A Nuffield Farming Scholarships Trust Report

Award sponsored by

The National Trust

Building a Sustainable Farm Business

Jonathan Brunyee

October 2016

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NUFFIELD FARMING SCHOLARSHIPS TRUST (UK)

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A Nuffield (UK) Farming Scholarships Trust Report

Date of report: October 2016

"Leading positive change in agriculture. Inspiring passion and potential in people."

Title	Building a Sustainable Farm Business
Scholar	Jonathan Brunyee
Sponsor	The National Trust
Objectives of Study Tour	To explore how we can build a sustainable farm business that values our environmental, human and social assets, with a specific focus on: 1. What are the main management and financial challenges facing farm businesses? 2. What is a 'sustainable' farming business? 3. Is sustainability the correct goal or should we be seeking more? 4. Do we really value our environmental and social assets? 5. Which agricultural management practices and entrepreneurial approaches extract value and which ones add value? 6. What is the role of CAP, government and NGO support – successes and failures? 7. What is the potential role for payments for ecosystem services and other natural capital reward initiatives? 8. What can smaller more extensive farmers learn from larger intensive businesses, and vice versa?
Countries Visited	France Belgium USA Canada Italy Romania China Hong Kong
Messages	To build a sustainable farm business and industry we must: 1. Tell our story and celebrate our industry 2. Put soil health first 3. Celebrate the role of small farmers 4. Nurture people 5. Seek outcomes not output, effectiveness not efficiency 6. Build diversity and complexity 7. Seek regenerative agricultural systems 8. Move to a true cost paradigm The challenge for the industry is to build new integrated policies and mechanisms for farming, food and the environment that deliver the full range of public goods. This will take time, clear thinking, leadership, communication and a decent budget. Brexit, which none of us saw coming at the start of our Nuffield Farming experience, should now be seen as an opportunity to build a more sustainable, dare I say, regenerative system that works with nature, not against it.

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DISCLAIMER

The opinions expressed in this report are my own and not necessarily those of the Nuffield Farming Scholarships Trust, or of my sponsor, or of any other sponsoring body.

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1. Executive Summary

I grew up on a Nottinghamshire arable farm. From a young age I believed that food production and the environment must go hand in hand. I practise this belief on my own organic and pasture-fed farm in the Cotswolds, my wife and I working closely with our landlords and sponsor, the National Trust.

My Nuffield Farming journey allowed me to study various models for building a sustainable farm business, valuing our environmental, human and social assets. While travelling through Romania, USA, Canada and China, plus on trips to Italy, France, Belgium and Ireland, I explored the concept of sustainability, and met with a range of inspirational eco-entrepreneurial farmers and pioneering academics.

Our ecosystems and natural resources are being continually depleted. We are far from achieving a sustainable level of existence and development, and travelling the globe has confirmed this to me. Agriculture and our food chains are, whether we like it or not, a major culprit.

However, our wonderful industry also has many of the answers, and I witnessed great examples of practical farming and pragmatic programmes that deliver. Within the regenerative practices of Joel Salatin at Polyface Farm in West Virginia, the farming systems trials at the Rodale Institute, and the work of organic entrepreneurs Dan and Tincuta Cismas in Transylvania, I saw hope.

My conclusions fall under eight key themes. To build a sustainable farm business and a future proof industry we must:

1. Tell our story and celebrate our industry
2. Put soil health first
3. Celebrate the role of small farmers
4. Nurture people
5. Seek outcomes not output, effectiveness not efficiency
6. Build diversity and complexity
7. Seek regenerative agricultural systems
8. Move to a true cost paradigm

This report offers recommendations for the industry and my sponsor. I also consider what next for my farm and my academic role at the Royal Agricultural University.

The challenge for the industry is to build new integrated policies and mechanisms for farming, food and the environment that deliver the full range of public goods. This will take time, clear thinking, leadership, communication and a decent budget. Brexit, which none of us saw coming at the start of our Nuffield Farming experience, should now be seen as an opportunity to build a more sustainable, dare I say, regenerative system that works with nature, not against it.

2. Introduction

2.1. First roots

My pioneering Flemish ancestors first arrived in England in 1626 to drain the Eastern Fens and to farm. The Brunyee family have turned the soil in Yorkshire and Nottinghamshire ever since.

From a young age, although I knew I wanted to farm, I also knew that I didn't want to be part of an industry that I perceived to be heading in the wrong direction. Growing up amid the intensification of farming in the 1970s and 80s, I witnessed my father removing hedgerows, draining wetland, and ploughing up pasture; and the sad demise of mixed farming. Flocks of lapwing, once common, never returned. Crops were sprayed indiscriminately from the air, the labour force diminished and we over-produced commodity product for a distant, unconnected and ailing consumer.

Although as a teenager I loved harvest and tractor work, I also busied myself by planting trees and digging ponds wherever I could, and badgering my production-orientated dad and elder brother! This early passion for the farmed environment led me to inspiring written work by Jonathan Porritt and James Lovelock, an interest in food system reform, and a degree in Rural Resource Management from Seale Hayne. I later studied Environmental Management for Business and Commerce at postgraduate level in Sheffield.

My first proper job was as an adviser with the Farming and Wildlife Advisory Group (FWAG) in Lincolnshire working on the original Countryside Stewardship Scheme. I then worked for the Peak District National Park and The National Trust. Things go full circle it seems.

2.2. Back to my roots

I have been at Conygree Farm as a tenant of the National Trust (the UK's largest conservation-focused land owner) for over 11 years now. Mel, my wonderful persevering wife, who previously helped manage some of Norfolk's finest nature reserves with sheep, cattle and semi-feral ponies, moved to the area in 2010, and now runs the farm with me and our young family.

We have recently been awarded a new 20-year farm business tenancy giving us the security to invest and grow.

Figure 1: The author, Jonathan Brunyee, with his wife Mel

Conygree is something a little special. Forming part of the Trust's Sherborne Park Estate in the heart of the Cotswolds, the farm is 75ha of organic grass and arable land managed for farmland birds, bees and butterflies, as well as premium 'pasture fed' meat which we sell from the farm door. Rare breeds

(original population Hereford cattle and Cotswold sheep), local food, resource conservation (air, soil, water and carbon), diversification and educational visits are also part of the mix.

If the farming life wasn't hectic enough I am also a Senior Lecturer teaching farm business management, food chains, farm diversification and sustainable agriculture at the Royal Agricultural University (RAU) in Cirencester. Inspiring tomorrow's land managers is crucial and I love the job.

2.3. Becoming a Nuffield Farming Scholar

I was honoured to be awarded a Nuffield Farming Scholarship in 2015 sponsored by the National Trust. Over the last 18 months I have been lucky enough to travel around the world looking at how farmers like me can build a sustainable and regenerative business based on natural and social capital, and how my views and ideals sit in a world struggling to feed itself.

It has been a wonderful year and a half. My highlights include meeting with farming heroes Joel Salatin, Gary Zimmer and Michael Ableman in North America, and discovering the work of Wendell Berry, Penn State University and the Rodale Institute. Spending time with peasant farmers working the limestone grasslands of Transylvania and learning about the initiatives being tested on The Burren in Ireland also stand out. The World Expo in Milan and the fascinating extremes of Hong Kong and China add to my journey.

While a Nuffield Farming Scholarship enables a Scholar to travel abroad and find out, hands-on, about industry practices and perspectives, implications and developments, it is more than that. Being a Scholar means being part of a diverse international community. The passion and thoughts of fellow Scholars help expand one's own views and opens up new opportunities. The times spent with my cohort from the UK, Ireland, France, Holland, Australia, New Zealand, Canada and Brazil at the Contemporary Scholars Conference in Reims in February in 2015, and since, will never be forgotten.

2.4. This report

This report is a permanent record of my travels, observations and development experienced during my study tour. It is written chronologically, as a travelogue, allowing the themes to develop and emerge through narrative.

My Nuffield Farming experience does not stop and start when crossing the channel or boarding a plane. I have visited some amazing farms, engaged with various events and organisations, and met a range of inspiring people in the UK this year. They are all crucial to my Scholarship narrative and learning, and will be touched on in my report as context.

Similarly, my Nuffield Farming experience does not stop with this report. I now have more questions than when I started and an even stronger desire to make a difference. The journey will continue and this report will be developed upon in the future.

2.5. Study background

The world's soils, ecosystems, biodiversity and natural resources are being continually depleted. Climate change is upon us. Whether we like it or not, agriculture and our food systems are major culprits. At the same time we have an industry that is experiencing continued declines in profitability and viability - despite a plethora of Government and EU initiatives, decades of CAP support payments and a move to diversify and get closer to the disconnected consumer. Fewer farmers are expected to produce more food for a growing population and levels of depression within the industry are high.

I am passionate about farming and the natural environment, believing that for the two to thrive they must go hand in hand. For the future of society we must farm with nature and not against it, aiming for a more sustainable suite of farm business models and paradigm change. I believe enterprise and entrepreneurship have an important role to play here.

2.6. Study aims

The overall aim of my study was to explore how we can build a sustainable farm business that values our environmental, human and social assets.

The key questions that I sought to answer were:

1. What are the main management and financial challenges facing farm businesses?
2. What is a 'sustainable' farming business?
3. Is sustainability the correct goal or should we be seeking more e.g. regenerative agriculture?
4. Do we really value our environmental and social assets?
5. Which agricultural management practices and entrepreneurial approaches extract value and which ones add value?
6. What is the role of CAP, government and NGO support – successes and failures?
7. What is the potential role for Payments for Ecosystem Services and other natural capital reward initiatives?
8. What can smaller more extensive farmers learn from larger intensive businesses, and vice versa?

My personal and career development goals were to:

1. Learn more about the industry I love at global level.
2. Challenge how my views and ideals sit in a world struggling to feed itself.
3. Seek potential solutions, however small, so I can offer a better strategic contribution.
4. Explore new ideas for my farming business.
5. Develop my knowledge to benefit my teaching and research activities.
6. Grow in confidence.
7. Spend time away from farming, family and teaching to allow deeper reflection.

2.7. Geographical context and study tour Itinerary

The geographical context of my study was as follows:

- Many of our most precious landscapes, rich social communities and areas of high natural value rely on active farming for their creation and future. Such landscapes e.g. Dartmoor and the Yorkshire Dales, are termed High Nature Value Farming (HNVF) areas. My aim was to visit at least two designated HNVF areas in Europe during my Nuffield Farming journey. I chose **The Burren in Ireland** and the Carpathian Mountains of **Transylvania in Romania.**
- There is so much to learn from the **USA.** We share many of the same issues and make many of the same mistakes. When planning my trip I knew I wanted to visit the heart of policy making in Washington DC, Nuffield Farming friends in Pennsylvania and Joel Salatin at Polyface Farm in West Virginia. This focused my US leg on the East Coast.
- There is much to see and inspire in **Canada.** The work on food strategy in Vancouver and sustainable farming on Vancouver Island were of great interest to me.
- When considering farming, food and environment one cannot ignore the rise and demands of **China**. My Nuffield Farming study concluded with a trip to **Hong Kong** and Shandong Province, and included 2 weeks of teaching at the Shandong Agricultural University.

A detailed list of where I went and when, plus key activities, is shown in the table below:

Study Tour Itinerary

Country	Date	Venue
UK	February 2015 3 days	Birmingham - NFU Conference London - Houses of Parliament
Belgium and France	February 2015 1 week	Brussels - EU parliament Reims - Contemporary Scholars Conference
Romania	June 2015 1.5 weeks	Cluj Napoca - Eco Ruralis Saschiz - Fundatia Adept Saschiz - Transylvania Food Company Saschiz - Hugh Williamson Topa - Dan & Tincuta Cismas Mikslosvar - Count Kalnockys tourism project
Italy	June 2015 – 2 days	Milan -The World Exposition
USA	July/August 2015 2.5 weeks	Washington DC- USDA, NSAC and SARE West Virginia -Joel Salatin and Polyface Farm Lancaster County - Verdant View Farm Lancaster County - The Lancaster Farmland Trust Pennsylvania - The Rodale Institute Pennsylvania - Penn State University Pennsylvania - PASA and Gary Zimmer
Canada	August 2015 1.5 weeks	Vancouver - University of British Columbia Vancouver Island - Edgar Smith and Beaver Meadows Farm Salt Spring Island - Michael Ableman and Foxglove Farm
Ireland	July 2016 2 days	County Clare - The Burren Life Programme County Clare - BurrenBeo
China and Hong Kong	September 2016 3 weeks	Hong Kong - Kadoorie Organic Farm Tai'an - Shangdong Agricultural University

2.8. Contemporary Scholars Conference 2015

Before heading off on our own study tours, New Scholars from around the world came together at the Contemporary Scholars Conference. The UK cohort began their tour at the NFU conference in Birmingham, toured the Houses of Commons and workshopped. We met our first Australian and Kiwi compatriots. We took a Eurostar to Brussels, visited the European Parliament (if only we had known!) and British Agricultural Bureau, before closing with a leadership session on the Battle of Waterloo battlefield. We then travelled to Reims, in the heart of the Champagne region, meeting up with our Canadian, Irish, Brazilian and French colleagues. A diverse and intense week of talks, visits, workshops and discussions on French and world agriculture tested our beliefs and challenged our perspectives.

Figure 2: Nuffield Farming Scholars visit the European Parliament – if only we'd known what we know now!

Figure 3: Exploring the impressive Moet and Chandon factory near Reims

After this Conference disbanded I began my solo study tour with a visit to Romania.

