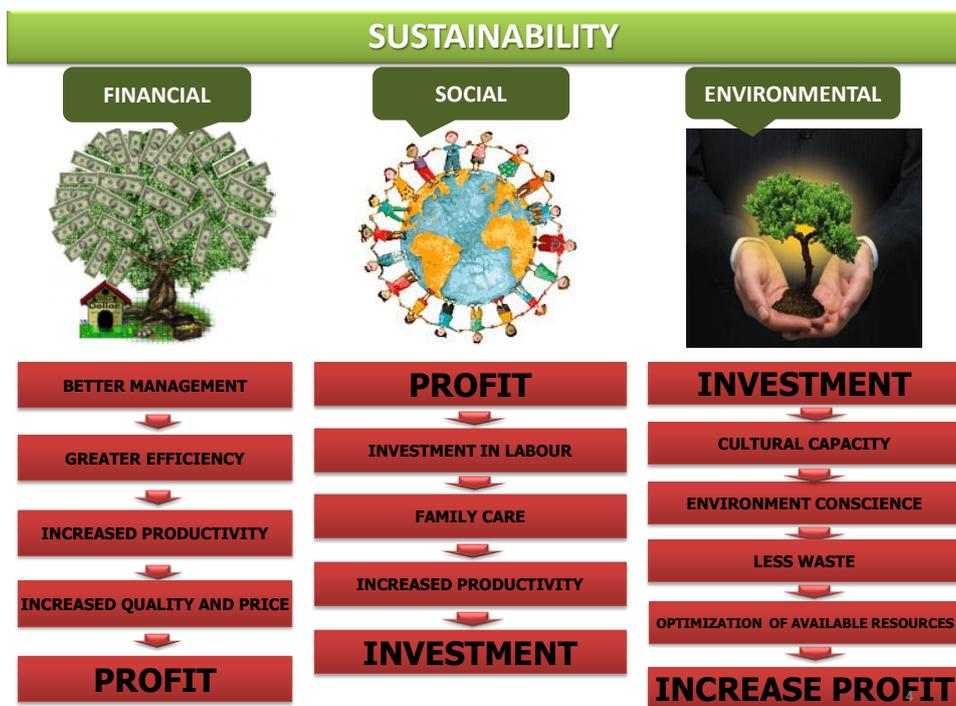


4b. What can I do on my farm?

Look at which cycles I'm involved with and how I can work with them, principally the Soil Food Web. Embrace Social and Economic cycles as well because ultimately none of this is possible without Economic Sustainability.

Consider Financial performance, Environmental impact and Social consequences together when making strategic decisions.

Below : A graphic illustrating the core argument of Ian Hill, managing director of Jacarezinho





5. Sustainable principles for my business

Every business will find it has a different set of principles. When I travelled it helped me discover what was important to me and the way I want to run my business. I found that I wanted to concentrate my efforts in these areas:

- Local trade

- Quality leads the way to profit
- Pride
- Looking after our people
- Make the most of what we already have before looking to expand.

The best way to explain what I mean by these headlines is to look at how I came to these conclusions.

5a. Local Trade

By trading locally it is much easier to influence the cycling of money. The advantage of trading with local companies is that it keeps the money local. It creates more local employment which as well as providing more money to buy produce from within the locality, also means that more local tax can be collected, thus reducing the local tax burden on everyone else. For example a national company pays all of its taxes back to the UK

whereas an international company will pay a certain amount of UK Tax, while other tax and labour payments will go outside the UK.

With anything local this question often arises: *"How do you define local?"* I think that the best answer to this is *"as close to your business as possible"*. I came across two situations where the concepts of local trade were highlighted to me.

5a.(i) Polyface Farms Inc. - USA

Polyface Farms is an American family-run farming business with an interesting story. I managed to get myself along to one of the field days which they run once every three years. They opened the door to 1500 people on this single day (all at a ticket price of \$100 per person), and attracted visitors from all over the US and further afield. The business has a set of guiding principles that help steer the direction of the business, and unlike many business with mission statements in place Polyface actually sticks to these principles and they work for the business. The Salatin family, headed by Joel, wanted to maintain their quality of life, and keep people working on

the land, hence the name Polyface (the farm of many faces).

Polyface Guiding Principles

TRANSPARENCY: Anyone is welcome to visit the farm anytime. No trade secrets, no locked doors, every corner is camera-accessible.

GRASS-BASED: Pastured livestock and poultry, moved frequently to new "salad bars," offer landscape healing and nutritional superiority.

INDIVIDUALITY: Plants and animals should be provided a habitat that allows them to express their physiological distinctiveness. Respecting and honoring the pigness of the pig is a foundation for societal health.

COMMUNITY: We do not ship food. We should all seek food closer to home, in our foodshed, our own bioregion. This means enjoying seasonality and reacquainting ourselves with our home kitchens.

NATURE'S TEMPLATE: Mimicking natural patterns on a commercial domestic scale insures moral and ethical boundaries to human cleverness. Cows are herbivores, not omnivores; that is why we've never fed them dead cows like the United States Department of Agriculture encouraged (the alleged cause of mad cows).

EARTHWORMS: We're really in the earthworm enhancement business. Stimulating soil biota is our first priority. Soil health creates healthy food.

A visit to Polyface farm is like reading Steven Covey's *"Seven Habits of Highly Successful*



People" only in this case it's real life, not just words in a book.

You can see in the Community principle the value that is placed on local trade and sticking to this principle is ultimately what put Polyface on the map. It was the writer Michael Pollan, who writes on food politics, including the "Omnivore's Dilemma" in which Polyface becomes a central theme, that did it. Pollan became interested in Polyface because they would not mail him a steak. They do not ship food. They have set themselves a market area of 4 hours' drive (as far as someone can come on a day trip). Joel says when people call from far away his standard answer is "Find your local land healing farmers and patronize them".

I can see the point of this, and it really made me think about my business in a different way. Out of interest I wanted to work out how many people I can actually feed from the land that I have. The simplest way of doing that was to look at how many calories I produced last year and divide that by 1 million. (2740 calories x 365 days). The answer was 21,500 people. That sounds a lot until I consider that I'm situated halfway between two towns with a combined population of 110,000, people with a further 140,000 in a third town within half an hour's drive, and that's not including the residents in the surrounding areas (in excess of 100,000 people). This is an indication to me that it would not be impossible to sell all of our produce into the local area. However, we don't grow the right crops to be able to sell our produce locally. The transition from a commodity producer to a local food producer will require a massive shift in our paradigm, which will also require

us to gain more knowledge. For us this is a long term aspiration, one that will need to be funded from within our business. Therefore we mustn't forget to be focused on profitability in order to fund a change in strategy. There are things that we can do in our current system to engage more with local businesses. We can choose who we buy from and sell to, and look to do business with those closest to us. This change in mindset should open up opportunities to produce for more local markets just by going out and looking for them.

For me one of the reasons that farming has moved away from mixed farming (the kind that is more likely to produce more local food) is because of the greater demands on labour. Good labour has been hard to come by in the past. Many of the jobs involved in producing local food are low skill, but even these low skill jobs have been hard to fill and get good quality reliable staff. We were unable to pay enough money to attract decent people, because the prices we were getting for our produce were not sufficient to pay the good wages, work only 40 hours a week, and still turn a profit. This is largely because the value of our agricultural raw materials is out of synchronisation with the value of our wages. We have a minimum wage, but no minimum price for our produce. Our produce is priced at the world price, but we have to pay our work force the UK rate. One is regulated and the other is not. This is a problem of international free trade. I don't want to disrupt the minimum wage, or labour welfare laws because they provide our citizens with a decent way of life, so the only way out of this situation is to realign the value of our raw materials to the value of our labour.



5a. (ii) International Free Trade.

Whilst in the US I wanted to learn more about the management of soil fertility and in particular the Albrecht system, which is a system that has been referred to in many Nuffield reports over the years. I wanted to understand the system as I felt it should make a difference to land value if the productive ability of the land was increased and I wondered if this programme might be an answer to that. I was advised by Neal Kinsey, the main voice of the system, to visit one of his keenest consultants in Maine. I took the trip up to see Alan Perry to learn more about the system, but ended up discovering as much about economics as I did about soil.

There is a similarity between the Albrecht system, and the economic lessons I was to hear about. The Albrecht system is about the balanced distribution of chemical elements within the soil's cation exchange sites and The National Organisation of Raw Materials (NORM) promoted a system of balanced distribution of wealth in the economy called parity pricing. They both involve measuring the components of the system and comparing them against a benchmark to identify elements that are out of alignment.

It was an attack on free trade, one that I had never even considered before. I always thought that there was nothing wrong with free trade. In fact I was extremely positive about free trade and the abolishment of subsidies. I had learnt a bit about the subject at college in an economics module and to hear a view contrary to that was challenging, mainly because it ultimately made sense. Wilken¹ noticed that raw materials were the

primer of the economy at the time there was a 1:5 ratio between raw material income and the national income. He also noticed that 70% of the raw material income was from agricultural products meaning that there was a ratio of 1:7 between agricultural income and national income. In other words, for every \$1 of agricultural income the national income would be \$7.

Wilken said, therefore, if we allow the value of agricultural products to fall below the costs of production of the country then we reduce the national income by 7 times that amount. The main reduction of agricultural income comes from allowing cheaper products to come into the country. One of the main reasons that production costs were higher in the US (in the 60s) was the level of regulation. The worker had a minimum wage and social security programs, while the importing country had none, or a lower level of this. Eventually the US economy would have to adjust itself to the cost levels of the importing country.

In East Africa, there are a host of poverty issues we hear about so often. What I saw was that there were two main problems: the amount produced, and the price paid for that production. In the rural areas more income is needed to address poverty, and that income comes from Production x Price. With more money in their pockets they can afford to send their kids to school, buy roofing materials, and clothing. Eventually labour division can take place and production capacity can increase. The thing that prevented there being more money seemed to be free trade. The price of maize was low because some was being brought in from abroad at below the costs of production in Africa. I heard stories of the double edged sword of famine crises. When there was a drought in some parts of Kenya and other parts had a surplus, the price of their products fell through the floor throughout the country, because free international aid crops set the price at zero. Everyone was a loser: those that

¹ Carl H. Wilken, one of the "Fathers of Raw Materials Economics" who died in 1968, was trained as an engineer during World War I. He transferred his methodical mode of thought and analysis to agriculture and economics during the Great Depression.



had half the crop due to drought got less than half the price for their produce, and those that had a surplus couldn't afford to ship it because there was not enough money to pay for the shipping costs.

Where a local market was established paying even a small bit more for the products, improved living standards could be seen. Whilst being driven through the southern highlands of Tanzania, this was illustrated by a change in building materials. In areas where income levels were higher, roofs were metal rather than the traditional thatch. Where there is a better Price x Production level, there are better living standards. A better price facilitated the reinvestment of some money into better seeds, which then increased the available income.

The African society has its own private social security system: if someone in the family has money they are expected to help out those without. My conclusion from this was that if there was more income around in general, social security would happen even without government intervention.

It was hard for me to comprehend the levels of corruption involved in the daily lives of the Kenyan and Tanzanian people, and that did lead me to wonder if the governing system would be able to deliver the introduction of something like import tariffs without the economic benefits getting swindled away. I was shocked to hear that the president of Kenya was on a better salary than Barack Obama, and that half of Tanzania's GDP is aid money. In that example I had to ask myself if

there was much difference between Aid and Debt: each increases the amount of unearned income in the system, increasing the price of goods and distorting the natural balance of the value of products and incomes.

Africa highlighted to me the reality of the service economy that the UK is supposed to have. I was in a town in western Kenya. In the past this town had a whole industry of making clothes, taking the raw material and adding value down the chain, resulting in clothes for the locals. This process employed many people and there would have been a trade turn from the price of the raw material wool or cotton, to the total income produced from the processing, transport, and services involved in the conversion into clothes. It's what happened to that industry that is the important part of the story. It disappeared simply because Oxfam set up a shop giving away second hand clothes to the locals. This wiped out the whole chain that went before and put those involved in it back to poverty and in some cases the Oxfam clothes were traded. Someone would buy them and then sell them and make a profit. This wiped out a whole host of employment opportunities along the chain, but did contribute to some national income.

I can see a parallel with the service economy that we are supposed to be in here in the UK. We just buy and sell stuff, but in doing so we have reduced our levels of required employment by not making anything. We can't afford to make much because we are undercut through the free trade mechanism.

5a. (iii) How does international trade affect my business and how could local trade help?

At the moment my business is not directly suffering as a result of these facts. I receive a subsidy which fills the gap between what I should be getting for my produce and what I actually do get for it. But it doesn't look to me as if we can expect the level of subsidies to remain at the current level, and when combined with the fact that I need to

constantly increase the amount of money I produce each year just to stand still in terms of wealth, I'm going to have to look for a way to increase my Price x Production. It also seems to me that in order to increase my price I need to take more control of the supply chain and I feel that I must concentrate



on my circle of influence which means trading within my local community.

It would be great to be able to change the way the economy works through lobbying, discussions and examples etc., but to do that I ultimately need a surplus of time and money, as well as a critical mass of likeminded people. It also seems generally accepted that a realignment of values is inevitable, either

through price protection or austerity. I can see that when that realignment starts to be felt in the economy the opportunities for producing goods in the UK will increase. The trouble seems to me to be that we have lost some of the skills and motivation to do this sort of work, which will put people like farmers, who know how to produce something useful, at a premium.

5a.(iv) What can I do on my farm?

Get involved with the supply chain; Investigate the companies that I deal with and find out if I could get the same products/service from someone more local. Speak to the buyers and tell them I have a local preference. Find out where my produce goes, and if a different product or service is needed.

5b. Quality leads the way to profit

I find this principle hard to explain, but the more I consider it the more I want to pursue

quality. I will again use Polyface Farms as an illustration.

5b.(i) Polyface Farms - USA

I first came across the above idea when reading the Principles of Polyface Farm. On their website there is a series of articles along the theme of *scaling up without selling your soul*. It is a sort of Ten Commandments for their business. The last one is what caught my eye: Quality must always go up. I have not yet seen an example anywhere of a situation where an increase in quality has not been beneficial to a business. I also feel that if I make it an objective to improve quality I will be in a really exciting business, always trying to do better without having a detrimental impact on those around me.

It's got to be more sustainable too, especially if the correct quality factors are recognised. Increasing the nutrient density of the products I produce is a good example. The higher the nutrient density, the less volume of food is needed to fulfil the nutritional needs, so more people are fed from the same amount of food. The better the quality of consumer products produced, the longer they last, and the less they need to be discarded and replaced. The better quality soil I have, the more I can produce with less disease pressure and chemical requirement. The better quality service we provide the more likely we are to have repeat business.



we've developed a list of directives. These would be different for every business, but let's look at them and at least appreciate that they represent innovative thinking in a western capitalistic business climate. I call these ethics-based contrarian business ideas.

1. No Sales Targets
2. No Trademarks or Patents
3. Clearly Defined Market Boundary
4. Incentivised Work Force
5. No Initial Public Offerings
6. No Advertising
7. Stay Within the Ecological Carrying Capacity
8. People Answer the Phone
9. Stay Seasonal
10. Quality Must Always Go Up

Polyface's "Ten Commandments"

5b.(ii) Leldet seed company ~ Kenya

I met up with Janey Leakey, founder of Leldet seed company in Kenya. This company is all about improving quality, and in this case Janey's mission is to improve the quality of the seeds that the Kenyan peasant farmers have access to.

Janey's sales technique was fantastic. Having produced the seeds, she needed to convince people that they were worth growing instead of home-saving the normal seed stock. She set up demonstration plots in the villages for the locals to see what was going on, then she waited for people to come to her having seen that the new seed was so much more vigorous and productive. This was in contrast to the way many of the aid agencies worked as they simply gave improved seed out and expected the people to understand what this new seed was all about. These systems didn't seem to have much longevity because the users of the seed had much less personal

interest in it. Often the first people to notice were the women and they were keen to try some seed, but unfortunately the men looked after the money. The culture is that the women have the metal change money to spend while the men keep all the notes. The women found it hard to convince their husbands that they should spend their money on some new seed.

Janey's solution was to reduce the package size making the seeds affordable to the women, who could now try a whole range of seeds and then later on, with their husbands, they could decide which seeds to grow on a larger scale. Janey was aware of the fact that many of her seeds could be home saved and multiplied throughout the communities, but she felt confident that the difference in quality would be the thing that would keep demand growing.



After three years of toil, Janey Leakey, a founding director of Leldet Seed Company in Nakuru, Kenya, can rest assured that improved varieties of underutilized crops like pigeon pea, sorghum, soya beans, chick pea and ground nut will finally be approved for production by the Kenya Plant Health Inspection Services. Breeders have historically faced many financial and bureaucratic hurdles in getting new crop varieties certified, and in the hands of farmers. But through an AGRA grant, Leldet has not only surmounted those hurdles, but also conducted more than 600 demonstrations to tens of thousands of farmers across Kenya. Its sales of small seed packs -- matched to the size of farmer's pocketbooks and acreage -- is raising yields and spurring demand for high quality, certified seed.

<http://www.agra-alliance.org/>

Website describing Janey's seed company

5b. (iii) Hamish Grant ~ Kenya

I stayed for a while with Hamish Grant, a dairy farmer based North of Nairobi. His focus was also on quality. He brought in genetics from throughout Europe, but mainly from Denmark, to keep his herd up-to-date. The cows were dipped once a week for ticks which gave the manager an excellent opportunity to keep an eye on the whole herd at one time. He watched every animal as it passed through the system and could quickly spot and deal with any animals that were not right, and investigate why not.

See photo on next page

Hamish used a mobile milking parlour which helped him to improve the quality of his pastures. By moving the parlour daily he knew there would be a concentration of manure from the collection area concentrated in a

particular spot. By managing where the parlour went he was able to increase the quality of his pastures, focusing in on areas of poorer fertility and moving the parlour there for the hooved muck spreaders to do their work.

Hamish was also keen to show me his ear tagging system which allowed him to keep track of the individual cow's performance. This measurement allowed him to focus on the quality of his herd and making the correct choices when it came to breeding selection. Although more commonplace in the UK this practice was leading the way in Kenya and the results by comparison with other local herds could be seen.

See photo on next page



Hamish Grant's race for dipping cows for ticks



Hamish Grant's mobile milking parlour



5b. (iv) Albrecht soil nutrition ~ USA

While in Maine discovering more about the Albrecht system, I was taken to see some potato growers. The season had been extremely hard with constant rain throughout the growing season. Hollow heart, a disease where the centre of the potato was hollow and not fit for sale, was a huge problem and some farmers had lost over half their crops. The growers who didn't suffer from this problem were using the Albrecht system, they were focused on the quality of their soils and had come out way ahead of the game.