3. Romania

3.1. Background

Romania, a wonderfully diverse and agriculturally rich nation, has over 14.5 million hectares of farmed land. Land use is mixed with intensively farmed arable areas to the south, east and far west, and more extensive livestock systems and permanent grasslands in the north and central areas. Farm size varies drastically. Large corporate owned farms in the south are some of the largest arable units in the EU (*Page and Popa, 2013*) while small 1ha holdings are common in the central areas.

Figure 4: Romania by Region

The 2007 enlargement of the European Union saw Romania join the EU and the Common Agricultural Policy. Romania's total agricultural output has risen to a value of EUR 15.48 million in 2014 *(Eurostat data*) which places it eighth in the European Union (although output per hectare is low in comparison to others). Key outputs include wheat (half of which comes from the Walachia breadbasket), maize and sunflower.

During the communist period of 1947-1989, 90% of the agricultural area came under the authority of the state (*Page and Popa, 2013*). The Romanian Revolution of 1989 led to land reform – land that was in state cooperative ownership was returned (restituted) back to private pre-collectivisation owners. In addition, those who did not own land at the time also received small allotments. According to Valdes (2000) before the reform, 411 state farms and 3,776 cooperatives exploited almost all the country's land resources; by 1991, about 65% of this land had been was restored to former owners or their heirs.

The Eurostat agricultural census data from 2010 shows 3.8 million agricultural holdings in Romania; a 14% decrease compared with 2003 data. This, says Page and Popa (2013) is by far the highest number of farms recorded within the EU-27 reflecting its agrarian culture and history of land reform. The

average area per farm in Romania in 2010 was just 3.4 hectares (compared to 64ha in the UK). 1 million holdings with less than 10 ha cover 20% of Romania's agricultural area.

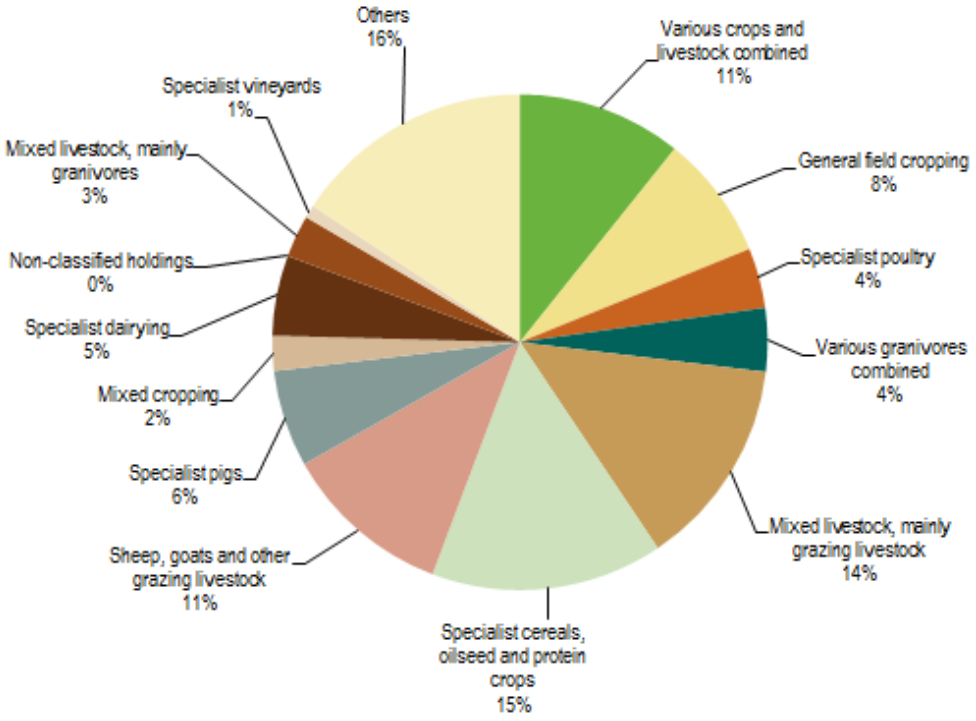

Figure 5: Farm output in Romania by type

(*Source* http://ec.europa.eu/eurostat/statistics-explained/index.php/Agricultural_census_in_Romania#Key_indicators)

The range of problems faced by Romanian agriculture today includes a lack of investment and poor access to funds, fragmentation, soil erosion, environmental degradation, declining workforce, property-related lawsuits and ageing technology. However, opportunities exist and somewhat controversially to some, a number of major companies, such as Glencore, Bunge and Cargill, have purchased land and developed major operations in Romania.

I spent 10 wonderful days in Romania in June 2015. I focused on the region of Transylvania as I wanted to learn more of the renowned historic pastoral systems and sustainable agricultural practices, and the impact of land reform and EU accession. I also wanted to experience the role of agri-tourism in the region and to see the involvement of HRH the Prince of Wales (a reoccurring person of inspiration in my Nuffield Farming journey) in this respect. The region of Transylvania is known for the scenic beauty of its Carpathian limestone landscape drawing useful land use comparisons with my Cotswold home.

3.1. Eco-Ruralis and the Peasant Movement - Cluj-Napoca

My first meeting in Romania was with Szőcs-Boruss Miklós-Attila (known as Attila) the Campaign Coordinator for grass roots movement Eco-Ruralis, based in the vibrant city of Cluj-Napoca. The

association, founded in 2009, is made up of small farmers who practice organic and traditional farming based on environmental principles.

As outlined on the Eco Ruralis website *(http://www.ecoruralis.ro)* the team develop programmes and activities which seek to strengthen traditional and organic farming practices in Romania and empower farmers to preserve their way of life, make decisions which benefit their communities, and protect their legal rights.

We first discussed the concept of the 'peasant' farmer and how to define the term. To me, the word 'peasant' was loaded and often used in a pejorative (insulting) way in the UK. However, International Peasant Movement, La Via Campesina, uses the following and preferred definition:

> *"A peasant is a man or woman of the land, who has a direct and special relationship with the land and nature through the production of food and/or other agricultural products. Peasants work the land themselves, relying above all on family labor and other small scale forms of organised labor. Peasants are traditionally embedded in their local communities and they take care of local landscapes and of agro-ecological systems. The term peasant can apply to any person engaged in agriculture, cattle-raising, pastoralism, handicrafts related to agriculture, or a related occupation in rural areas. This includes indigenous people working on the land.''*
>
> *(Source: http://www.ecoruralis.ro/web/en/About_us)*

Further discussion and thought led me to a positive understanding and my first Nuffield light bulb moment. I am a peasant farmer and I should celebrate the fact!

We explored Romania's profound farming culture and the key issues facing the millions of small, peasant, farmers including the impacts of fragmentation, land grabbing, loss of seed sovereignty, soil degradation and CAP policies. We discussed how Eco Ruralis was born from the need to act together in order to protect the environment, rural community and farming families in the face of industrialisation, foreign investment and the push for efficiency and increased output.

Attila, full of passion and knowledge, reinforced my belief that small farmers have a very important role to play in the industry. We cannot build a sustainable future by denying or ignoring the importance of peasant farmers in our society.

Small self-sufficient businesses may not serve traditional economic models of specialisation and scale, or of output targets and polices measured by Gross Domestic Product, but maybe we ask the wrong questions and measure the wrong things? Are small complex systems more sustainable than large efficient systems? This first meeting set the scene for the rest of my Nuffield Farming journey.

3.3. Fundatia ADEPT: Supporting Nigh Nature Value Farming - Saschiz

Leaving Cluj I drove deep into the heart of Transylvania to Saschiz, my home for 3 nights and the perfect base to explore the beautiful Saxon villages and farmed landscape of the Tarnava Mare region.

EU-funded highways took me through wooded valleys and past my first flower-rich hay meadows being cut my hand, small flourishing farmsteads, strip systems, hop fields and vineyards. Expansive communist state farms lay derelict - white concrete elephants, reminders of the collective past. Driving all day I saw just one tractor, a hundred horse-and-carts and numerous Dracula-themed attractions.

Saschiz is the home of Fundatia ADEPT and its project manager, Nat Page, a man I had wanted to meet for many years. Nat is a zoology graduate, an experienced foreign diplomat and an organic beef farmer in Wiltshire, as well as leading the conservation of precious farmed landscapes in Romania.

Over a cool beer at the Hanul Cetati hotel I interviewed Nat about his work. ADEPT works to protect the nature-rich, farmed landscapes of Transylvania, and to support the traditional farming communities who created and maintain them. Their aim is to give these landscapes and communities a sustainable and productive future. These fragile and rich landscapes are often referred to as High Nature Value Farming (HNVF) areas – in the UK HNVF areas include Dartmoor, North York Moors and Scotland's Western Isles.

Figure 6: Haymaking in Transylvania. The majority of farms in Romania are small family farms and labour intensive

According to the ADEPT website (*Source: http://www.fundatia-adept.org/)* when ADEPT started work in 2004, these kinds of semi-natural man-made landscapes did not enjoy support. More recently, policy-makers have increasingly appreciated the wider social, economic and environmental benefits of these kind of farming systems. Fundația ADEPT has contributed to this shift in policy at national and European level. During the past 10 years, ADEPT has grown from a local project, to an award winning NGO with national and European influence. Its strength in influencing policy derives from the fact that its proposals are based on practical experience through the innovative projects it carries out on the ground.

My meeting with Nat and other members of the ADEPT office team in Saschiz, emphasised how important innovative and integrated approaches are to complex issues of farm business sustainability. If our most precious farmed landscapes and rural communities are going to survive and prosper,

policies and programmes that link economic and social benefits with biodiversity conservation will be required. To enable delivery we must also increase local capacity for good management. We do not have this focus in the UK at present.

Another key realisation from my time with ADEPT was the importance of leadership and passion. Successful initiatives need a Nat Page to drive them forward. We also discussed and agreed on the importance of diverse small farms and Nat directed me to his work on the subject (see below).

The Importance of the Small Farm
(adapted from Page and Popa, 2013)

The majority of farms in Romania are small family farms (*Page and Popa, 2013*). Although family farms are found in great numbers all over Romania, they are found in their highest numbers in the northern and central parts of Romania. The majority run extensive pastoral and mixed farming systems.

Although small, these farms are of significant economic importance. While these holdings are mostly semi-subsistence farms producing for home consumption, local sales and for their extended families, these farms are estimated to produce 25-30% of national food consumption.

As there was a very large number of farms in Romania, there were also many agricultural workers; about 7.1 million people were working on Romanian farms in 2010. Between the two reference years, the regular agricultural labour force decreased by 19%; in relative terms, about 1.7 million people left the industry. Nonetheless, the Romanian agricultural labour force represented 73% of the active population in 2010 - the highest proportion among the EU Member States.

The importance of the small family farm is not only economic. They are the providers of a range of public goods including precious landscapes, valuable wildlife habitat, cultural traditions and a complex social fabric.

See diagram on next page: The work of Fundatia Adept.

3.4. Transylvania Food Company and socially responsible investment - Saschiz

Jim and Sally Turnbull are Transylvanian food heroes and wonderful hosts. Originally from Oxford, they now spend much of their time in Romania making a difference.

Jim has a wealth of knowledge with over 40 years of commercial business and agribusiness experience in Africa, Asia, South America and Europe. He was founding Director of Fundatia Adept between 2004 and 2011. In 2009 he set up the Food Development Company (FDC) in the UK with the aim of promoting socially responsible investment in the poorest areas around the globe.

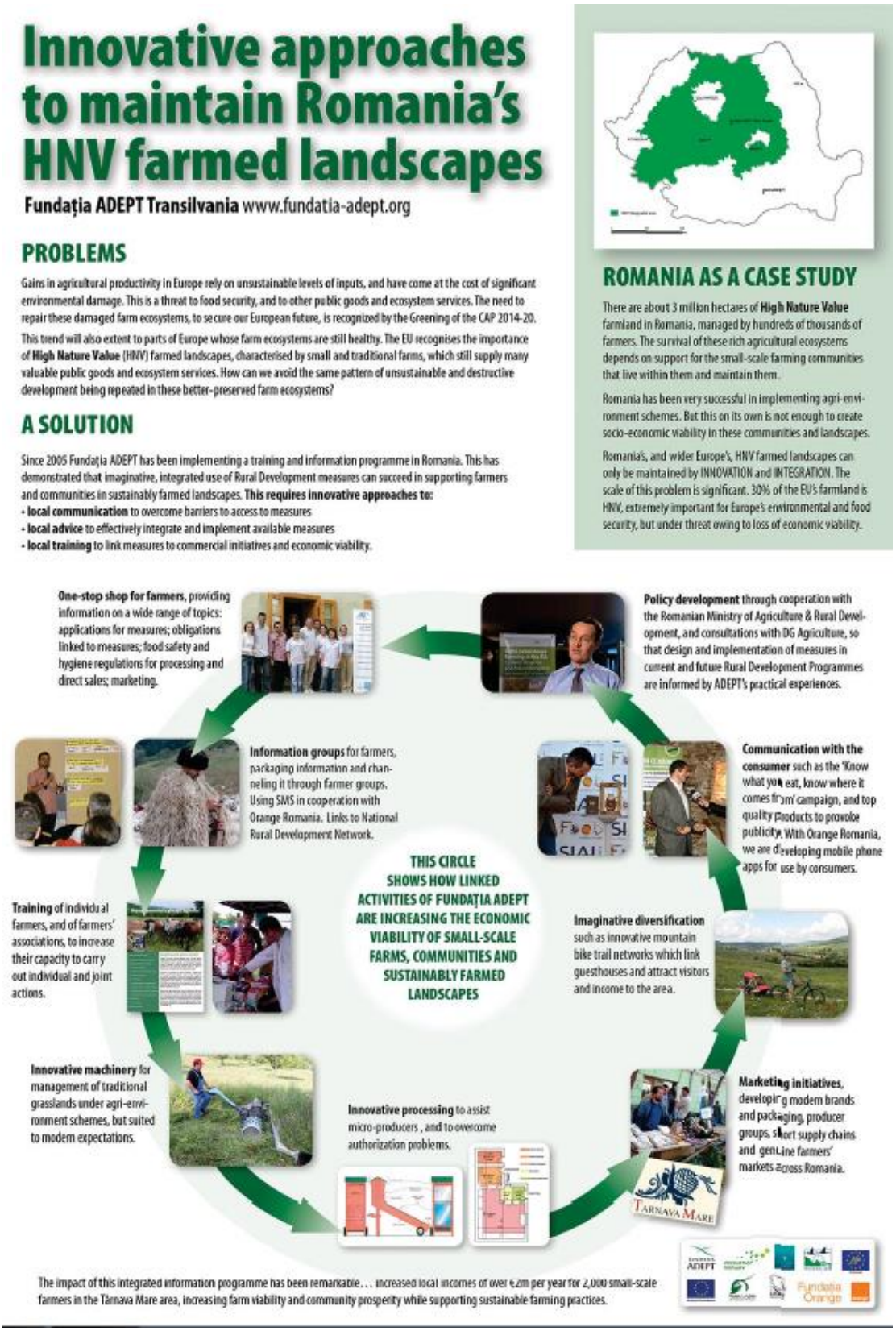

Figure 7: The work of Fundatia Adept

(Source: Fundatia ADEPT 10-year report 2004-2014)

Figure 8: Jim and Sally Turnbull outside the new processing plant in Saschiz

One such FDC business is the Transylvania Food Company (TFC) and the *Pivnița Bunici* (or Grandma's Cellar) brand, based in Sashciz since 2010.