As well as quality there is also a requirement for constancy and transparency of the processes involved. To achieve this consistency accurate measurements must be taken. This was the case with the Jacarezinho bull improvement system, and it was

reinforced by my visit to Bio Citrus in southern Brazil. This company dealt with the essential oils collected from oranges, tangerines and limes. The company extracted these oils from fruit collected in the region and it served as a market for the fruit that didn't make the grade for the supermarkets. Each batch of extracted oils were analysed with the individual components mapped, this then allowed the company to blend the various samples and produce consistency for the end market. As the end market for these oils was cosmetics and fragrances there was no room for inconsistent supply. The industry was hard to enter into because you had to have a proven track record of delivering a consistent supply of the correct quality before anybody in the market place would take you seriously.

5b. (v) What can I do on my farm?

Key Performance Indicators. To focus on quality I need to measure what I'm doing so that I can monitor and make improvement. Firstly I must work out what I define as quality and how I can measure it. These will become my key performance indicators. I have found it useful to write down all the things that I think I would like to measure without restriction, from counting the number of earthworms in a field, or songbirds in the woodland, to asking all our customers how satisfied they are.

The next stage is to work out what makes a good measurement. Again I feel that this is individual to each business. For us we want to be able to continue the measurement, so it has to be easy and not too subjective. It has to be meaningful and we want to limit ourselves to a maximum number of headline figures, also these may consist of other component figures. If these measurements work correctly they will steer our business in the direction that we want to go so they must give us that guidance, and relevance into the future.

5c. Pride

Business is about more than profit. There is a massive culture attached to each business,

one that attracts or repels stakeholders. The key to a sustainable business seems to me to



be a connection to the place where it is situated and the people around it. I want my business to be surrounded by people who are proud of it. This pride will lead to me dealing with happy and more contented people which in turn will help *me* to feel more happy and contented.

5c. (i) Precision farming in Southern Brazil

I spent four days driving from central to southern Brazil with Ademir Wendling of Baseap. This was a precision farming company he had set up, carrying out soil sampling and mapping and giving crop nutrition advice. As we drove along the area where he had a concentration of clients Ademir pointed out

I noticed while on my travels that the businesses that were at the front of the industry looked by far the tidiest with painted fences and mown driveways. I could immediately tell that the people were proud of what they were doing.

which farmers were his clients and which were not. After a while a definite pattern emerged and *I* was able to tell *him* which farms were his customers, as they were the smartest, tidiest and most professional looking ones.

5c. (ii) No-Till in Tanzania

This pride in their location leads the people responsible for managing the land to constantly try to improve things. I saw this in Tanzania on a farm where they had introduced No-Till. There was so much passion and pride about what they were doing that they were prepared to keep pushing the boundaries and discover more.

It's a big step to go to No-Till in the middle of Tanzania; you can't go down to the machinery dealer and buy a No-Till drill, you have to import one. You can't give your agronomist a

ring and ask his advice as there aren't any, - you have to call up people in South Africa to get advice or subscribe to magazines from the US. There isn't a club of No-Tillers to join and share experiences with because this farm is the only one within 10 hours' drive. You just have to be sure of yourself and proud of what you are doing and where you are. In a place where you can get 150mm of rain in 3-4 hours it is rewarding in a way to know that your farm is benefiting from the rain while on others the soil is being washed away.

See photo on next page – soil in Tanzania being washed away by excessive rainfall.

5c. (ii) British conservation

I have noticed here in the UK that the farmers who undertake conservation activities well, do so because they feel a true sense of ownership and belonging to the place where they live and work. As I travelled I realised that the UK farmers were more aware of environmental sustainability than others. We

understand the language of beneficial insects, pollinators and soil food webs better than the farmers I met in other countries. However I also saw that this environmental work doesn't have to be dependent on government subsidies, and that is particularly noticeable in Brazil.



Soil in Tanzania being washed away by excessive rainfall

5c. (iv) Brazilian Conservation

I was expecting to see lots of slash and burn and deforestation when I went to Brazil, but I didn't see any. Brazil is a big place and I didn't get close to the rain forest areas, but what I did learn while I was there is that the farming industry is, and has been for a while, responding to international criticism and seems to have some of the strictest conservation measures of any country I visited, including the UK.

Every single farm in Brazil must have at least 20% down to natural reserve and there is no payment for this, it's simply the law. If you farm in more sensitive areas the amount of reserve increases to as high as 80% in the rain forest. As well as this there were mandatory buffer zones around all water courses, and these increased in size as the water course got wider. In the early days of these regulations not much thought was given to where to site the reserves and there was very little

connectivity between the plots. There is now much greater planning for these areas and any new land use permits are only granted after the layout of the reserves has been fully agreed.

One company that I encountered had found a way to make some of this natural habitat pay. They had a plantation of rubber trees from which they were harvesting the rubber, but because this is a native tree it was fine to do so under the regulations. It was amazing to see this process which required such specially trained operators that 100 people go through the process in order to end up with 5 fully trained rubber harvesters.

Giving the environment and its management a commercial value must be more sustainable than grants and subsidies. The rubber tree harvest reminds me of a situation in the UK – the decline of hazel coppice. At one time the



great commercial reason to maintain hazel was for the creation of charcoal. However now there is little demand for charcoal, the coppice and the associated habitats have no

commercial reason to exist so they have declined. The same can be said for many other vital habitats including wildflower meadows and the cork plantations in the Mediterranean countries.



Harvesting rubber from native tree in Brazil

Continued on next page



What can I do on my farm?

Transparency and openness. There are already activities in place where I can show people what I am doing on my farm. By doing this I will find more pride in my farmland, and those around me will understand what it is that we do and why they can be proud to be involved. Open Farm Sunday is a good starting place for this work.

Privately funded conservation. The campaign for the farmed environment is all about promoting the conservation work that farmers undertake outwith the conservation schemes. Several times, with a bit of thought, I have been able to come up with conservation programmes that pay for themselves.

Take stock of the place. The more I know about my land, the more interested I become and I can then take pride in what I do. Every council in the UK has already done a lot of work looking at the landscapes around them. These are called “landscape character assessments” and they are a good place to start to get an understanding of how others see my land. County Offices have a historic department that will carry out an audit of the historic features of my land. These are all useful bits of information that help to give the landscape a story. It is also good to know how the landscape is used by others so that I can consider them in my actions.

5d. Looking after our people.

I hear over and over again that people are a business’s greatest resource, and I totally agree. However, they are more than that. They are our customers, friends, family and support network, as well as people who help us to run our businesses. When I think about

people with sustainability in mind I have to think about the cyclical relationships that are involved between people and my business, as opposed to the linear relationships which are more typically found in business today.

5d. (i) Jacarezinho - Brazil

I saw various examples of this cyclical way of thinking. Jacarezinho was a good example of a company looking after its own people with an excellent human resources program, and I saw further examples where companies reached out to those around them. In Africa

the use of out-growers was commonplace. The idea was that bigger companies got local farmers to grow some of their produce for them, and I saw examples of this in coffee, tea, and avocados.



5d. (ii) Sotik tea out-growers Co operative ~ Kenya

In the Kenyan highlands where there was a lot of tea production I visited Sotik Tea, a huge tea estate where as well as growing their own tea they took in leaves from the surrounding areas. They grew 12000ha of tea and employed 2-3000 people. They also took product from 73 farmers and 8 co-ops all of which was handpicked. This gave the local people a market for their goods, giving them surplus income to spend on improving their lives. The Sotik company spent time and effort working with the out-growers, showing them how to improve productivity through the use of new varieties, different growing techniques, and co-operation.

I met with Daniel Juma who was a retired school teacher now working on his 6.5 acre

farm on which he employed 4 people. With the help of Sotik he had set up a co-operative with a group of farmers. They had bought a truck to collect the tea within the area and transport it to the Sotik factory. The group of farmers received a better income selling their tea direct to the factory instead of going through a middle man. This extra money enabled Daniel to buy a small flour mill that attracted 50-70 people a week wanting to mill 2-6 kgs each.

Daniel was now busy trying to convince the younger people in the community to stay on the land, as there were better prospects for them than if they went to the town. The young people wanted to go to town because they felt it was a better place to be.



Top two pictures are of the tea harvest at Sotik tea and the bottom two are of Daniel Juma's farm.



5d. (iii) Brookfield Agriculture Pineapple Project –Brazil

In Brazil I was taken to a 400ha Pineapple growing enterprise that was facilitated by a big landowning investment company. The company worked with the local council to put together a scheme where local people could rent 2 ha of irrigated ground at a marginal

cost and grow pineapples. These were then taken to the town and processed, canned and sold. This gave the whole town an interest in the pineapple growing, as 50% (1000 people) of the population were involved in the total process.

5d. (iv) Polyface Farms Inc. - USA

A further example of looking after the people involved in the organisation was found – again - at Polyface Farms. They are in favour of incentivising their work force, and working towards a situation where instead of employing people, they partner with them. This they feel gives the workers more opportunity for earning more money. Where they employ people they pay a basic wage and add on bonuses and commissions. They prefer to allow the people who are doing the work to take more of the profit, instead of keeping most of it on the balance sheet and

handing the money to shareholders who haven't worked for it.

This is a similar situation to the John Lewis Partnership. When John Spedan Lewis realised that he and his father took home more than the combined salaries of the rest of his staff he set about putting a profit sharing scheme in place along with a constitution. That turned his staff into partners through shares distribution, giving them a say on the direction of the business. I learnt more about this when I visited Ian Dalton, the managing director of John Lewis's Leckford estate.