The Transylvania Food Company (*see* http://www.pivnitabunicii.ro/index.asp) aims to '*develop a profitable business that provides support for rural communities; by purchasing their produce or wild harvested flowers, fruits and berries, processing these into high quality products that taste superb, like Grandma used to make, and to delight customers who come back for more.'*

Jim and his team collect fruits, berries and flowers from farms and the open countryside to produce a range of desirable artisan preserves, chutneys, sauces, cordials and honey in the newly built and impressive processing plant in the village. Consistent quality and high standards of food safety are paramount. Direct sales are made from the shop on site and deliveries are sent to retailers and tourism outlets around the region.

The season starts with a burst of intense activity when they harvest and process acacia blossom and elderflower in May and June. Different fruits and berries then become available every two or three weeks from June to October. As well as for their own use, TFC are also contracted to supply acacia blossom and elderflower juices to Bottlegreen for further processing in the UK. Over 52 tonnes of elderflower were collected in 2015, enough for 80,000 litres of juice.

The guiding values that underpin Jim's work are crucial, and are, as stated on the company's website (http://www.pivnitabunicii.ro/index.asp/) as follows:

- Integrity: To follow and promote good business practice, transparency and accountability.
- Honesty: To tell the truth at all times.
- Ethical: To purchase local produce at a fair price and be exemplary employers.
- Respect: To care about local people, traditions and culture.

- Quality: To cook as grandma would cook for her family.
- Safety: To consistently follow protocols and international standards in food safety.
- Customer service: To be prompt, efficient and courteous.
- Environment: To reduce our impact on the environment and promote sustainable wild harvesting.

The Transylvania Food Company is a social enterprise employing eight permanent staff. They are the largest private sector employer in town, with additional seasonal workers on contract at the busiest times of the year. Between 1000 and 1800 Roma help pick in the summer months, which is staggering. This income is the only money many receive outside their limited state benefits.

Jim's approach is called impact investment. It has been achieved by mobilising private capital and bringing income-generating opportunities to poor communities. To date, twenty-eight private individuals from the United Kingdom, United States of America, Australia and Romania have funded FDC in a mixture of loans and investment (debt and equity). They place considerable emphasis on on-the-job training, mentoring and building the local human capacity to manage and develop.

Jim believes that investments in the rural sector frequently fall into the so called 'missing middle' - too small to get institutional financial support and too big to get commercial bank funding. His approach to impact investment in the Transylvania Food Company is already being recognised internationally as a model for long term sustainability and one which can be replicated.

Projects come and go with funding but entrepreneurial initiatives like the Transylvania Food Company can be self-sustaining. *'Invest in people not stainless steel'* suggests Jim. This is a moot point as in England funding is available for capital projects (under the Leader programme, for example) but there is little for revenue spend (training, capacity building, development etc.)

There are problems, however, and lessons to learn. Jim is constantly striving to find local staff who will step up to management roles and take the initiative. Finding good staff is hard. One hangover from the communist era is the lack of trust, enterprise, communication and cooperation. Jim has also found reluctance in the local sector to support high quality offers (in food processing and tourism) and top hygiene standards as required for successful growth. An appreciation of authenticity and traceability can also be lacking.

Jim sees agri- and food tourism as a crucial linking element – bringing people to the area, raising awareness and selling local produce, the environment and the experiential. To this end Jim has also run tourism training events to help improve the local offer. One important thing to remember here is that most of the local tourism providers have never actually been a tourist themselves so they do not understand guests' expectations. More work to coordinate, train and market this very fragmented sector is now required.

One other clear message came out of my time with Jim and Sally. Environmental conservation will only succeed if accompanied by economic development. When faced with poverty your only thought is about your next meal. You focus on today, not long term sustainability. Jim sees this short termism

every harvest when some pickers cut down trees to get to the highest flowers, berries and nuts, with little thought for next year's yields.

3.5. Hugh Williamson – it's all about people

While in Saschiz I chanced upon the friendly face and fellow enquiring mind of anthropology student, Hugh Williamson. Hugh was conducting fieldwork in the Saxon villages of Transylvania for his Cambridge PhD investigating the dynamics of the community in terms of human, natural and material factors, and the meanings and effects of investments in transformational work (such as ADEPT funding).

Hugh noted that accession to the EU in 2007 and the associated designation of this particular region as a site of 'High Nature Value' under the EU's Common Agricultural Policy have opened up new opportunities for the funding of so called 'development' and 'conservation' projects. This, in combination with the post-socialist processes of privatisation, has contributed to a situation marked by strong disparities between social positions and privileges, and between the perceived opportunity to build a brilliant new life and the frustrations of negotiating in a socially, bureaucratically and naturally unpredictable new world.

This fascinating area of study brought one big thing home for me. While we are good at talking about the economic and environmental issues of sustainability, we often forget the social side: the human dimension. Our histories, relationships, perceptions, desires and needs are complex. But these are the things that drive our decisions and behaviour and ultimately our policies and strategies. If we are to move toward a more sustainable future we must better understand and value people.

In fact, it's all about people.

3.6. Dan and Tincuta Cismas – The Ecological Farm, Topa

Spanning three branches of the Carpathian Mountains sits the Transylvanian Plateau, an expanse of beautiful valleys, forests and ravines. This is where I found Ferma Ecologica Topa (The Topa Ecological Farm) run since 2005 by Dan and Tincuta Cismas.

Motivated by the desire to provide both their family and their community with healthy food, the couple aim to promote environmentally friendly, sustainable farming while strengthening their community. This is peasant farming at scale and at its best.

The farm consists of 45 hectares on 40 plots of certified organic land: the family owns 2 hectares and leases the rest of the land from neighbours within their village. This arrangement is beneficial to everyone as it provides the Cismas family with essential land and their neighbours with a steady source of income. The original leasing price per hectare was 250 lei, but as Dan Cismas's farm flourished and received EU subsidies he decided that he should not be the only one benefiting. Over recent years the Cismases voluntarily doubled the rent they paid per hectare to 500 lei.

The family produces a wide variety of vegetables from tomatoes and eggplants to beets, garlic and medicinal plants such as calendula. In addition, larger amounts of corn, lucerne and wheat are grown. There are cows, pigs, chickens, sheep and goats from which the family gets eggs, meat and dairy products. 500m2 of glasshouse and 1ha of roses are also seen. Jams, zacusca, syrups, and teas are produced on site.

Figure 9: Dan and Tincuta Cismas

Dan and Tincuta grow around 75% of their family's own consumption, leaving 65% to be sold. Some customers buy directly from the farm but others live in neighbouring towns and villages. Ferma Ecologica Topa is also part of Biocoop, a cooperative of organic farmers with a store in Sibiu, and sells at fairs and local events.

Though most young people are not interested in an agricultural career, Dan and Tincuta's 22-year old son is dedicated to the family farm. They also employ 10 additional part time workers. The next generation is crucial but for the young to be attracted to the industry there must be suitable reward, support and progression. This is central to the ideology of Ferma Ecologica Topa.

The sense of community is probably the most important aspect of farming for Ferma Ecologica Topa. Over a lunch of fresh bread and homemade cheese, jams and tea, Dan summed up his vision by saying that *"farming at a small scale is more human. People are linked to each other which helps develops the spirit of the community. Our direction is towards keeping our neighbours close and to developing our community spirit."*

Another example of their dedication to positive practice is Dan Cismas's participation in the local community cow raisers' association. The Asociatia Crescatorilor de Bovine Albesti manages 300 hectares of communal pastures in the area. The Commons are essential for small peasant farmers who rely on animals yet do not have access to large amounts of land. Cooperation is more efficient as it consolidates the amount of land required for herding.

When Dan and Tincuta first started farming in their own right 10 years ago, the local peasants were hesitant to follow their lead and to join in. Over time, however, the community has come to appreciate the importance of organic and agro-ecological practices in addition to the traditional importance of land stewardship, working together and the positive role of small farmers.

During my visit we talked about a range of issues that impact and threaten the future of the family farm in Romania including a CAP system that rewards intensification and not sustainable systems, the

loss of agricultural jobs, and migration to the cities and Western Europe. Another problem facing the village and its peasants is land grabbing and the spread of monoculture.

Dan and Tincuta are also involved in World Wide Opportunities on Organic Farms (WWOOF). WWOOFer volunteers assist in the harvesting, cheese preparation, preserved food preparation, planting, and general maintenance work. The importance of this exchange to the family is clear. Not only do the volunteers assist at critical times of harvesting or planting but as Dan pointed out: "*They interact with the members of our community in various ways bringing new ideas into the village and opening people's hearts*."

As I left, Tincuta emphasised another aspect of their vison. '*We like selling our farm produce to the village and the local town of Sighisoara – it helps build bridges with the community. You cannot develop a healthy farm if you have no connection with your community.*' I couldn't agree more. Another lightbulb moment.

3.7. Authentic rural tourism with Count Kalnocky, Mikslosvar

The rural tourism industry is one of the fastest growing industries in the world. In 2013, world tourism generated 9% of GDP and accounted for 1 in 11 jobs (*UNWTO Tourism Highlights, 2014*). Much of this economic activity occurs in rural areas and draws on the value of the local environment and culture.

But are we destroying the countryside that we come to see? Is the cultural heritage authentic or a staged reproduction? What are the roles and opportunities for farmers? How can we sell the farm experience and our high value environments and cultural heritage? I couldn't leave Romania without visiting two tourism projects in the area that would help me explore these issues.

My first stop was the remote rural village and UNESCO world heritage site of Viscri, located in the south-eastern part of Transylvania, about 8km from the town of Bunesti. Approached on unmade roads passing redundant State farms and ghosts of the communist past, you first see the iconic fortified Saxon church on the hill. The beauty of the fortified church is matched by the quaint houses lined up on each side of the main road. Villagers sit selling locally made produce and collect water from the well. Herders drive cattle to the commons and pigs and geese roam the street.

Transylvania and Viscri won the heart of Prince Charles (a recurring inspiration to me during my Nuffield Farming journey) many years ago. In 2010 he purchased one of the village houses and transformed it into a guest house using traditional materials and methods. He has also helped restore other properties, including the church, through The Prince of Wales's Romanian Foundation. He works closely with rural communities across the country assisting locals in learning new professions and skills. Many go on to generate income through enterprise that draws from, but does not destroy, local heritage and the natural environment. This is an excellent example of appropriate rural development based on authenticity.

Prince Charles has also developed rural properties in Zalanpatak working with Count Tabor Kalnoky. The colourful Count has renovated a number of traditional houses and I was lucky to stay for 3 nights in his wonderful guesthouse in Mikslosvar, a historic Szekler Hungarian village. Here I engaged with unique and bespoke nature walks led by local guides to some of the best meadows and untouched

habitats imaginable. We stopped and ate a simple impromptu lunch of homemade cheese, bread and salami (horse and pork) washed down with caraway brandy at a small peasant farm in the hills. With the help of an interpreter and photos on my mobile phone we talked cattle and pig breeds, and about sustainable management of the land. In the evening in Mikslosvar, all 10 guests dined on local foods and wines.

Figure 10: An impromptu lunch of horse salami and caraway brandy with a local peasant farmer

Our stay contributed to the sustainable development of Transylvania and to the preservation of its cultural and natural heritage. The luxury of simplicity, authenticity and the experiential, together with the multiplier effects of the integrated environmentally focused community model, all added to the value and sustainability of the enterprise. Win, win, win!

4. Italy

4.1. The Milan Exposition: Feeding the Planet - Energy for Life

From Romania I ventured briefly to Italy; the home of agri-tourismo, slow food and the Milan Expo 2015. The Expo ran from May to October and had a focus on 'Feeding the Planet - Energy for Life'. What more could a Nuffield Farming Scholar wish for but to visit a festival of food and farming showcasing the work of over 140 countries plus international organisations such as the European Union and United Nations? I planned to spend 2 days at the event meeting representatives from across the globe, from Cuba to the Congo, marvelling at a new dawn of innovation, drive and commitment to a sustainable food system.

Sadly, one day was more than enough time on site. For me, and many others that I have since spoken with, Milan was an obscene let down and a huge missed opportunity.