5d. (v) Ranching in Central Kenya

In Central Kenya I saw a different approach to looking after staff. The herdsmen were given a tin shelter to sleep in plus the latest cooking device. This was a clay fire place which concentrated the heat better than did an

open fire. There was nothing uncommon about this in the area, and the fireplaces were greatly appreciated. It taught me that there is no one-size-fits-all approach to worker compensation; it must fit into the system.

See next page for photos of Kenya



Herdsman's hut, Kenya



Complete with latest cooking device



5d. (vi) What can I do on my farm?

Talk to our people and find out what they want and work out how to deliver it. I found appraisals and community surveys to be useful. Listening is more important than talking. Seek first to understand before being understood.

Get involved in the local community: parish councils, scouts, schools, NFU, Young Farmers Clubs etc. The more I know the people around me the more chance I have of being able to make a positive impact on their lives

5e. Make the most of what we have before looking to expand

The very first conversation I had within the Nuffield Organisation was about Professor John Beddington's Foresight Report, and the now famous Sustainable Intensification. I'm sure that there will be few reports published this year without this term finding its way into them. For me it was a hard concept to grasp,

but as I have travelled I could see what the report was getting at. I have seen many examples of where growers have, or could have, increased the amount of calories they produce from their ground without it having a detrimental effect on the environment. In fact in many cases there was a positive effect.

5e. (i) Polyface Farms Inc., USA

The most memorable example of this type of work was at Polyface. As always with this farm Joel Salatin has his own way of describing things calling, his system "***mob stocking herbivorous solar conversion lignified carbon sequestration fertilization***"!

Polyface engaged in what I call "enterprise stacking", where different enterprises were carried out on the same piece of land. The rabbit breeding shed was one example. The rabbits were raised above ground level with chickens roaming around below. This had multiple benefits. The chickens ate the food and bedding that fell from the bunny boxes. They also scraped away at the manure which prevented the build-up of ammonia usually

found in rabbit sheds. As the chickens didn't require the space above ground level there was no impact on the stocking rate of the chickens, thus increasing the intensity.

Chickens were also used in the cattle pastures. They followed 3 days after the cows had been through the grass. The 3 days was important because this was when the dung beetle larvae were at their largest; by day 4 they had turned into beetles and would fly away. To get to the larvae the chickens had to peck away at the dung - the result was dung evenly spread across the pasture. The laying chickens only took around 10% of their diet from the grass/dung. The rest was in supplemented feed which was brought in



from local arable farms. The chicken muck from this extra feed fed the grass ready for the cows' return.

The woodlands were also enterprise stacked, this time with pigs. The pigs were moved through the woods every 3 weeks, disturbing enough undergrowth to break the dormancy of some wild flowers, but not staying so long as to do permanent damage.

They also had a special function in the early spring when the cows had vacated their winter housing. The farm would have spread maize in with the cows' bedding during the winter, so by the time the cows had moved out there was a goodly amount of fermenting maize seeds in the manure. The pigs were then brought in. They would go mad for the fermenting maize seeds and dig into the muck resulting in a much better composting process all for free.

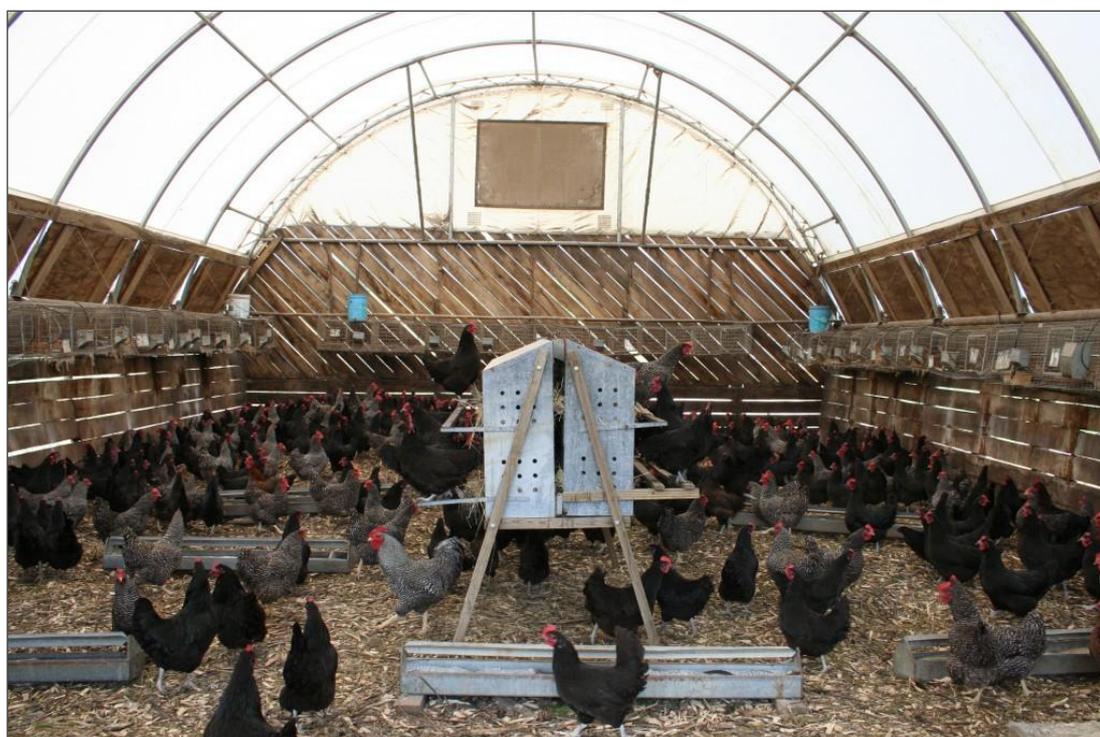
There were many other such examples at Polyface. They all illustrate one of the

messages that I got from reading about Carl Wilken (*first mentioned on page 14 of this report*): namely that livestock is free labour. It just needs feed, but no social programmes, school fees or holidays.

The best way to exploit the efforts of livestock seems to be to look at what they do in nature:

- pigs root around, so use them as cultivators
- chickens scratch so they make good harrows
- and cows move in large mobs so the system of mob grazing and concentrating their natural fertiliser works
- goats eat rough pasture and are excellent at rejuvenating degraded areas.

All of this free labour is available 24/7 for the price of a bit of care and attention and (sometimes) feed.



Chickens in polytunnel at Polyface Farms



5e. (ii) John Landers OBE No Till Association – Brazil

In Brazil I met with John Landers OBE. He was a founder member of the Brazilian No-Till Association and has worked tirelessly promoting No-Till throughout Brazil, and further into South America. He has seen how this technique has allowed farmers to grow crops where previously they couldn't. In the hotter areas it permitted greater moisture retention, and in the wetter areas it led to the

removal of the contour banks as a result of the greater water infiltration. No-Till also made it possible for farmers to grow two crops in a year in some places because of the greater moisture retention. He was starting to develop his research into agro forestry, growing crops and trees together. This would increase the productive output of the land through a process of vertical expansion.

5e. (iii) Ulyate family, Tanzania

In Tanzania the Ulyate family had recently taken on some ground in the southern Highlands after moving from Kenya. They managed to increase yields from 1t/ha of maize to 9t/ha maize in 3 years by yield mapping their harvested crops, identifying the

poor areas and then adding lime from 700 miles away. It is an extreme example but it does reiterate the difference that proper soil nutrient analysis and application can make to intensifying the productive capacity of land.



The Ulyate family direct drilling maize



5e. (iv) What can I do on my farm?

Measure calorific and increase margin. Everything we produce from farmland has a calorific value, as do all the inputs that we use to get those calories. A simple spreadsheet will give a total figure to start with and then, to improve that result, a more detailed analysis is required into which activities are the most energy efficient. We can then look at which activities pay the most for the surplus energy produced. Working to increase the calorific margin will result in our using our resources more efficiently, thereby extending the amount of time that we can access these resources and reducing our impact on their natural cycles.

Understand my soils and deal with the limiting factors. Good sampling and analysis is required to give a good picture of what is going on. I prefer the Albrecht and Reams soil tests as well as tissue analysis, as they seem to address more of the underlying issues than the straight NPK index system.

Use environmentally responsible inputs. Understand the impact that our chemical inputs have on the environment. Most of the time there are alternatives that are kinder to the environment. Also remember to understand the reason for using the input. If it is being repeatedly used because there is a greater underlying problem, consider sorting out the underlying problem. This will require more than one set of annual accounts to see the long term benefits.



6. Are these principles sustainable?

I believe that they are, and that the adoption of these principles will help me to deliver:

- ❖ Greater profits.
- ❖ Reduced environmental impact.
- ❖ Better lives for our people.

There is, however, a “but... “

I am more convinced than ever that it will not be possible for us to benefit from living better lives, and reducing environmental impact until global agriculture achieves greater and lasting profits. In my findings I have suggested that more local trade would be the way for me to achieve better profits.

This will still not deal with the underlying problem of poor raw material prices preventing large swathes of agriculture from making reliable or sustainable profits. As I progress down the route of local trade I will always be competing with cheaper imports of food calories. These imports are the problem. They are what set the price, and until this is understood the industry will fail to have the capacity to address some of the serious issues that face us today including those set out

below. A sustainable economic policy is the only answer.

Economic
National Debts
Slowing global economy
Inflation
Peak oil
Unemployment
Reduced savings
Exchange rate effects
Social
Income gaps
Feeding a growing population
Obesity and Starvation
Unemployment
Low nutrient diets
Poor pension provision
Terrorism
High prison occupancy
Environmental
Habitat loss
Species decline
Resource demand
Climate change
Water supply and purity
Carbon dioxide levels
Top soil depletion



7. Economic Sustainability

7a. Twenty first century paradigms

While travelling on my Nuffield study tour I have had plenty of time to read, and this reading has helped me form some new opinions.