Expo 2015 was hit by expanding budgets with the overall cost rocketing to around €13bn. A number of pavilions were not finished and they had to spend €1m building camouflages to hide them. There were charges of corruption and bribery, leading to rioting in the streets. But if it delivered, the cost would be forgotten.

Spanning across 110 hectares, the site was a crazed collage of concrete and stainless steel, with undulating canopies, pagodas and pavilions housing everything from food themed interactive displays, an automated supermarket, to aquaculture towers.

The aim was to build a stage where all the actors - i.e. the 140 participating countries and brand sponsors - can make their voices heard. They definitely achieved that, with everyone screaming their presence at full volume. The event claimed to be a celebration of new ideas, sustainability, equality, farming and healthy food. But it grew into a bloated circus cheered on by corporates such like Coca-Cola and McDonalds.

I walked the endless avenue of novelty structures, past the United Arab Emirates pink concrete walls (designed by Norman Foster - cost €60m) and Brazil's giant climbing frame. Dazed visitors wandered in search of the authentic. Most countries' exhibitions felt like a futuristic airport gift shop with multimedia wizardry promising bountiful and sustainably produced food from a beautiful and thriving countryside.

Walking into Cuba's pavilion I hoped to speak to someone about the country's future and organic food system. The only person to speak to was a guy selling rum and a DJ playing salsa music. Romania promised an overview of 'Living with Nature'. A stark display of art and textiles left me cold and disappointed. The UK offered hope proclaiming 'Grown in Britain – Shared Globally' and a pint of cider and a clever pollinator/innovation hive display lifted my spirits briefly. The Irish focus on their Origin Green brand proved of interest. The massive USA structure, complete with restaurant, cheerleaders and the Obama screen was also of interest in view of my future travels but it did not inspire. The Dutch space, my favourite, was fun and of human scale. It focused on 'Share, Grow, Live' with an interesting and educational circular economy theme.

You entered the main complex through a gigantic UN structure and cinema wall playing a video about peasant farming in Eastern Europe and its fragility, and importance of food culture and the environment. These types of messages were few and far between, often just lip service it seemed, until you reached the other side of the site. Here, disjointed from the main area, I spotted a ray of light – the Slow Food pavilion.

Figure 11: A ray of hope at the Milan Expo 2015

Slow Food's goal (as outlined on https://www.slowfood.org.uk/about/about/what-we-do/) is '*to reinvigorate people's interest in the food they eat, where it comes from and how our food choices affect the world around us. Recognising the importance of our local food traditions and the years of accrued knowledge and culture that accompanies this, Slow Food promotes true enjoyment of good food, and food production systems that provide good, clean and fair food for everyone*.'

Slow Food developed in part as a response to the opening of McDonald's outlets in Italy in the late 1980s. Their pavilion was a low wooden structure without pomp, bright lights or dancing girls. It told the story of food cultures, biodiversity losses, traditional breeds and crop varieties. It tried to connect, gently. People sat and talked. Surely the Expo needed more of this?

All in all the Milan Expo 2015 just didn't feel right. On the positive side it was challenging, jaw dropping and I saw some very interesting innovation. But did it help people connect with real food? Did it change anyone's behaviour or purchasing decisions for the good? Who benefited most – global corporations seeking PR, Governments pimping their national ambitions, pavilion architects, or the farming industry, the consumer and rural communities? I suspect not the latter.

5. Back at the RAU – a brief royal encounter

Between my European travels and forthcoming trip across the Atlantic, I returned briefly to the UK to attend the convocation ceremony on the 23rd July 2015 at the Royal Agricultural University. HRH the Prince of Wales (that man again!) gave a wonderfully relevant speech to graduates which spoke to my Nuffield Farming study aims and formed part of my journey. The speech deserves a place here.

Our Fundamental Challenge

It is absolutely clear that the most fundamental challenges the world faces over the coming years will need to be solved by those working in agriculture. Feeding an unsustainably growing global population of some nine billion people with limited natural resources, while coping with the inevitable impacts of climate change and, at the same time, sustaining Nature's capacity to sustain us, will be no mean feat. We are now pushing Nature's life-support systems so far that they are struggling to cope with what we ask of them. Soils are being depleted, demand for water is growing ever more voracious and the entire system is at the mercy of an increasingly fluctuating price of oil. When we talk about agriculture and food production, we are talking about a complex and interrelated system and it is simply not possible to single out just one objective, such as maximizing production, without also ensuring that the system which delivers those increased yields meets society's other needs. These must surely include the maintenance of public health, the safeguarding of rural employment and smallholder farming, the protection of the environment and vital natural ecosystems.

Dealing with such daunting challenges will require a different approach – an approach that puts the protection of natural ecosystems back at the heart of the whole process, so as to see a dramatic improvement in soil health and organic matter and to ensure genuine food security, not to mention long-term human health. It will also require the very best of human ingenuity, dedication and resourcefulness. And that, to me, is why farming and land management can never be 'just another industry'.

You, ladies and gentlemen, will very soon be acting as custodians, or stewards, of a precious natural asset on which all of humanity depends, and taking decisions in your daily lives that will have long-term consequences. Now I know only too well that you will be faced by endless financial and economic pressures pulling you in the opposite direction, but if I could just ask one thing of you, it would be that amidst all the excitement of starting your new jobs you make time to look around you and try to understand the bigger picture. What has happened in the past to shape the land the way it is? Are you looking at a healthy, diverse and resilient ecosystem? And is the balance right between short-term production and long-term health and sustainability? I know those may not be the most obvious things to ask as you start to find your way around, but they might well be among the most important, at the end of the day.

In managing rural assets you will also, of course, be playing important roles in rural communities. And I do hope you will also think hard about this human dimension, because the health of the agricultural sector and the health of what is left of the rural community are directly connected in so many fundamental ways. I expect this is something you all understand very well, but the wider population certainly doesn't.

(source http://www.princeofwales.gov.uk/news-and-diary/12137/speech)

6. United States of America

6.1. Background

The United States has over 2 million farms covering an area of 373 million hectares, ranging from small hobby farms to large commercial holdings covering thousands of hectares.

Colonialism and the introduction of European agricultural practices greatly affected the native landscape. Farming developed from east to west - following the early settlers - and corn (maize), turkeys, tomatoes, peanuts, potatoes and sunflower seeds arrived from South and Central America. A wheat frontier, where the climate allowed, led the way for mixed and dairy farming. Cattle ranged the plains and forest was cleared to produce feed and new grazing areas. In the south, promulgated by the use of slave labour, the tobacco and cotton industry reigned.

The mechanisation of farming plays an important part of American history. Where would we be today without John Deere's plough, McCormick's reaper or the Fordson tractor?

Today, wheat and other small grain production take a back seat to corn and soybeans in arable areas. Soybean output was low until the early 1930s but after World War Two the US became the world's largest soybean producer to meet the need for a domestic source of fats, oils and livestock feed.

Soil exhaustion has been an historical problem in USA. Erosion and nutrient depletion was noted by New England settlers ploughing with oxen. Overgrazing and desertification of the native grasslands followed. Cultivation of the plains, combined with drought, led to the dust bowls of the 1930s.

Many lessons have been learnt from the past but why is soil and water quality still a major concern in the USA, particularly in areas such as the Chesapeake Bay? The demand for red meat has resulted in vast areas of land dedicated to growing grains for livestock feed – is this sustainable? What models exist for supporting sustainable land use and farming? I ventured to the USA with lots of questions.

What is a Farm?

While flying to America I read a short piece by Minnesota organic farmer, Atina Diffley. She started by considering the concept of the farm, as quoted below. This beautifully-worded definition resonated and stuck with me on my travels as it helped to describe the complex and holistic nature of 'the farm'.

'A farm is a synthesis of the land, the people, and the business. A blending. A new entity with a personality – that is the farm. No two combinations are the same; each farm is unique, with its own character. The land contributes its climate, topography, soils, precipitation, biological diversity and eco-systems. It is fixed in a location. The people bring their passions, skills and labor, their relationships, creativity, and emotional patterns. The business brings its financial capacities, its reputation and earned good will, the culture and market it operates within. There is no one size fits all. Each farm must develop its own strength and place. When one aspect is changed, all are affected'.
Extract from 'Turn Here Sweet Corn: Organic Farming Works' by Atina Diffley (2012)

6.2. Washington DC and the corridors of power

My starting point in the USA was Washington DC. Here I aimed to get a feel for US farm policy and the keys issues facing the industry.

I first met with Ferd Hoeffner, Policy Director of the National Sustainable Agriculture Coalition (NSAC). NSAC is an alliance of grassroots organisations formed in 2009 that advocates for federal policy reform to advance the sustainability of agriculture, food systems, natural resources, and rural communities (*source* *http://sustainableagriculture.net/about-us/*) NSAC was founded upon two integrated and equal priorities. These are:

- to support, build, develop, and engage the grassroots of sustainable agriculture for the health and vitality of the sustainable agriculture movement;
- to research, develop, and advocate federal policies relating to farm, food, and environmental issues, appropriations, and implementation to support and advance sustainable agriculture.

Ferd identified a range of priorities for the NSAC. As outlined on their website (*http://sustainableagriculture.net/our-work/*) they are currently working to reform and construct policies and programmes that:

- ensure opportunity and fairness for small and medium-sized family farms;
- promote agricultural practices that conserve our soil, water, wildlife habitat, and energy resources;
- increase the ability of beginning farmers to enter into farming;
- encourage new and existing farmers to transition to sustainable and organic production practices;
- expand cutting-edge on-farm research and extension for sustainable agriculture;
- enable producer access to local and regional food systems;
- increase consumer accessibility to sustainably produced foods.

We discussed the current Farm Bill and its use of crop insurance to prop up the corn and soya industry, GMOs, and the long battle to improve soil management. We covered the political minefield surrounding organic and grass fed traceability and assurance, and the use of conservation stewardship payments. Ferd explained the complex range of programmes that exist on the ground - a great introduction to the issues and polices of this amazing nation.

I left, slightly bemused, but with a better feel for the role of corporate power and the all-important lobbying process in Capitol Hill. NSAC is committed to diversity and aims to build capacity among members at the grassroots to develop leaders – great stuff. Crucially, however, it also seeks coalition with political, media and communication stakeholders to achieve its goals.

Next, I visited Jill Auborn of the National Institute of Food and Agriculture (NIFA, part of the United States Department of Agriculture (USDA)). Jill is an experienced National Program Leader who works on sustainable agriculture and food systems in various programmes and activities, including heading the team that leads the Beginning Farmer and Rancher Development Program.

Jill indicated that the three biggest issues for US agriculture are poor water quality, the carbon footprint of the industry and the loss of permanent grassland due to cultivation for corn and soya. Jill felt progress was being made but that getting good young farmers into farming is crucial. We discussed 'the missing middle' of medium scale family farms (either you 'get big or get out') and the rise of the part time and hobby farmer. More work is being done on supporting the small farmer and ensuring that policy and programmes do not discriminate based on size. Campaigns that aim to reconnect consumers with growers are important, citing the 'Know your Farmer – Know your Food' initiative as one success.

How do we instigate change in our food and farming system? What are the drivers? Jill highlighted three levels on which we must work to have impact:

- Markets (economics)
- Regulation (lawyers and policy makers)
- Culture (sociology)

Will change come quickly enough? Governments around the globe recognise that, despite all the current efforts and spend, biodiversity remains in decline, soil is still being degraded, climate change marches on and the consumer faces malnutrition or obesity. Jill was hopeful and pointed me to the work of John E. Ikerd, Professor Emeritus of Agricultural Economics in the University of Missouri (*see* http://johnikerd.com). Jill quoted Professor Ikerd suggesting that ''*we are not yet toppling the status quo but immobilising the missionaries*'' and that ''*we are nurturing the alternative until the bigger systems collapses*''. Some interesting concepts to explore here.

The Work of Professor John E Ikerd

Following my meeting with Jill Auborn, further research into the work of Professor John E. Ikerd revealed a rich seam of research, blog material and commentary on the subject of 'deep' sustainability. Here are a few extracts from his work (*source* http://johnikerd.com/blog/) that resonate with my study:

'Sustainability and Small Farms

'The pattern of large farms is that of a machine or mechanism – of industry. The natural ecosystems and rural cultures within which farms must function are living systems rather than machines – organisms rather than mechanisms. In fact, a farm itself is an organism – a living system made up of soil, plants, animals, and people that constitute an integral whole. The ecological and social externalities of large farms are a natural consequence of the inherent disharmony and conflict between the industrial extensive-management paradigm that cause large farms to be large and the ecological and social context within which they must function

'Sustainable farms must be organized and managed to function in harmony with healthy, diverse, dynamic, individualistic, interdependent living systems. Only healthy living systems are capable of balancing the efficiency, resilience, and regenerative capacity essential for sustainability. Thus, sustainable farmers must have the knowledge, understanding, and management skills to work with nature. Sustainable farmers must also understand and appreciate human nature – particularly the value of human relationships. They must see the economy as a means rather than an end – a means of

pursuing a social and ethical way of life. They must care about their land to be caretakers of the land. They must care about people if they are to be caretakers of society. Sustainable farms must be both management-intensive and human-intensive, and thus accordingly small.

'Healthy Soils, Healthy Communities, Healthy Economies

'The critical linkages among health soils, healthy communities, healthy economies, and health societies are firmly rooted not only in history but also in the most fundamental principles of economics and laws of physics. Everything of use to us, including everything of economic value, ultimately comes from the earth – soil, water, minerals, air, energy. There is no other possible source. Beyond self-sufficiency, we must rely on other people – friends, community, or society – to meet needs that we cannot meet directly from nature. To meet needs that we can't meet through relationships with people we know personally, we must rely on the "impersonal markets" – meaning the economy. Regardless of the means, everything that sustains the health of people, communities, societies, and economies ultimately must come from the earth – from nature.

'US Farm Policy and Specialization

'Price supports, deficiency payments, crop insurance, and disaster payments, all reduce the risks associated with specializing in producing one or a few basic commodities. Without such programs, a diversity of crops and livestock enterprises would be essential to manage production and market risks, which would also help maintain the ecological health and natural productivity of the soil.'

My final meeting in Washington was with Kim Kroll, Associate Director of the Sustainable Agriculture Research and Education (SARE) programme. SARE's mission is to work for all American agriculture to promote innovation that improves profitability, stewardship and quality of life by investing in ground-breaking research and education *(see http://www.sare.org/About-SARE/Vision-and-Mission/)*

Kim explained the role of university research and extension in the US. I was impressed with the bottom-up approach to much of their work – farmers identify issues and seek researchers to help investigate. Farmers are engaged in all three stages of knowledge exchange from conception to conduction and dissemination (on the ground and in research papers). Although I saw some comparisons with our own Innovative Farmers initiative led by the Soil Association, I felt this bottom-up approach has been lost with UK academia. University research can often be for the sake of research (and funding or kudos). Maybe I could do something about this on my return to the RAU.

Kim believes that the dominance of commodity production e.g. corn, is not going to go away, as the infrastructure is in place, it's profitable (with support) and the pro-lobbyists are very powerful. While there is a definite market for grass fed and organic systems there have been label fails in the US and consumer trust is fragile. US consumers prefer the taste of grain-fed and hence feed lots are also not going away. There is a strong 'buy local' and farmers' market movement but this does not cater for those on low incomes. Linking food stamps with local foods has been attempted with mixed results.

Kim introduced the concept of 'regenerative' agriculture to me. Regenerative agriculture means putting more in than you take out. It goes further than conservation agriculture or sustainability in

that it aims to make things better and not just protect. Surely, as we suffer ongoing environmental decline and degradation, we must seek a system that reverses these trends and rebuilds. We discussed the role of cover crops in arable systems for soil health as an example. While we agreed that the term 'regenerative' does not slip off the tongue and that the language we use is crucial, I left the meeting with a new vision for agriculture – one of regeneration.

6.3. Shenandoah National Park – rewilding and tourism

America pioneered the National Park movement with the creation of Yellowstone in 1872 and I had heard much about the US approach to rewilding and conservation, and so I eagerly spent a day exploring the Blue Ridge Mountains of Virginia and Shenandoah National Park. Here, the butterflies were the size of my hand and the fireflies were brighter than the moon, but something more than a 'lonesome pine' was missing. The area was designated as conservation land in 1935, and 450 families were relocated (*source: https://www.nps.gov/shen/learn/historyculture/index.htm*). Farming and commercial forestry ceased and the mountains were released to nature.

While I fully support moves to create more space for nature and I can see the value in untouched or unmanaged landscapes, do we want full blown rewilding programmes - like the US model - in the UK? Should we, as some suggest, re-wild, for example, the Lake District hills or the Arran coast, and reintroduce keystone species (lynx, beaver etc.)?

The most precious landscapes in the UK and Europe have been shaped by man's farming activities - this is the basis of the High Nature Value Farming concept. Would it be right to remove man and beast from the complex landscapes? I have witnessed some excellent rewilding work at Knepp Castle and Ennerdale in England but these all include grazing animals, and farming still plays a role. In the US, it sometimes seems that one side of the fence is for nature, and the other is for food production. Connections are lost. But maybe we will have to recourse to zoning in the UK and draw this line in the future to reduce land use compromise – at the moment, neither farmers or conservationists ever seem content. Maybe we do need to be bolder.

One positive business outcome of the national park movement is the increase in tourism value and its associated multipliers. William E Carson (Virginian politician and co-founder of Shenandoah National Park) once pronounced in a radio interview that '*scenery is Virginia's next great cash crop' (source: Shenandoah National Park visitor centre*). Farmers should remember this – the value of nature and our beautiful landscapes to our rural businesses is massive. Let's not destroy this key asset.

6.4. Joel Salatin and Polyface Farm

The highlight of my US trip was the time I spent at Polyface Farm, Virginia, with one of my farming heroes, Joel Salatin.

In 1961, William and Lucille Salatin and their young family took on a tired and environmentally degraded farm near Swoope in Virginia's Shenandoah Valley. Using nature as a pattern, they and their children, with Joel at the helm, began healing the land following regenerative principles. Disregarding the conventional wisdom of '*get big or get out*' they '*did something different*' - the Salatins planted

trees, made compost and dug ponds. They developed a mob grazing cattle system, rotated and integrated with chicken, pigs and rabbit enterprises. Lush pastures supported by ecstatic copulating earthworms testified to the healing. They missed out the middle man and sold their produce direct to the local consumer. Once a farm that initially struggled to produce enough to support one person, the holding now employs 10 people and links with many others, creating more than $1 million in sales each year.

The farm's mission is to develop emotionally, economically, environmentally enhancing agricultural enterprises and facilitate their duplication throughout the world. If this isn't a model of sustainable farm business, what is? (Source: *http://www.polyfacefarms.com*).

Today, Joel calls Polyface Farm (the 'farm of many faces') a '*diversified, grass-based, beyond organic, direct marketing farm*' (*see http://www.polyfacefarms.com*). He terms himself as a Christian libertarian environmentalist capitalist lunatic. That's quite a mix and, boy, what a character! Arriving at the farm at 7am on the first day of a two-day intensive workshop, as the sun rose over the famous Blue Ridge Mountains, I was blown away by the man's energy and passion. I, together with 20 other eager souls and new friends from across the States, were in for an amazing experience.

The farm's guiding principles (*source: http://www.polyfacefarms.com/principles*) are:

1. Transparency: anyone is welcome to visit the farm anytime. No trade secrets, no locked doors, every corner is camera-accessible.
2. Grass-based: pastured livestock and poultry, moved frequently to new "salad bars," offer landscape healing and nutritional superiority.
3. Individuality: plants and animals should be provided a habitat that allows them to express their physiological distinctiveness. Respecting and honouring the pigness of the pig is a foundation for societal health.
4. Community: we do not ship food. We should all seek food closer to home, in our food shed, our own bioregion. This means enjoying seasonality and reacquainting ourselves with our home kitchens.
5. 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 cow disease).
6. Earthworms: we're really in the earthworm enhancement business. Stimulating soil biota is our first priority. Soil health creates healthy food.

Over the two days, Joel and his son, Daniel, showed us in great detail how they produce a range of products *(see http://www.polyfacefarms.com/production*) including:

- Salad bar beef - Rearing cattle by grazing species-rich grassland, following 'tall grass' mob grazing methods. The key principle here is to '*eat a third, trample a third and leave a* third' moving cattle daily on to fresh pasture, leaving cover and building organic matter.
- Pigaerator pork – In winter, cows are housed in pole barns bedded on saw dust, wood chip and old hay. At the end of winter corn is added and pigs are introduced to rootle and aerate

the bedding, creating a wonderful compost. During the summer the pigs are in special savannah pastures in the woodland glades rotated every few days with electric fence.

- Pastured poultry – Broiler chickens reared in portable sheltering systems to allow easy movement around the pastures. They use 10 ft. x 12 ft. x 2 ft. high floorless, portable field shelters housing about 75 birds each to grow 8-week meat birds. Moved daily to a fresh pasture paddock, these birds receive fresh air, exercise, sunshine and GMO-free grain. The cows mow ahead of the shelters to shorten the grass encouraging growth and ingestion of tender, fresh sprouts.
- Pastured turkeys - A portable hoop-house called the Gobbledygo offers shelter to the turkeys inside their electrified-netting paddock. Moved every couple of days to a fresh pasture, the turkeys ingest copious amounts of grass to supplement their organic grain ration.
- Pastured eggs – An Eggmobile also follows the cows in their rotation. The Eggmobile is a 12 ft. x 20 ft. portable henhouse and the laying hens range free from it, eating insects and scratching through cattle dung to sanitise the pasture (just like birds in nature that follow herbivores acting as biological cleansers). The birds are secured inside a large electrified netting that is moved every three days to offer clean pasture.
- Forage-based rabbits - Daniel began raising rabbits in the late 1980s as a young farmer (4-H) project and has developed a line-bred genetic base for meat rabbits that are hardy and can eat forage without getting diarrhoea. Housed in elevated shelters above the chickens in a custom-made building called the Raken (Rabbit-Chicken) house, the breeding stock receive alfalfa pellets and hay or fresh greens. In season, they are finished in portable, slatted-floored field shelters moved daily similar to the broilers.
- Forestry products - Utilising 450 acres of forest including oak, poplar, cherry and walnut, the Salatins practice a sustainable harvest rotation turning rough logs into useable timber on site with a band-saw mill. This facilitates numerous homemade construction projects – pole barns, fence posts, housing (including Daniel's family home), chicken shelters etc. Wood chip, sawdust and old building material all make their way to the compost piles and back on to the land – completing the closed carbon cycle. (Source: *http://www.polyfacefarms.com*).

All the poultry and the rabbits are processed on site in an open sided USDA-approved building (that story is a whole chapter in itself!). Produce is delivered directly to 2,000 families and buying clubs, 25 restaurants and 10 retail outlets including customers in Washington DC. Customers love the high quality, face-to-face traceability (Joel doesn't believe in government-led assurance schemes) and regenerative ethos.

Polyface Farm arguably represents '*America's premier non-industrial food production oasis*' (*see (http://www.polyfacefarms.com/principles*). They don't do anything conventionally adding that '*we haven't bought a bag of chemical fertilizer in half a century, never planted a seed, own no plow or disk or silo—we call those bankruptcy tubes. It's a symbiotic, multi-speciated synergistic relationship – a dense production model that yields far more per acre than industrial models. And it's all aromatically and aesthetically romantic.*' That's one way of putting it!

Figure 12: Joel enthusing abour tall grass grazing and his 'salad bar' beef

Figure 13: Processing chickens at Polyface

Figure 14: Pastured poultry and portable 'eggmobile' shelters at Polyface Farm

Figure 15: Working with others is crucial to the Polyface ethos

In addition to their pasture fed enterprise stacking system, the value of organic matter and their customer-focused approach, I was enthused by the role and integration of the Polyface people. As well as family members, the farm employs or hosts 2 interns and 9 apprentices every year, plus hundreds of other visitors like me. The place is alive – there are lots of 'eyes per acre' offering faming and social benefits. A good number of apprentices have gone on to start their own pastured businesses, and some work with Polyface as satellite enterprises. The economic multipliers are considerable.

Over our last meal together by the basecamp fire I asked Joel to consider the biggest lesson he has learnt over the years – what would he have done differently? He pondered, and in his wonderful Virginian drawl he told me: '*I should have employed more people, earlier, to do the things I can't do or don't like doing*'.

Now that's a message to remember and build on at home!

6.5. Lancaster County – exploring Amish country

A drive north took me to Lancaster County, Pennsylvania. The area is a popular rural tourism destination, with the large Amish, Mennonnite and Brethen community being a major attraction. Although somewhat commercialised and staged in parts, there is still an authentic and private feel to the community: a fascinating place.

In the early 18th century, many Amish and Mennonites emigrated from Europe to Pennsylvania, seeking freedom of religion. They were also attracted by the deep rich soil and mild climate of the area. Farming, cottage industry and engagement with the tourism industry is central to their economic survival.

For centuries, Amish, Mennonite and Brethren farmers have been regarded as excellent farmers. Although this is peasant agriculture is a different form, most are innovative risk-taking entrepreneurs, and are often on the leading edge of agricultural productivity. Many are organic and draw on family labour. Most do not permit the use of tractors but use teams of horses or mules to pull modern farm equipment. In many ways the cooperation, work ethic and enterprising style seen in Lancaster County reminded me of Dan and Tincuta of Topa, and the Salatins; mixing old with the new, building from a community upwards.

The legal status of farmers in the area is complex. Dan Nosowitz reported in 2014 for The Modern Farmer (http://modernfarmer.com/2014/11/amish-mennonite-farmers-polluting-lancaster-county) that '*the government leaves the farmers alone, and the farmers leave the government alone. Many*

opt out of government systems entirely. They do not accept government subsidies or advice, nor do they pay into or receive benefits like Social Security.'

But there are problems. The old techniques used by Lancaster County farmers may follow traditional methods, but that doesn't mean they are environmentally sound. In 2009 the Environmental Protection Agency (EPA) began cracking down.

Nosowitz in the on-line article highlighted that '*Lancaster County generates about 28,000 tonnes of manure per year - more than any other county in the area. Runoff from the manure, organic or not, can pollute the water systems, spiking nitrogen and phosphorous rates, reducing oxygen and killing wildlife. When the EPA visited local farms they found violations in 85% of the farms, ranging from improperly stored manure, cow dunging in watercourses, and high levels of E. coli in the wells. Another problem - the traditional ways of farming, like horse-drawn ploughs, rip up the soil and promote erosion much more than more modern minimum tillage methods*.'

Most of this pollution ends up in the troubled Chesapeake Bay watershed. Funding, and new methods of engagement, is now being used to pay for fencing to keep cattle out of water bodies and improved slurry and manure storage. Hopefully, this will help the Lancaster County farmers to farm traditionally within their cultural values and to protect their cherished land.

The important point here, for me, is that "small, organic, traditional", does not always equate to "environmentally sound or sustainable". In fact, in my career as a farm adviser, some the biggest culprits of bad practice, whether it be overgrazing, poor animal welfare or inappropriate use of agrochemicals, were the smaller less experienced hobby farmers who did not have to engage with farm assurance scheme standards. Larger commercial farms are, at least, hot on compliance, assurance and training.