The first new opinion was brought to me by Ray Anderson in his foreword to "Living Above the Store" by Martin Melaver. He explored

the paradigms (values) within the industrial system, and argues that they stem from the beginning of the industrial revolution some 300 years ago, and are still influencing the way the economy operates today. He called for a change in this mindset and set out what was required for the 21st Century. The chart below demonstrates his theory.

Current paradigm inherited from the 18 th century	Required paradigm for 21 st century
The earth is an inexhaustible source of natural resources. It is a limitless sink able to assimilate our waste, no matter how much	The earth is finite, both as a source and a sink. It has a carrying capacity for us humans and we are already exceeding it.
There will always be substitutes, the market will always find them.	There will come an end to the possible substitutes. The market is opportunistic, and dishonest, in its willingness to externalise any cost that an unwary, uncaring public will allow it to.
Relevant time frames for the consequences of our decisions are, maximum, the life of a human being; more likely, the working life of a human being; sometimes, especially in business, just the next quarter. In politics the next election.	We must at least think beyond ourselves and our time on earth, and of our species and all others, not just ourselves, over evolutionary time. We could adopt indigenous people's standard of 7 generations for a start.
The earth was made for humans to conquer and rule. We don't really need those other species except for food, fibre, fuel, and shelter.	Human kind was made for earth, not the other way around. It doesn't belong to us, we belong to it. Diversity of nature is crucially important in keeping the whole web of life going sustainable over evolutionary time.
Technology is all-powerful, especially when coupled with human intelligence, specifically left brained intelligence (practical, objective, numbers driven, results orientated, unemotional). These will eventually prevail.	Technology must fundamentally change. Technologies should be renewable, cyclical, solar driven, waste free, benign, and focused on resource productivity (not just labour productivity). The right side of the brain is at least as important as the left since it respects the human spirit.
Businesses exist to make a profit for their shareholders	Businesses need profit to exist. But they must exist for some higher purpose other than pure shareholder value.
The way to abundance for all is through increasing labour productivity. (Natural enough to think this way in the 18th century, of course, when people were the scarce resource and nature was bountiful).	The route to abundance for all must be through increased resource productivity – putting people to work using material resources more efficiently.
<i>Adapted from the foreword of "Living Above the Store"</i>	The greatest moral and ethical challenge for humanity is to lift the poorest among us out of poverty while healing our already damaged earth. <i>by Martin Melaver</i>



I found this to be a thought provoking piece of work, and the book itself to be extremely relevant to every business wanting to embrace sustainability. In it Melaver discusses how he has converted his real estate business into a sustainable business. He details the transition that his organisation made, and calls for us to go further than sustainability and work towards restoration. He also talks more about how he delivers social and environmental sustainability in his community through his business activities.

7b. A definition of economics

Webster in his definition of "economics" defined the cycle as **"The science of producing and distributing wealth"**.

My reading around the subject of raw materials economics suggested to me that our current economic guidance fails to understand this science. It explained that the debt problems that we are facing globally are a result of poor wealth distribution caused by the uneven distribution of value placed on raw materials compared to finished goods.

It highlighted to me that we are not in debt because there is not enough money in the

What he fails to do is talk about economic sustainability beyond the realms of running a business to make a profit. I discovered this book near the end of my study and the bulk of my reading was in the area of Raw Materials Economics. I realised early on that delivering social and environmental goods was only going to be possible if there was some sound economic practices going on.

system, we are in debt because the *distribution* of money is wrong.

Sustainability is about balancing cycles of all sorts:

- Life cycles
- Nutrient cycles,
- Energy cycles
- and Money cycles.

The only explanation of a balanced money cycle that I have found centres on the understanding of raw material economics.

7c. Raw Materials Economics

This is a body of work was carried out by Carl H. Wilken who called himself an economic analyst rather than an economist. He made this distinction because his opinion was formed after analysing the economic record of the United States for more than 20 years, and he did not write any recommendations until after that study. He analysed the position of the economy by working out the yearly national income of the country and said that

all the trading activity could be placed into 6 segments.

1. Payrolls
2. Farm proprietor income
3. The income of small business
4. Rentals
5. Interest
6. Corporate Profits.



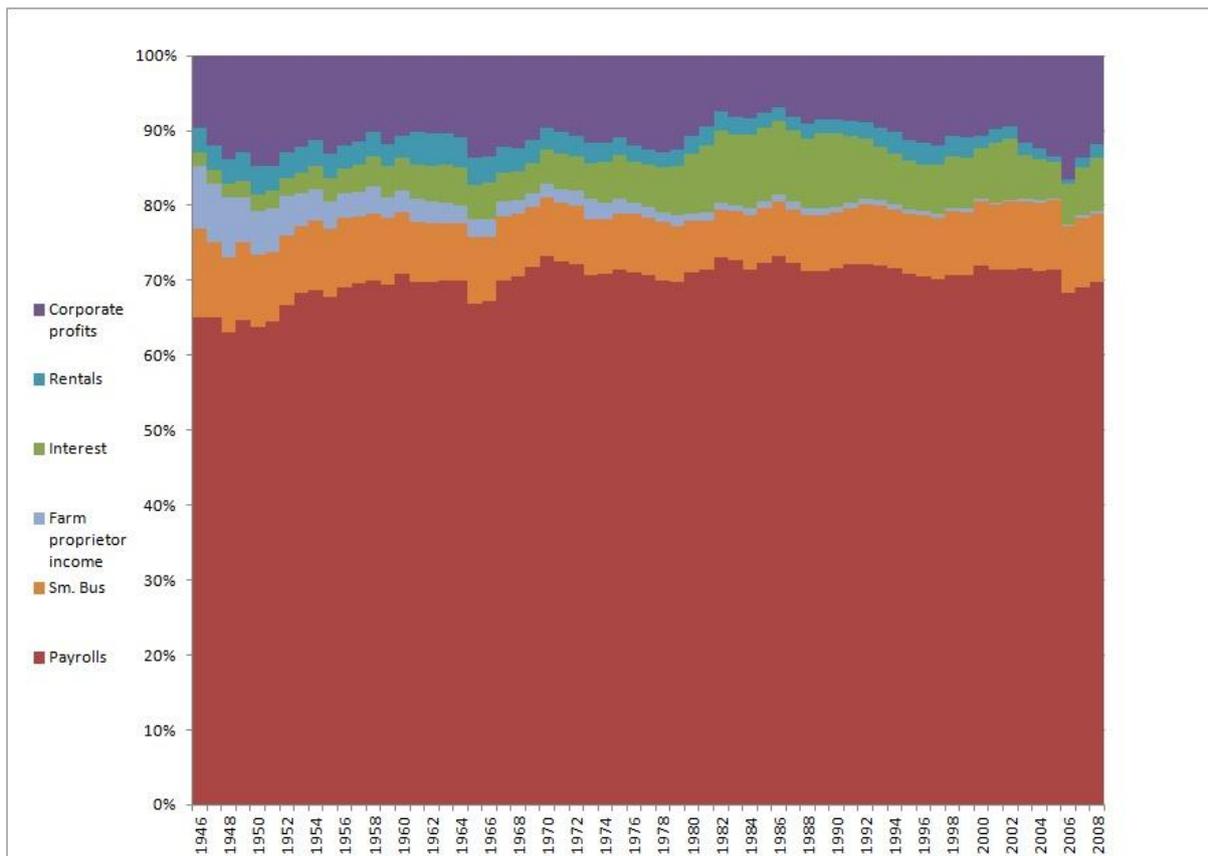
The first three represent for all practical purposes the monetary return for personal effort. Payrolls include all workers receiving their income from wages or salaries. The income of the farm operator and the small business units come under number 3, self employed.

The total income of the three groups should represent approximately 80% of the national income.

The next three groups represent returns from capital investment and should total 20% of the national income. This 20% approximates to the operating profit of the United States as a huge corporation and becomes available for investment in capital goods.

Wilken goes on to explain how the US uses the 20%, and then explains the importance of keeping all of these 6 segments in balance with one another.

The table below shows the percentage of each of these 6 segments in the national income of the US. It shows that the 80/20 rule has been fairly constant over time, yet the way the 80/20 is made up has altered. Notice how interest payments have increased while farm income has diminished. The Interest is a good indication of the level of debt in the system, and Wilken's argument is that it has occurred because of a failure to maintain the value of farm incomes relative to other segments within the economy.



My chart using figures from Carl Wilken's literature and updated by NORM showing distribution of money from 1946 to 2008

The key differences between Wilken and other economists of the time, including John

Maynard Keynes, are twofold; firstly Wilken analysed the figures while Keynes developed



theory, and secondly Wilken and Keynes differ on where the new wealth required to run the US each year came from.

Wilken published "ALL NEW WEALTH COMES FROM THE SOIL", an 80-page booklet that he distributed throughout the governing agencies of the US in 1957. In it he shows how

raw materials are the first stage of the economic cycle, and that failure to recognise this fact leads to economic confusion.

The difference between this stance and Keynes's General Theory is this acknowledgement of where wealth creation begins. There are 5 rules of raw material economics which, if followed, would allow us to enjoy debt free consumption of all finished goods.