6.6. Lancaster County – Verdant View Farm

My first serendipitous night in the county was spent at the appropriately named Verdant View Farm, Paradise, with the most hospitable Ranck family.

Verdant is a 4th generation small dairy farm currently milking around 30 Holstein x Montbeliard cattle. They sell milk for Land O'Lakes butter, finish pastured bull calves and grow corn. In line with their Mennonite faith the farm does not benefit from government support. Farming on this scale, without subsidy, is not economically viable so the family has worked hard to build a thriving and high quality agri-tourism business based on farmhouse B&B, farm tours, experience days and good food. This is authentic agri-tourism with visitors welcomed into the milking parlour and yards.

Don and Ginny are now handing over to their children Eldon and Tammy, and Eliza and Patrick - a fine example of planned succession and family cohesion.

On arrival I found Eliza and Patrick working and laughing in the parlour, showing their happy cows to a delighted young family, who, like 25% of their customer base, come back to Verdant every year.

Figure 16: Verdant View Farm

Figure 17: Eliza and Patrick Ranck in the parlour – their enthusiasm brings guests back year after year

Later, over ice cream in the sunny town square of Strasburg, I quizzed them about the farm and their ethos. Patrick outlined the farm's vision suggesting that '*sustainable agriculture in the first place involves making connections: between urban and rural, between food producers and food eaters, between the economy and nature, and between generations of young and old,'* adding that '*our mission at Verdant View Farm is to help make these connections, one family at a time*.' Wonderful!

Patrick, like myself, works on the farm and lectures at the local university. His passion for sustainable farming shines through. He introduced me to the work of farmer, poet and author, Wendell Berry, and gave me a book (Bringing it to the Table: On Farming and Food) complete with his own notes and thoughts. For this, I am forever grateful, as Berry has since shaped my thinking. Berry seems to put

into words thoughts of my very own. A supporter of the Slow Food movement and agrarian society, Wendell Berry reminds us all to understand the basics of what we consume. "*Eating is an agriculture act*," he writes *(Berry, 2008*). Indeed, we all have a role in our local and global food economy, and we can, in fact we must, all vote with our fork.

6.7. Lancaster County – farmland preservation

Farmland preservation is big in Lancaster County. Land Trusts (of which there are many) purchase and place conservation easements on agricultural property preserving the farmed landscape for future generations.

A conservation easement, paid at the rate of $800 to $3000 per acre (depending on the land use clauses enacted and Trust involved) restricts housing, commercial and industrial development, and certain other activities on the land, in perpetuity. The clauses are agreed upon by the Trust and the property owner. After signing the easement, landowners continue to farm and own their properties. Tax breaks are often available too. A conservation plan outlining improvements to be made may also be attached to the agreement. Conservation easements ensure that farm land remains available for agricultural use forever.

The Lancaster Farmland Trust, based in Strasburg, is a private, non-profit organisation that works closely with the communities of Lancaster County, including its Amish and Plain-Sect members (*see http://www.lancasterfarmlandtrust.org/home/preservation*). Here I met with Ken Pacanowski, the Trust's Stewardship Coordinator, who showed me some of the preserved farms and keys issues on the ground. Ken is responsible for managing the Trust's Smart Farms Program, which offers conservation support to owners of preserved farms. Ken also drafts soil and water conservation plans, and develops strategies to educate farms about the economic and environmental benefits of good conservation practices.

Due to the work of The Lancaster Farmland Trust, together with the Lancaster County Agricultural Preserve Board, around 100,000 acres (40,000ha) of farmland has now been successfully preserved. This equates to around 25% of farmland in the county - the highest rate of preservation in the nation.

Could this model work in the UK? The National Trust (and others) protects precious farmed landscape by purchasing holdings and working with tenants to achieve their environmental goals that reach over and above basic regulatory compliance and development control. Is ownership the most effective way? Could easements be used to extend conservation gain at landscape scale?

I have concerns, however. Buying a farming family's right to develop in the future must, to a degree, constrict entrepreneurial spirit. Would essential diversification such as a farm shop or tourism development be allowed under the terms of the easement? If flexibility is not inherent then the farm is frozen in time. All businesses must grow and be able to react to the market to be truly sustainable.

6.8. The Rodale Institute – the 30-year farming systems trial

Next stop was the Rodale Institute, near Kurtztown, Pennsylvania. The institute is the home of organic research and outreach in the US and '*was founded in 1947 by organic pioneer, J.I. Rodale, to study the link between healthy soil, healthy food and healthy people*' (*http://rodaleinstitute.org/about-us/mission-and-history*). The Rodale values are stated on the website as:

- We empower each other to live our mission
- Our farm is a destination for inspiration
- Our research is a catalyst for change
- We are a clear voice for informed choice

J.I Rodale wrote in 1954: "*Organics is not a fad. It has been a long-established practice - much more firmly grounded than the current chemical flair. Present agricultural practices are leading us downhill*."

Here I met Jeff Moyer, Executive Director and renowned authority in organic agriculture. His expertise includes organic crop production systems with a focus on weed management, cover crops, crop rotations and equipment modification. Jeff is perhaps most well-known for conceptualising and popularising the No-Till Roller Crimper for use in organic agriculture. In 2011, he wrote Organic No-Till Farming, a publication that has become a resource for farmers throughout the world (*source http://rodaleinstitute.org/about-us/our-staff*).

Figure 18: The widening circles of influence in regenerative agriculture. (*Source The Rodale Institute*)

We discussed the growing market and future potential for organics in the US due to consumers seeking antibiotic-free and non-GMO produce, and the low margins on conventional commodities. The demand for organic snack foods and ready meals is an area that is expected to boom.

But could we feed the world following organic principles? Critics are quick to suggest we couldn't without utilising all our lands for food production at the expense of all natural habitat. The research at Rodale, however, suggests a different paradigm: one based on regenerative agriculture.

Regenerative agriculture improves the resources it uses, rather than destroying or depleting them. It is a holistic systems approach to agriculture that encourages continual on-farm innovation for environmental, social, economic and spiritual well-being (*Rodale Institute, 2014*). The circles of influence start with the farmer and the farm, extending to the local environment and community.

Dr. Kristine Nichols, Chief Scientist for the project, showed me the results of the 30-year Farming Systems Trial (FST) which is the longest running trial comparing organic and chemical-based agriculture in the US. The trials are based on four systems:

1. Organic manure system
2. Organic legume system
3. Conventional synthetic system
4. No-till system

The published results (*see Farming Systems Trial – Celebrating 30 Years. Rodale Institute, 2011)* have shown that organic farming, over a sustained period, is better equipped to feed us now and into the future, in that:

- Organic yields match conventional yields
- Organic outperforms conventional in years of drought
- Organic farming systems build more soil than conventional systems
- Organic farming uses 45% less energy and is more efficient
- Conventional systems produce 40% more greenhouse gases
- Organic systems are more profitable than conventional.

Surely, this is too good to be true? The data is open to scrutiny and in need of criticism, of course, and replication is required in different settings. But, similar trials across the US including the USDA farming systems project, are also promising.

A comprehensive review by Seufert (2010) in the respected journal Nature, compared organic and conventional crop yields in developed countries and concluding that '*under certain conditions - that is, with good management practices, particular crop types and growing conditions - organic systems can … nearly match conventional yields.*'

In the developed world, the primary challenge is arguably ecological and social sustainability, not specifically increased yields or productivity (Seufert et al. 2010). Maybe '*nearly matching conventional yields'* is enough to provide domestic food security and a range of other positive outcomes. Imagine if the organic sector had the budget comparable to the conventional sector and agro-chemical industry - with continuing research and advanced development, organic yields could surely rise much higher.

Further discussion with Kris revealed inherent bias in the current US system that favours conventional commodity production. Institutions (e.g. the traders) and infrastructure (silos and transport) are geared for conventional soy and corn. Increased processing diversity and flexibility is needed. Also, while crop insurance now includes organic production the use of cover crops can lead to an insurance breach. Ironically, if a conventional farmer attempts to establish an inappropriate crop into badly managed soil and it fails, the insurance pays out. That seems crazy to me!

Later that day I spent time with Dr. Gladis Zinati, Associate Research Scientist for the project, looking at their research into composting, carbon sequestration, soil fertility and pest management including their pioneering work on companion cropping and beneficial insects. Great stuff.

Dr. Emmanuel Omondi, Research Director for Farming Systems Trial showed me the Farming Systems Trial plots where we discussed weed management issues in no-till systems. Weed control remains a major issue and one they haven't conquered yet although correct timing of seeding and ensuring appropriate competition is proving crucial.

6.9. Pennsylvania State University and Jean Lonie

Penn State University (PSU) is a land-grant research-intensive university with a focus on the teaching of practical subjects such as agriculture. It is one of the largest universities in the United States with nearly 100,000 students enrolled across its 24 campuses. The impressive University Park campus, complete with dairy farm and creamery, where I next based myself, houses more than 46,000 graduate and undergraduate students alone, putting my own University in Cirencester, with 1200 students, somewhat in context.

Penn State is also the home of the ubiquitous Jean Lonie, a Nuffield International Farming Scholar in the U.S. On arrival Jean put me straight in front of an enthusiastic group of young leaders on the excellent 4-H and Future Farmers of America (FFA) programme. What a great opportunity to sell the Nuffield Farming experience and to promote my sustainability messages, and to meet tomorrow's decision makers.

A meeting with Dr. Ted Alter, Professor of Agricultural, Environmental, and Regional Economics, led to a discussion about agricultural extension. Budgets and activity in the US (as in the UK)) have been slashed. In the 20th century a seamless service of research, teaching and extension was built around academics; now the focus is on hired advisors. Research is more reductionist (over simplified) and academics drown in their own data, far from the coal face. University workload models should reward working with farmers and training in the field.

It can be argued that the reductionist approach, splitting theories and subjects down into their component parts and ignoring complex relationships and outcomes, has dominated science and education over the last 3 centuries. In agriculture this has contributed to the rise of monocultures and the focus on yield over other outputs. We have reduced plant nutrition to the basics of phosphorus, potassium and nitrogen, and ignored the holistic soil management.

Further discussion about food systems sustainability followed. Ted advised me to seek the commonalities between 'production' and sustainable agriculture, use a holistic approach bringing all the food system players together, and to identify leverage points. Ted shared with me one of his draft papers (as yet unpublished) on the subject. In Global Agri-food System Sustainability in the 21st Century (*Alter, 2010*) he concludes with the following:

> *"The long-run sustainability of our agri-food system is a central concern for agriculturalists, agribusiness people, policy makers and citizens going forward in the 21st century. Our ability to produce and distribute adequate quantities of safe, nutritious food to alleviate hunger and reduce poverty worldwide is being buffeted by high levels of population growth, variable and uncertain economic forces, lagging investment in agricultural research and decline in the rate of agricultural productivity growth, and environmental degradation. This confluence of trends not only has potential to limit the strength and viability of our global agri-food system, both at the local and global levels, but also to diminish the long-run socio-economic well-being and quality of life in agricultural and rural communities everywhere. What is required in this situation, in the 21st century and beyond, is a mentality of innovation, courage, and leadership that fosters and drives change in agriculture, agribusiness, and the broader society. Collaborative strategies within and across multiple value chains and agri-food systems, coordinated by a participatory and democratically conceived international council,*

is a promising avenue toward a revolutionary shift in international trade and food production mentality that can enable its participants – and participating nation states – to take a bold step toward a more sustainable and collectively profitable future."

The Pennsylvania Rural-Urban Leadership (RULE) Program encourages and fosters the development of adult community leaders from all segments of Pennsylvania. (*source* *http://extension.psu.edu/community/rule/about/mission-and-vision-statements*). RULE explores public issue engagement, inter-organisational networking, effective public decision making, strategic design, and sustainable relationships. J.D. Dunbar, a wonderful whirlwind of a lady, has been the chief administrator of RULE for 28 years. Over lunch we explored the need for leadership in the rural environment. The RULE programme fosters numerous outcomes but the most common and relevant (as stated on their website) to my Nuffield Farming journey, are:

- Increased understanding of the economic, political, cultural and social forces inherent to the public decision making process.
- Enhanced knowledge of the application of leadership skills, processes and strategies to resolve conflict.
- The ability to study community problems and issues from a broad economic, political, cultural and social perspective.
- Increased understanding of contemporary social and economic problems and policy issues, and how to effectively impact public policy.
- An understanding of the budgetary concerns encountered by rural/urban communities.
- An enhanced awareness of international relations and the world economy.
- A broadened understanding of the legislative process and legislative procedure.
- Increased ability and opportunity to participate in local government and non-profit community organisations.
- Expanded and strengthened leadership skills, the catalyst for the democratic process (*Source* *http://extension.psu.edu/community/rule/about/mission-and-vision-statements*).

My time with J.D reminded how important the Nuffield Farming programme and leadership training offered by other stakeholders such as the Worshipful Company of Farmers, actually is. Without strong and skilled leadership, the rural voice will not be heard. The sustainability agenda needs leaders too, and often I find this, and the language used, lacking.

6.10. The Pennsylvania Association of Sustainable Agriculture - Summer Conference

The role of the Pennsylvania Association of Sustainable Agriculture (PASA) is to promote profitable farms that produce healthy food for all people while respecting the natural environment *(see* *https://www.pasafarming.org/about*). As the website states:

"PASA grew out of the need for an educational and support system for farmers - both experienced and beginning - interested in non-traditional agricultural practices, such as organic, biodynamic and grass-based farming, as well as the desire to create local markets for sustainably produced food" I spend two days with the PASA team at their summer conference at the county showground and Penn State farms. I first explored the work of PASA with Bryan Snyder (Executive Director) and Charlie White

(Penn State Extension lead). Bryan explained that PASA has been in existence since 1992 and that it is now the largest state-wide, member-based sustainable farming organisations in the country.

The conference focused on soil health – they key to sustainable farming. We looked at the Penn State minimum tillage and cover crop trials, and heard from a range of speakers on composting, soil bacteria and fungi.

Figure 19: PSU 'crimper roller' used on the cover crop trials

Figure 20: Discussing crops and soil health at the PASA Conference

An important message arising from the event was the true value of cover crops and better rotations that include grass and legumes (such as the herb-rich leys we are now using back at home) when seeking better soil health and yields. Charlie White explained that '*mycorrhizal fungi are beneficial soil organisms that form a symbiotic relationship with living roots. The fungi get sugars from the plants and the plants get more nutrients and water because the thin strands of mycorrhizae act like additional thin roots, scavenging deep into the soil and into hard to reach pores. Mycelluim, the fungi's thread-like network of biomass, can improve soil aggregation by exuding a glue-like compound called glomalin. This binding agent helps soil particles stick together into aggregates that resist erosion and maintain soil porosity. Mycorrhizal fungi do best when we grow hosts including grasses, most vegetables and legumes. In contrast, brassicas and buckwheat are not hosts and the number of mycorrhizae will decrease until another host crop is grown. By using cover crops, and having roots all year-round in the soil, you are providing a habitat for mycorrhizae to thrive and ultimately benefit your soil*.'

The standout sessions for me were run by the renowned and inspirational speaker, Gary Zimmer. Gary, a Wisconsin dairy farmer and animal nutritionist, is one of the world's leading authorities on

'biological farming'. As a consultant he is recognised for improving farming by restoring soils across many thousands of hectares, in the US and further afield.

Figure 21: "*Feed the soil and the soil will feed us*' Gary Zimmer

Biological farming is a hybrid of organic and conventional principles. Gary explains the principle in his book as '*a sustainable method designed to improve yields and to remove obstacles to healthy, efficient production. If the biological properties of the soil are in balance, you can expect optimal outputs, even in bad years. It's about raising productive capacity by working in harmony with nature. Biological farming improves the environment, reduces erosion, disease, weed and insect problems. Feed the soil and the soil will feed us'*.

In his book 'Advanced Biological Farming (Zimmer and Zimmer, 2011) Gary states that '*biological farmers learn how to take care of soil life — they nurture it, feed it a balanced diet, and use tillage tools and methods to enhance soil life. Biological farmers learn proper fertilizer uses to correct mineral and nutrient imbalances to feed plant and soil life'*. This in turn produces healthier food crops, livestock and humans. Another win-win-win!

It is impossible to capture Gary's knowledge and energy here. I recommend you seek out his books and see him in action at a conference one day. But to whet your appetite here are few points that resonated with me during his sessions. Gary emphasised that:

- Organic farming is often a system of *not* doing something whereas biological farming is all about *doing*.
- We need a regenerative approach to rebuilding soil.
- We are not going to feed the world by chasing yields based on NPK and pesticides, but we will if we realise the potential of our soils.
- Use artificial inputs these only when needed (a necessary evil) and focus on feeding the soil and soil bacteria.
- Soil health is everything and it depends on water infiltration, nutrient cycling, minimum disturbance (min till/zone till, and don't damage the middle layer), residue decay (fungal and bacterial activity), no crust, living roots and plant diversity. Test your soil and add what's missing.
- Highly digestible grasses = increased nitrogen in cattle and low protein/energy balance = low quality meat with poor taste/taint.

- Calcium is the most crucial element in the soil system, coupled with organic matter/compost.
- Feed value of tall grass/top third grazing is under estimated by traditional tests.

Before I left the conference, and America, I had a final chat with Gary. We discussed the key problems and the opportunities ahead and he left me with a very moot point. He said '*we have been selecting plant and animal genetics to fit our modern farming systems and soil conditions, but our systems and soils are flawed, and hence our current genetics won't fulfil their potential'.*

Figure 22: Learning more about biological farming and soil management with Gary Zimmer and the PASA/PSU team.

7. Canada

7.1. Background

From the massive wheat fields of the prairies to the orchards and vineyards of the Okanagan valley in the West, Canada is one of the largest and most diverse agricultural producers and exporters in the world. Small grains, particularly wheat, plus soya and maize, dominate large arable areas of Alberta, Ontario, Manitoba and Saskatchewan. Livestock production is also important here. British Columbia to the west is more intimate with mixed farms, dairy producers and vineyards enjoying the maritime climate and chill of the Rocky Mountains.

Vancouver, in British Columbia, was my next stop. I had heard much about the region's efforts to develop a new and sustainable food system, and its 'foodie' culture. Has 'regenerative agriculture' and grass fed production taken off in BC? What challenges is the industry facing? Does urban farming play a role?

7.2. Professor Kai Chan –University of British Columbia, Vancouver

Kai Chan leads the Connecting Human and Natural Systems Lab (CHANS Lab) within the Institute for Resources, Environment and Sustainability at the University of British Columbia (UBC). His research is driven by his '*vision for a world where consideration of social and ecological risks and consequences is fundamental to decision-making' (see* http://chanslab.ires.ubc.ca).

Our discussion focused on ways of promoting and incentivising sustainability within agriculture and land use. The key points we discussed where as follows:

1) Payments for Ecosystems Services (PES) and traditional stewardship schemes will never be truly successful in delivering landscape scale conservation and complex public goods. We agreed that such schemes are often too prescriptive and basic (based on reductionist thinking), focusing on outputs and not outcomes. They are often very expensive to develop, monitor and administer. Kai suggested that PES can actually demotivate some stakeholders (called 'motivational crowding out') and promote displacement activity. The monetarisation of change can work against deeper value change. We need integrated programmes that work on hearts and minds and that recognise complexity theories, and not just profit motives and the bank balance.
2) Alternative models include 'Reverse Conservation Auctions'. Here, the Government or lead NGO develop a proposal for change e.g. new habitat creation along a river corridor, and farmers bid/tender for the work. This method can result in proactive farmer involvement and buy in, and a better understanding of costs/realities. Kai indicated that as there is often only *'one buyer but many sellers'* the market competition can result in value for money bids (often lower than the income forgone/opportunity cost) and cost savings. The system can draw from the farmers' personal values and can offer increased leverage.

3) Another interesting approach could be the use of Conservation Stewardship Bonds. Here, bonds are issued to all engaged stakeholders on the ground (farmers, villagers, utility companies etc.). The bonds are realised and paid on when, and only when, the agreed conservation target e.g. a cleaner watercourse, is met. This can buy in long term commitment, invoke engagement and self-monitoring across the community, and reduce the feeling of short term profiteering.
4) Farmers who are committed to conservation feel a sense of pride. Just as a high yielding clean crop of wheat thrills the arable producer, a species-rich field margin full of invertebrates and voles makes a farmer conservationist smile. This identity, often built over time, this sense of purpose and achievement, can be diminished when others in their community begin to deliver and be rewarded for the same or similar, following PES-type payment and short term policy driven change. Reward and recognition for long term provision and a deeper, value-based commitment to sustainability are important for some. I recognised this concept within myself.

My time with Professor Chan was short lived and we only touched the surface but our meeting sparked lots of interesting thought. We parted with a promise to keep in touch with the possibility of collaborative research. This is one to follow up.

7.3. Edgar Smith – Beaver Meadows Farm, Vancouver Island

Figure 23: Edgar Smith with his Pasturesaurus Dangsteins

Following the most beautiful ferry ride from Vancouver to Vancouver Island, escorted by a majestic pod of killer whales, I ventured up the north coast to the Comox Valley, Beaver Meadows Farm and the home of Edgar Smith and family.

Edgar explained that Pasture Fed (100% grass) accreditation is not yet formalised although they do operate peer to peer assessment and monitoring, alongside their organic assurance, to ensure brand integrity.

The beef herd is an interesting mix of genetics and one that Edgar enthuses. The family, Edgar and his two brothers, once milked 350 cows off grass (one of the largest operations in Canada at the time making award winning pastured Brie) but none of the twelve Smith children currently wants to milk on this scale. The milking herd has been scaled right back. Edgar has, however, kept some of their original Dairy Shorthorn genetics and crossed with Red Angus, Holstein, Ayrshire and Murray Grey blood to create a dual purpose grass based milk/beef breed he calls the *Pasturesaurus*

Dangstein. Wonderful! Thankfully, a younger son is showing interest and the milking operation may soon be re-established.

Figure 24: Promoting good practice at Beaver Meadows Farm

The 600-acre third generation holding is a certified 'heritage farm' recognising that the family have conserved, yet developed (as this is no museum), the style of farming originated by Edgar's grandparents in the 1930s. According to the farms website *(see http://naturalpasturesbeef.ca)* the family have always believed in a natural agricultural production system in sync with nature. The website states that the Smiths are a Conservation Partner with The Land Conservancy, protecting habitat and aquatic life in their streams, fields and forests. Most impressively, they "*have restored the salmon and sea-run cut throat trout habitat across the farm and work with the Little River Enhancement Society to operate a farm hatchery for coho, pink and chum salmon and trout. The Little River is recognized as one of the most productive fresh water salmon habitat streams on Vancouver Island*" as a result of their organic and soil-focused farming practices. Their practices have won numerous conservation awards. Amazing work.

After a tour of the farm I considered what I had discussed with Kai Chan at UBC. I asked Edgar about his motivation. He explained that his Dad did farm intensively and conventionally for a time in the 1970s/80s but when cancer claimed him (the family believe this was linked to pesticide use) they vowed to return to a more natural biological system. Edgar, who travelled the world as in international rower, saw the grass based systems employed in New Zealand and corn has not been fed at Beaver Meadows since. These changes and commitments were not borne from scheme payments or Government policies but they came from the heart. In Edgar's words *'if a farmer values the environment he will protect, enhance and enjoy it'*.

Before leaving Beaver Meadows I queried Edgar about the future of the farm. Who will succeed, who will take the hard work on? This is indeed a problem – there is little support for young farmers in the region and most don't want to farm. One answer is maybe to turn the business into a community trust, working with Comox locals and the ever encroaching urban developments. Time will tell.

7.4. Michael Ableman – Foxglove Farm, Salt Spring Island

Salt Spring Island, a short ferry hop from Vancouver Island, is a beautiful retreat offering organic foodie delights and alternative living. Here I visited food hero Michael Ableman - farmer, author, photographer and food advocate, at his home, Foxglove Farm.

Figure 25: Michael Ableman at Salt Spring Farmers' Market

According to the website, Foxglove is a 120-acre organic holding surrounded by native forest and hillside pastures. It is one of the original homesteads on the island and today it produces strawberries, raspberries, blueberries, asparagus, melons, greens and a range of vegetables, as well as orchards of diverse varieties of peach, plum, apple, pear, quince, persimmon, fig, chestnut, and cherry *(see http://www.foxglovefarmbc.ca*). They also keep a few laying chickens, produce ten acres of grains and legumes, and have over 30 acres of hay and pasture for stock. Good soil management and diversity is key here. Much of the farm's produce is sold at the thriving Salt Spring Island farmers market, and to local stores and select restaurants on the island and in Vancouver and Victoria *(Source: http://www.saltspringtuesdaymarket.com/).* The team also sell direct to farm cottage guests (where I stayed for a couple of nights) and through meals to participants in the workshops held on site. They also run a well-established Community Supported Agriculture (CSA) scheme engaging a good number of Salt Spring families.

Michael has been farming organically since the 1970s and is considered among the pioneers of the international movement. Renowned for his commercial scale organic farming techniques, Ableman has lectured audiences all over the world about the food revolution and agricultural conservation: a true food hero. As well as a wonderful farm of high value delicious bounty, the farm is the base for the Centre for Arts, Ecology and Agriculture.

After a long day in the field with his team of employees, volunteers from around the world and interns, Michael invited me in for tea and a chat. He moved to the holding in 2004 after developing a similar venture in California over the previous 25 years. Working with his partner, Jeanne Marie Herman, he helped develop the farm, the Centre (which now hosts around 20 events a year) and the local food economy of Salt Spring.

Michael has also developed a number of urban farming initiatives, such as Solefood in Vancouver, which he sees as a crucial part of the jigsaw – reconnecting city dwellers with growing.

Overall, his mission has been a great success. However, I sensed unease. Pressed further, Michael expressed concern for the future. On a personal level, he is tiring and at 61, he is seeking someone to take on the farm and hard work. Here is the problem – it is near impossible to find people with the skills, enthusiasm, motivation and ethos to take things forward. Farming is not sexy (although the lifestyle may seem so for many for a short while – the romantic ideal) and organic production often means back breaking high labour input and low reward. Also, young farmers receive little support. Who will do the hard work in the future? Migrant labour can help in some areas but this is not available everywhere.

Michael is also concerned about what he classed as a '*crisis of participation*' - too few people producing food for the masses, a loss of connection, a society that doesn't realise the true cost of food, and continued urbanisation. Industrialisation therefore wins and cheap mechanised commodity production dominates. He suggested that more natural and regenerative systems do not fit well with market economies and the lobbying power of large agri-business.

Feeling slightly downbeat I asked about the positives. Michael agreed that public awareness of food sustainability is on the increase (although he questioned if enough people will act – it is too easy not to change) and that the consumer has more knowledge. Key infrastructure, such as local farmers' markets, internet channels and field to fork restaurants, is better developed than 15 years ago making selling much easier.

He concluded that '*there is hope, it is early days for the revolution, we just need to keep nurturing the skills, seeds and troops'* before retiring to bed.