These **5 Rules Of Raw Materials Economics** provide a basic understanding of the process of human wealth creation. (Charles Walters *Unforgiven*)

1. The **amount of raw materials** removed from nature becomes **humanity's potential wealth**. The potential wealth of the materials **determine the number and value** of jobs available to produce, transport, process, manufacture, distribute and retail **finished products made from these materials**.
2. The **values** placed on raw materials **determine** the amount of **money** that can be paid for the tools and services used to produce raw materials and **controls the price** and volume of tools and services **purchased by raw materials producers**.
3. Tools and services **purchased by raw materials producers** and the tools and services purchased by other people during the same **economic cycle** becomes the original method of **job creation** and manifests all the wealth necessary to **purchase all finished goods**.
4. A **fair balance** between the value placed on **raw materials** and the value placed on **finished goods** automatically creates **healthy markets** and manifests the **wealth** required to **purchase all finished goods**.
5. The **act of production** times the **fair value of production** ($AoP \times FVoP = \text{wealth}$), or the proper relationship between **production and price**, manifests **all the wealth necessary for the debt free consumption of all finished goods**.

7d. Keynesian economics

Keynes promoted man-made devices for stimulating national income, including government spending, control of interest rates, adjustment of exaggerated contrasts in the level of income, and an increased public sector.

He saw capital investment into buildings, infrastructure and state-of-the-art advancement as the way to stimulate income. This, basically, is delivering Wilken's 20% operating profit without earning the money to pay for it. This has been the way that the US economy has been run since the adoption of the



Keynes's economic theory in 1951 plus its more recent adaptations.

One problem with this course of action is that it never deals with the problem of continually servicing an ever ageing and compounded debt, and that it requires extra borrowing to work. This extra money that enters the economy is unearned income and has no means of being paid back so we will always be living on borrowed capital and have a compounding level of interest to pay back. It also increases the value of all finished goods away from the value of raw materials.

Although much of this work is based in the US we can see similar patterns emerging in Europe since the change of European policy in 1985 away from protectionist practices.

I have struggled to collate information for Europe and the UK mainly due to difficulties in two areas. Firstly I have been working hard to fully understand this body of work and knowing where to start looking for the numbers has been hard, and secondly not being able to put across this theory well has caused problems when I ask economists for help. This is a challenge to what they have learnt and written about for so long so when I spoke to them about an economic system I didn't fully understand it was easier for them to say that what I was talking about was not the case any longer and wouldn't work.

The main answer I have received is that because we are in a service economy raw materials don't matter any longer. This is an answer I have struggled with.

7e. Has trade liberalisation in poor countries delivered the promises expected?

In his paper "Has Trade Liberalisation in Poor Countries Delivered the Promises Expected?" Tony Thirlwall, Professor of Applied Economics at the University of Kent (<http://www.kent.ac.uk/economics/staff/prof/iles/tony-thirlwall.html>) finds that countries couldn't industrialise without some form of protectionist regime, and later that the service industry will struggle to deliver full employment. In a critique of Keynes's theory he says that it fails to deal with underemployment and creating the conditions for extra employment in the economy. His main explanation for this was that when countries opened up to free trade, the balance of payments worsened as there

was a greater influx of imports than of exports.

I'm sure that the UK situation is now very similar to the one that I have described in the US, particularly when I consider the level of subsidy that the UK and rest of Europe need to give agriculture to keep it afloat. Raw material prices must be already at an unsustainable level requiring 3/4 of agricultural net income to come from subsidies to provide an economic surplus for the industry. There is a general acceptance that we need to increase our manufacturing activities and Thirlwall argues that protectionism is required to stimulate that.



7f. Vincent Vickers

Vincent Vickers, Governor of the Bank of England between 1910 and 1919, wrote an Economic Tribulation in 1941 in which he looked at the British economic system and commented on the errors of its ways. <http://www.scribd.com/doc/36985699/Vincent-Vickers-Economic-Tribulation>

In it he noted : **"The world has never possessed a true and honest measure of value"**. He also stated that the lack of an

honest measure of value in terms of money has been. **"the principle irritant and restriction standing in the way of the world's economic progress, the happiness of the peoples and the achievement of a lasting peace"**.

Although this was written seventy five years ago, much of what was written in this tribulation is as relevant as ever.

7g. The history of prices and values

In fact I found it fascinating to learn that the argument between free trade and value stabilisation has been running for hundreds of years, Thorold Rogers's **"History of agriculture and prices"** shows the effect of Henry VIII's debasement of the coinage when he needed to raise extra money for his war efforts in 1542. Prices doubled between 1541 and 1556, the first time they had done so since the record began in 1490.

The Foreword of **"Unforgiven"** by Charles Walters goes to great lengths describing the trade relationships between Britain and America and the various swings between free trade and Import tariffs from the beginning of the American colony.

St. Thomas Aquinas (1225-1274) was probably one of the earliest on record to talk about the economic concept of **"Just price"**.

"The just price is a theory of ethics in economics that attempts to set standards of fairness in transactions. With intellectual roots in ancient Greek philosophy, it was advanced by Thomas Aquinas based on an argument against usury, which in his time referred to the making of any rate of interest on loans."
Wikipedia

This concept was later accepted and improved by the French Physiocrats (1694-774), although there are references to the correct valuation of goods and services as far back as the bible, as well as in Greek and Roman civilisations.

7h. Comparative advantage and free trade

Free trade relies upon there being a difference between the costs of production of a product in one country over another. This allows us to purchase or sell according to our

strengths. It also allows us to purchase goods for the cheapest price possible.

Economist David Ricardo explained the concept of comparative advantage in 1817 in



his book "*On the principles of Political Economy and Taxation*". The problem is that some of the things that affect our costs of production are manmade and for the UK to gain comparative advantage in some manufacturing areas it would have to look at how we deal with some of the social and regulatory conditions that set us apart from others including:

- *Taxes*
- *Non tax fiscal measures, for example, control of interest rates*
- *The state of the currency*
- *Exchange controls*
- *Overall Government expenditure*
- *State Subsidies*
- *Industry and trading standards, official and otherwise*
- *Public sector employment*
- *Transport costs*
- *Public ownership*
- *Defence*
- *Direct and indirect Government intervention*
- *Copyright, trademarks and patents*
- *The moral and social climate*
- *Practical cultural barriers such as the difficulty of a language*
- *Dumping*
- *Transport cost*
- *Working hours*
- *Trading laws*
- *Labour laws*
- *Wage rates*
- *Bureaucratic differences*
- *Company laws – particularly the attitude towards foreign ownership*
- *Banking laws*
- *Banking system*
- *Social policy – welfare, health and so on*
- *Physical infrastructure*
- *Honesty of public servants*

- *Foreign policy*
- *National strategic considerations*
- *Education – the amount spent, school leaving age, curriculum*
- *Limited liability*
- *Environmental laws*

Some of these conditions are actually what make us British yet, for free trade to work at its true comparative advantage, all of these conditions would need to be equal around the world. Either we would need to alter - for example - our working hours, labour laws, and environmental laws to match the global rate, or the rest of the world would have to match our conditions.

I don't think that either of these two scenarios is likely. We won't throw away minimum wages or health and safety regulations - why should we? Yet the rest of the world cannot afford to suddenly improve their standard of living to match ours, partly because they have a comparative advantage in not doing so. In free trade the cheapest product sets the world price, so to compete we have to continually reduce our prices to remain competitive.

If to reduce our prices we need to reduce our standard of living society has failed to progress. There is nothing great about cheapness. Cheap goods mean cheap labour, which means low wages, which mean less money to purchase goods and pay taxes, which means lower living standards. The extreme of this is 100% production at zero price as everybody tries to undercut to get a sale.

This may be acceptable in business where the organisations that fail to produce a profit go bust and are replaced by new ones, but when we are talking about countries it is a different matter.



I feel that ...

The only way therefore to create a sustainable economic system, one that supports the population of this country

and its environmental wellbeing, is through price stabilisation and realignment of values within our economy.

7i. Attacks on price stabilisation

The US parity pricing system which is discussed in great detail in the Raw Economics literature is constantly attacked because it relied on a base period of 1910-1914. The main argument is that farming was different back then as there was less technology and lower productivity. The comeback to that is that the rest of the economy has enjoyed an equal amount of productivity and technological gains so the ratios remain the same.

Another attack is that the fixing of prices is a socialist activity and will lead to communism. Wilken's reply to that was that his system delivered people's capitalism giving them the ability to make a profit. He referred to the current system as state capitalism.

If this is true it is important to consider what capital is. Webster defines capital from an economic point of view as **"a stock of accumulated wealth, specifically, (a) the amount of property owned by an individual or corporation at a specified time as distinct from the income received during a given period, (b) A stock of accumulated (economic) goods used to promote the production of other goods instead of being valuable solely for immediate needs or enjoyment."**

In this sense, as Wilken wants to create the conditions where every citizen can make a profit and have savings (capital), his is potentially more capitalistic than our current

system. We see increased levels of government control of capital through the expansion of national debt, which is a blanket mortgage against future earnings of citizens. This has been done through years of inflation. As an example of how the capital system had transferred from the people to the state he wrote:

"In 1929 the US had a gross national product (GNP) of \$104.4 billion with government spending (purchases) amounting to \$8.5 billion (approximately 8% of GNP). In 1955 the GNP totalled \$387.4 billion with government spending \$75.9 billion (approximately 20% of GNP)". Wilken called for government to "reduce these levels and to pay off national debts releasing capital into the channels of private enterprise. State capitalism breeds inefficiency and dictatorial control of personal freedom. As no group of planners in a state controlled system can have the knowledge of conditions at local levels of operation so necessary in deciding the use of capital in expansion, the best judges are the people in the local areas and their bankers, with capital accumulations belonging to the people in the community."

A further argument is that if we protect the prices we will end up with surplus grain mountains and milk lakes etc. The reply to this is that records showed that when parity pricing was introduced production did not increase. Any surplus that did arise was



towards the end of the period when import restrictions were relaxed allowing cheaper raw materials to undercut the home produced materials and distorting the market.

Some also say that people will produce more when there is a better price, but again the record showed that production was pushed less, as farmers could make a living without

having to push production so much. I would argue that this could be more sustainable, for if we could make enough money farming the easier land we would probably put the tougher land into fallow, or woodland or a game bird cover strip, thus providing environmental habitats without a social cost of subsidy.

7j. Our connection with money and our requirement for surplus energy.

Whilst travelling on my Nuffield Scholarship I have been forced to reconsider my connection with money. I have discovered **Money is a claim on human labour**. After all, money is used to facilitate the barter of one person's efforts for another's. This makes national debt a lot more relevant to me and our future generations, and makes me want to know to whom we owe the debt.

Money also has a close link to energy because barter can only happen once humans have a surplus of energy. If a society only produces enough calories to survive then that's all they do. It is only when there is a surplus that society can start to get more complex. Britain has produced a surplus of energy for hundreds of years, and it was this surplus that allowed her to perform so well compared to other places in the world.

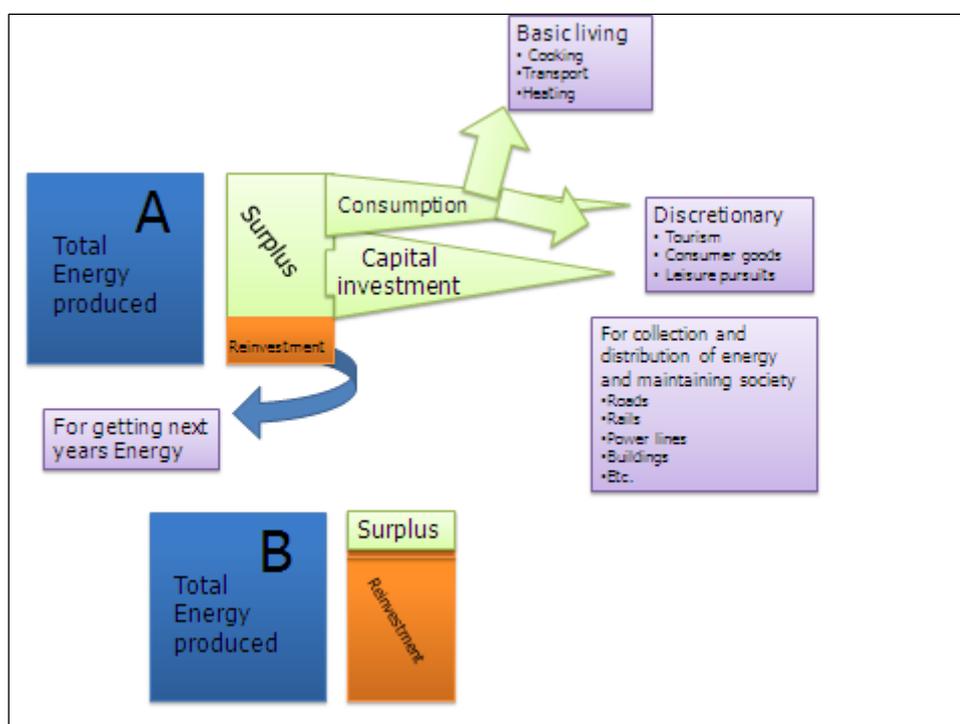


Chart showing how we use the energy that is produced, and the importance of the level of surplus energy over reinvestment energy

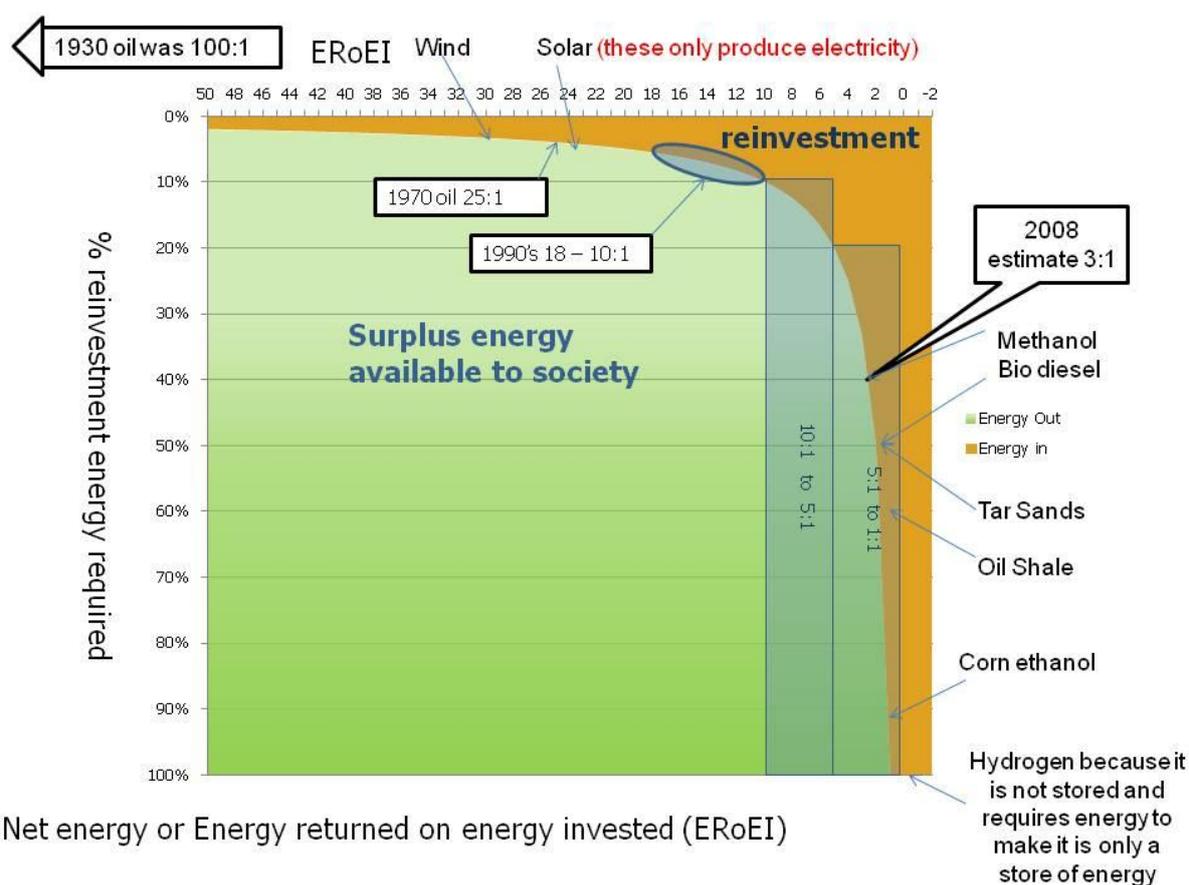


When describing the importance of surplus I could easily at any point replace the word “money” with “energy”. The measure for this surplus is called Net Energy and is calculated by taking the Energy Returned divided by the Energy Invested (ERoEI).

The graph below plots the amount of energy required to create a surplus at various different ERoEI ratios (along the top line). It is interesting to note that the difference in the % of reinvestment energy required for a ratio of anything from 100:1 to 10:1 is only 10%, yet between 10:1 and 5:1 there is a further

10% reinvestment energy required, and from 5:1- 1:1 there is an 80% jump in the level of reinvestment needed.

If we convert this to money the word we would use is gearing. This graph makes me want to know more about the ERoEI performance of my business to help me understand how risky my enterprise profile is, as my core business (agriculture) is really about producing an annual new supply of usable energy - which is where all new wealth comes from.



Amount of energy required to create a surplus at various different ERoEI ratios (along the top line).



7k. Industrial agriculture and oil

However, some commentators would question how renewable our current Industrial agriculture is because of its reliance on fossil fuels and mined resources. Saying that, **industrial agriculture is purely about converting fossil fuel into food**; an interesting perspective as we consider the prospects of declining oil reserves and a growing demand for food.

I quote:

"Ever since we ran out of arable land, food is oil. Every single calorie we eat is backed by at least a calorie of oil, more like ten. In 1940 the average farm in the United States produced 2.3 calories of food energy for every calorie of fossil energy it used. By 1974 (the last year in which anyone looked closely at this issue), that ratio was 1:1. And this understates the problem, because at the same time that there is more oil in our food there is less oil in our oil.

A couple of generations ago we spent a lot less energy drilling, pumping, and distributing than we do now. In the 1940s we got about 100 barrels of oil back for every barrel of oil we spent getting it. Today each barrel invested in the process returns only ten." Richard Manning "The Oil We Eat: Following the food chain back to Iraq"
<http://www.harpers.org/archive/2004/02/0079915>

Another quote:

"The Green Revolution increased the energy flow to agriculture by an average of 50 times the energy input of traditional agriculture. In the most extreme cases, energy consumption by agriculture has increased 100 fold or more.

In the United States, 400 gallons of oil equivalents are expended annually to feed each American (as of data provided in 1994). Agricultural energy consumption is broken down as follows:

- 31% for the manufacture of inorganic fertilizer*
- 19% for the operation of field machinery*
- 16% for transportation*
- 13% for irrigation*
- 08% for raising livestock (not including livestock feed)*
- 05% for crop drying*
- 05% for pesticide production*
- 08% miscellaneous*

Energy costs for packaging, refrigeration, transportation to retail outlets, and household cooking are not considered in these figures.

In a very real sense, we are literally eating fossil fuels. However, due to the laws of thermodynamics, there is not a direct correspondence between energy inflow and outflow in agriculture. Along the way, there is a marked energy loss. Between 1945 and 1994, energy input to agriculture increased 4-fold while crop yields only increased 3-fold¹ Since then, energy input has continued to increase without a corresponding increase in crop yield. We have reached the point of marginal returns. Yet, due to soil degradation, increased demands of pest management and increasing energy costs for irrigation, modern agriculture must continue increasing its energy expenditures simply to maintain current crop yields".

Source : "Eating Fossil Fuels" by Dale Allen Pfeiffer



http://www.fromthewilderness.com/free/ww3/100303_eating_oil.html

Other similar work can be found here...

<http://www.energybulletin.net/node/17036>

<http://www.feasta.org/documents/feastareview/quenther.htm>



8. Conclusions and Recommendations

- 1. Principles-led organisations will continue to thrive and provide the answer to sustainable business.**

I have found Steven Covey's "Seven Habits of Highly Successful People" to be a useful guide in creating a principles-led business. Start by taking stock of yourself and what you value in life then structure your business around that.

- 2. There are many examples in global agriculture that give us the answers to sustainable production.**

We need to be motivated to adopt a different strategy one that is more respectful to our planet. Change has to start by exploring our core beliefs and values, often referred to as our paradigm. Change without reference to the paradigm will be short lived and ineffective.

- 3. A shift in our paradigm (values) from that of the industrial revolution to the 21st Century is underway in some quarters.**

There are many sustainable business opportunities in the market place that farmers should seize particularly around renewable energy production. But keep an eye on Net Energy production as a true measure of performance.

- 4. Without Economic sustainability, Social and Environmental sustainability is not possible.**

People who are struggling to make ends meet do not have the surplus of energy to worry about the environment and social problems. The only way to deliver the required changes is to have an economy where the values of all goods and service are balanced with raw materials producing reliable returns that allow for innovation, and respectful business practices.

- 5. A realignment of values is needed, bringing raw materials back in line with value of finished goods and services to provide economic sustainability.**

An investigation into the economic performance of our country should be carried out to identify a base period. This will be a time when the net national income was positive, employment was around 98% and yearly borrowings were negligible. In the US this was 1910-14 with 2 further periods identified up until 1951 when its government borrowing and debt took off.

Continued overleaf



- 6. Free trade might be an option for providing sustainable economic conditions but only if there are Internationalised social, economic and environmental conditions and regulations, otherwise free trade will exploit markets where these conditions do not exist.**

These conditions don't exist and it is unlikely that they will. The best course of action will be to manage the price of raw materials entering our economy, so they match the value of our raw materials.



9. Life after Nuffield

My Nuffield Scholarship has given me the opportunity to stand back from my day to day life and take stock of what I truly value, both in my life and in my business. I have learned more about economic cycles than I ever thought I was going to, or needed too, and gained a better understanding of this "sustainability" word that has been branded about so much.

I have drawn conclusions and recommendations that leave me in a quandary as to what to do next. Clearly government policy and direction will not change overnight. A serious disaster is needed to act as a catalyst for that sort of change. However I fail to watch the news or read the paper without at least once saying to myself (or my wife) "if the values within that country's economy were balanced that issue wouldn't exist". Until I learn otherwise this is my position.

The trouble is that we live in a country whose values are out of balance, and I want to survive in that environment. There are a number of reasons that make me feel that the UK is the best place for me and my family to live, so moving to a country that is more aligned with my position is out of the question. I just have to understand the economic rules of the UK and play the game.

The game seems to be that I have to keep growing the net income and reserves of my business keeping ahead of the true level of inflation. I feel that 7% growth in net income per annum is a good starting point. This is best done through natural growth and with as little input from external investors as possible. I am sure that working with nature will provide me with the answers to increasing net income and reserves.

My course of action for our business will be one of transition from global commodity producer to local energy supplier, which will be in the form of food and fuel. This transition will not happen overnight, and it must be profitable all the way through or it will fail.

My early actions will be to continue to work with nature's natural soil cycle. I'm at the very beginning of this journey and the more I understand the soil and respect it, the more rewards I will reap. I will continue to reduce the amounts of straight fertilisers I apply, looking to use recycled products where possible. I have an idea that anaerobic digestion could help me with my nutrient supply and organic matter requirements as well as providing energy in the form of a fuel. I need to understand more about the interaction of the inputs that I use and the soil biology, and how any negatives can be avoided or compensated. I feel sure that this work can be done whilst still providing a profit at world commodity prices, but I need to keep focused on the market place to look for opportunities to place my products in higher value markets. I am certain that many of these opportunities will involve a more local supply chain, and that if I enter these markets with a consistently improving quality of product and service my presence in the local markets will increase.

Socially I have opportunities for people to make an income for themselves without it costing our business much in lost revenue. In fact I think that some of these opportunities will increase our output. I am working with our local wildlife trust to put in place a scheme that works with the Not in Employment, Education, or Training element of our local town (NEETs). We would allow



them to use some spare ground to grow vegetables to sell back to their communities, and in return they would give me, for example, a week's worth of conservation work a year, planting hedges and creating other habitats.

We will also look at our relationship with our tenants, as it is currently very linear: we send them a bill, and they pay it. I'm sure that if we interacted with our tenants more we would find that there were opportunities that would be beneficial to both sides. We need to realise that the more successful they are, the safer our rental returns are. I also think that we need to create a situation where it is a privilege to rent either a business or a residential unit from our company, so that the tenants have a pride in their unit, keep it tidy, and we have a waiting list.

Environmentally I will continue to work towards a situation where I have a business reason to maintain the conditions needed for the natural fauna and flora to thrive. We already have a financial reason for hares to exist on our estate, as we charge the public to watch falconry which depends on a healthy hare population. We must therefore do what we can to make sure the leverets (young hares) survive.

The introduction of 6 meter legume strips around all our fields could provide ample feedstock for a small 50kw AD plant, and provide a great habitat around our field edges. This approach would mean that the 6 meter pollen and nectar strips are viable in their own right, and being of legumes the resulting digestate would be harvested nitrogen, reducing our bagged nitrogen usage.

Until our economy becomes balanced again, British agriculture will always require subsidies. I have found that this balancing will come about through two methods: either the costs of production reduce, or the value of raw materials increases to accommodate the costs of production.

I have also found that while we pursue free trade, our costs of production will always have to compete with the lowest costs of production in the global market place. The problem with this is that to achieve these reduced costs of production we will have to reduce our standard of living to match that of those producing the lowest cost products. This message needs to be heard and understood by our population if we are to address our current financial situation in a way that maintains our standard of living. I will continue to explore this value balancing, understand how the decisions of our government will impact on us, and ask questions of those representing us. The US has the National Organisation for Raw Materials doing this, and the UK should have a similar organisation. This is something that I will pursue as I find a nucleus of like-minded people.

I will continue to enjoy spending time with my family, and wherever possible encourage my children to ask questions and discover as much as they can about our planet. One of my biggest regrets is that I can walk into a woodland habitat and not tell which birds I'm listening to, or which plants I'm looking at. I don't want my children to grow up without this knowledge and respect for the world around them.



10. Acknowledgments

- I must thank The Nuffield Farming Scholarships Trust and In particular Jill Willows for sponsoring me on my Scholarship.
- My wife Sharon is my rock, not only looking after our son Toby whilst I've been away, but giving us our beautiful daughter Arabella as well.
- My Dad and the rest of the staff at Kingsclere estates have kept the business running better than if I were around.
- Mum, and everyone else who has had the massive job of reading, re reading and then reading my report again.
- My fellow Nuffield Scholars who have supported one another through the process, each interested in what the other has discovered with true and sincere interest in learning something new.
- And last but not least all the many hosts in the countries I visited, who showed me their businesses, shared their philosophies and were so generous with their time and hospitality.

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Appendix : Recommended reading

Books

“The Seven Habits of Highly Effective People”, by Steven Covey

“Breaking the Code of History” by David Murrin. <http://www.breakingthecodeofhistory.com/>

“Who Owns the World?” by Kevin Cahill. <http://www.whoownstheworld.com/>

“Unforgiven: *The American economic system sold for debt and war*”, by Charles Walters
<http://www.acresusa.com/books/closeup.asp?prodid=754&catid=27&pcid=2>

“Raw Materials Economics”, by Charles Walters

“All New Wealth Comes from the Soil “ by Carl Wilken

“In Defense of Good”, by Michael Pollan. <http://michaelpollan.com/books/in-defense-of-food/>

“Our Turn to Eat : *The story of a Kenyan Whistle-Blower* “ by Michela Wrong
http://www.harpercollins.co.uk/Our_Titles/Pages/Home.aspx?objid=37000

“Organic No-Till” by Jeff Moyer
<http://www.acresusa.com/books/closeup.asp?prodid=2022&catid=6&pcid=2>

“Holistic Management”, by Allan Savory with Jody Butterfield

“Stuffed and Starved”, by Raj Patel <http://rajpatel.org/2009/10/27/stuffed-and-starved/>

Websites

National Organisation for Raw Materials (NORM) :<http://www.normeconomics.org/>

Polyface Inc. : <http://www.polyfacefarms.com/>

Jacarezinho : <http://www.agrojacarezinho.com.br>

New Economics Foundation : <http://www.neweconomics.org/>

Kinsey's Agricultural Services : <http://www.kinseyag.com/>

Joseph E. Stiglitz : <http://www.josephstiglitz.com/>