Michael Ableman has written three books: From the Good Earth: A celebration of growing food around the world; On Good Land: The autobiography of an urban farm; and Fields of Plenty: A farmer's journey in search of real food and the people who grow it (Source: http://www.driftwoodgulfislandsmedia.com/ . I beg readers to seek out one or all of his works for the passion and photography alone.

8. Ireland

8.1. Background

Many of our most precious landscapes rely on active farming for their creation and management. But should these High Nature Value Farming (HNVF) areas be expected to produce more food or less in the future? How can the HNVF farm businesses survive into the future and will/how will society pay for the provision of public goods?

My trip to Romania had answered some of my initial questions but I still had lots to consider. A quick trip to Ireland and The Burren, with my Nuffield Farming sponsor The National Trust, filled in some of the blanks

8.2. The Burren, County Clare, Ireland

The Burren is a stunning limestone karst landscape in County Clare. It covers around 250 square kilometres. 'Burren' means a rocky place. However, the area has also been referred to as 'Fertile Rock' as amongst the clints and grikes of the limestone pavement a rich mixture of herbal and floral species flourish. I was in wildflower heaven!

In 1651 a Cromwellian Army Officer named Ludlow (*source:* http://www.burrennationalpark.ie) remarked, '*of this barony it is said that it is a country where there is not water enough to drown a man, wood enough to hang one, nor earth enough to bury them. This last is so scarce that the inhabitants steal it from one another and yet their cattle are very fat. The grass grows in tufts of earth of two or three foot square which lies between the limestone rocks and is very sweet and nourishing.'* Maybe this area is or was ideal for great tasting pastured cattle?

The influence of people on the landscape can be traced back 6,000 years to Mesolithic times. So, as good as the wildlife is, the archaeology is just as important. The area was relatively intensively farmed in the bronze and stone ages, with many of the limestone walls that cross the area being ancient. There are also a huge number of stone barns, ring forts and tower houses.

The dominance of the free-draining limestone means that there is very little water in the landscape during the summer. Only one river runs through the entire region even though average rainfall is in excess of 200cm per annum. In winter the turloughs fill with water and water flows from springs. In contrast, summer is a time of drought, when rainwater harvesting becomes necessary. Where the limestone is warmed by the sun it creates what is known locally as the "dry lie". This combination of features, plus a naturally mild winter climate, makes the area uniquely well placed to overwinter stock. This has resulted in an unusual tradition of having stock overwintering on the hill tops leaving wildflowers to flourish in the summer. Farmers from as far afield as Dublin have historically owned land here for the purpose of overwintering.

Two hundred years ago the area was important for sheep which were said to be raised earlier and have sweeter meat than from elsewhere. Cattle have also always been important - historically, Shorthorn, and then Angus and Hereford breeds. In the 1960s and 70s over 70% of the suckler cows were Shorthorn.

Today, the area supports predominantly suckler beef production for the store trade with Charolais and Limousin and their crosses being the dominant breeds. There seems to be a reliable market for Burren stores selling at 850 Euros consistently. I couldn't help thinking that a move back to native breeds and finishing for a premium 'species rich pasture fed' market might be worth considering.

Typically cattle are taken up to the hill winterage in October. The cattle are then returned to better lower land in spring and sold as stores in the autumn markets. The cattle lose condition over winter but improve in spring faster than housed cattle. The average herd size is approximately 35 suckler cows. Given the amount of rock present, it is the area of available grazing land that is more important than the actual acreage of the holding. Local farmers tend not to talk about how many acres they have but more about how many cattle a particular farm can carry.

Sadly, over the last few decades, due to the decline in farm profitability, farm labour and the range of practical challenges faced in the Burren (including the introduction of SAC designation and rigid prescription based agri-environment schemes) there were considerable declines in grazing cattle on the hills, excessive scrub encroachment and intensification of the lower land. The HNVF mosaic could have been lost for ever if it wasn't for the work of the Burren Life Programme.

8.3. The Burren Life Programme

Since 2005, the EU funded Burren Life Programme (under its various guises) has worked, following an innovative yet simple model, with farmers and local communities to develop and deliver sustainable HNVF practices. It was created as a bespoke and targeted local scheme, working alongside the Basic Payment Scheme and national agri-environment schemes. The programme is now open to 500 farmers with 5ha or more eligible land operating with a £3-4million annual budget from Ireland's Pillar 2 pot.

Figure 26: Exploring The Burren and its species rich pastures

Valuable time with Dr Brendan Dunford (Programme Manager and inspirational driving force) and Dr Sharon Parr (Programme Scientist and lynch pin), meeting local farmers and other stakeholder, over two eye-opening days, gave me good initial insight into this amazing and exemplar project.

The key lessons I gleaned from the visit and highlights of the programme (*adapted from* http://burrenprogramme.com/the-programme/our-approach) were:

1) **Leadership** - without the vision, passion and hard work of Brendan (who first worked in the Burren in 1998 as a PhD student investigating the relationship between the landscape and habitats and farming) and his team, this programme would not have been what it is today. In fact, it may not have existed.
2) **Engagement** - from day one the programme team have talked and listened to the local community, and embedded themselves within it.
3) **Communication** - the language used is practical and clear, and delivered in a range of channels, from one to one (crucial), group gatherings, best practice guides and celebrations.
4) **Farmer Focused** - farmers nominate and co-fund conservation actions on their own farms and are generally free to manage the land as they see fit (within the law) to meet the outcomes. This achieves buy-in and ownership, nurturing the farmers' conservation pride.
5) **Simplicity** - the team minimises the bureaucratic burden (e.g. using just a simple 3-page farm plan) so that farmers can concentrate on what they do best - farming! Only 12% of the budget is spent on delivery.
6) **Results Based** - the scheme rewards those farmers who deliver the highest environmental benefits. Conservation becomes as much a product for the farmer as the livestock produced.
7) **Flexibility** - farmers are given the freedom to deliver the required outputs using their own skills, experiences and resources, as best fits their own farms and circumstances. This flexibility means that Burren Programme is capable of responding to the different needs and situations which invariably arise, from farm to farm, and from year to year.
8) **Practical** - focusing on works which address real needs in the Burren and which will yield real agricultural and environmental benefits.
9) **Holistic** - the team don't just focus on nature. The programme recognises the link between economic viability, community cohesion, heritage, wildlife and landscape.

8.4. The BurrenBeo Trust

We also met with Brigid Barry from the BurrenBeo Trust. BurrenBeo is an independent charity of 4 staff and about 300 volunteers, about 90 of whom are active. There are 46 separate programmes including a modular based schools programme involving 33 schools, running over 20 weeks including place-based learning (a great idea), a winterage weekend and a community festival. The aim is to create a stronger sense of place linking the built, natural and cultural heritage. Connecting people with their local heritage and history has increased the level of pride and community. Working closely with the Burren Life programme means that there can be good engagement with farmers involved in the project resulting to farmer-led walks and talks etc.

9. China and Hong Kong

9.1. Background

September 2016 brought my 18 month Nuffield Farming journey to a close. Flying over an expanse of Siberia and the Mongolian steppes to Hong Kong and China put much of what I had seen before in perspective. If we are to develop a more sustainable world food economy, we must look east. While we fiddle with field margins and skylark plots, Rome burns.

9.2. Exploring Hong Kong

Hong Kong is much more than the famous and crazed metropolitan area of Hong Kong Island (the most populated area in the world with up to 400,000 people per Km2). Just 30 minutes by boat or train takes you deep into rural communities typified by native forest, small scale farming, deserted beaches and low rise development.

Travelling out of town I came across a herd of wild cattle grazing the road verge. I didn't expect that! According to Hong Kong's Agriculture, Fisheries and Conservation Department (AFCD), there are two main groups of stray bovine in Hong Kong: water buffalo and brown cattle. Both were used by local farmers for centuries as draught animals to plough rice fields but, as local agriculture declined in the 1970s, they were abandoned. Their descendants became the wild cattle now commonly seen in Hong Kong's suburban areas, particularly in the New Territories and on Lantau Island. Apparently, there are now over 1200 cows wandering around.

According to AFCD (*source* *http://www.gov.hk/en/about/abouthk/factsheets/docs/agriculture.pdf*) Hong Kong consists largely of steep hillside and plateau land. Only 7km^2 (out of a total land mass of over 1100km^2) of land are now actively farmed. Farms are generally small in size and they produce mainly leafy vegetables, pigs or poultry. The mind boggling daily fresh food consumption by Hong Kong's population, of more than seven million, was 869 tonnes of rice, 2258 tonnes of vegetables, 4573 head of pigs, 49 head of cattle and 23 tonnes of poultry in 2015 (Source: http://www.gov.hk/en/about/abouthk/factsheets/docs/agriculture.pdf . Much of this is imported (including a small amount of traditional breed grass-fed beef from the UK – spotted in a high end Central district supermarket) but Hong Kong's primary producers still help to satisfy some of the demand. AFCD states that the gross value of local agricultural production was $945 million in 2015.

"Two per cent of the vegetables Hong Kong people consumed, together with 95 per cent of the live poultry and 6 per cent of the live pigs, come from local farms. Local production is geared to complement rather than compete with other major market suppliers. Production efforts are aimed mainly at high-value fresh foods." Source: http://www.gov.hk/en/about/abouthk/factsheets/docs/agriculture.pdf).

There has been a sad demise of agriculture in Hong Kong. Farming was once a bigger player.

"*To reduce the public health and environmental pollution problems associated with livestock keeping, the Government introduced a Voluntary Surrender Scheme for Poultry and Pig Farms in 2005 as well as a Buyout Scheme for Poultry Farms in 2008. These schemes encourage livestock keepers to surrender their [Livestock Keeping Licence] (KLs and cease their farm operation permanently in return for payment. Under these schemes, 162 poultry farmers and 222 pig farmers surrendered their LKL*."

(Source: http://www.afcd.gov.hk/misc/download/annualreport2012/eng/agriculture.html)"

Hong Kong has only one licensed dairy farm, located in Sha Tau Kok, New Territories.

9.3. Kadoorie Organic Farm and Botanic Gardens – Hong Kong

Kadoorie Farm and Botanic Garden (KFBG) covers in excess of 148 hectares of land on the northern slopes of Tai Mo Shan, Hong Kong's highest mountain, near Tai Po (See http://www.kfbg.org/eng/). KFBG sits between two deep mountain ridges. On the slopes there are forest, themed gardens and vegetable terraces plus 8km of walking trails to and from the main conservation and educational facilities. Around 200 staff members work for KFBG.

The Kadoorie brothers, Sir Horace and Lord Lawrence, sowed the seeds of the Kadoorie Farm when they founded the Kadoorie Agricultural Aid Association (KAAA) in 1951 to provide agricultural aid to farmers and Chinese civil war refugees in need of support to help them lead independent lives; and to provide leisure and educational experience for the public *(see http://www.kfbg.org/eng/aboutkfbg.aspx*). The KAAA's aim was to encourage a philosophy of 'Helping People Help Themselves'. Those in need were given training, provided with agricultural inputs and interest-free loans to set them on the path to becoming independent.

The farm, as stated on the KFBG website, was established in 1956 as an experimental and extension farm; as a centre to demonstrate effective and profitable crop production and animal husbandry techniques, to improve livestock breeds and to train local farmers and Hong Kong-based Gurkha soldiers in farming so that they could have some income when they returned home to Nepal. Special hybrids of pigs and chickens were selectively bred, and these made a big contribution towards food security. The result was a revitalisation, not only of the local economy, but also of the hopes and dreams of the people of the New Territories and Outlying Islands. (*Source: http://www.kfbg.org/eng/*

Times have changed in Hong Kong and farming has declined. Environmental issues are now a key focus of KFBG's work. In 1995, Kadoorie became a centre for a '*new era of flora and fauna conservation, organic agriculture, environmental education and a focus on sustainability in Hong Kong and beyond*' *(source http://www.kfbg.org/eng/early-days.aspx).* In 1998, KFBG extended its work into mainland China.

KFBGs mission is to '*harmonise our relationship with the environment*' with a vision of '*a world in which people live sustainably with respect for each other and nature*'. The organisation's core values (*source: http://www.kfbg.org/eng/aboutkfbg.aspx*) are as similarly impressive and inspirational, and worth listing here in full as listed on the website:

"*Building a Sustainable Farm Business*" … by Jonathan Brunyee
A Nuffield Farming Scholarships Trust report … generously sponsored by The National Trust

1. **Sustainable Living** - Appreciating the impact of our actions with regard to current and future generations. Having awareness of our connection with the environment. Valuing simple and responsible lifestyles.
2. **Justice** - Being fair and accountable. Valuing socially equitable systems that protect the health of the planet, the people and their way of life. Protecting future generations.
3. **Love -** Having self-awareness and understanding of the inter-relationship of all things. Having compassion and respect for all life. Recognising that outer discord is a reflection of inner discord. Striving for inner silence.
4. **Participation** - Engaging mentally, physically, emotionally and spiritually; fostering respect for different viewpoints, openness, dialogue and teamwork.
5. **Professionalism** - Being a role model of caring, integrity, commitment, professional standards and best practices for partners, organisations, individuals and communities.
6. **Learning** - Being adaptive and flexible to changing circumstances. Having a holistic outlook. Being practical, objective, creative and insightful.
7. **Happiness** - Appreciating that our happiness lies in creating and sharing happiness with others.

So, how does KFBG fit in today's society? I met with Professor Tam Yip-shing, Senior Sustainable Agriculture Officer. A tour of the facility, viewing the vegetable gardens, apiary, farm shop, composting sheds and reed bed water treatment, gave me a feel for the range of work undertaken here and how important this type of demonstration and research is for farmers, schools and the local community alike. But Hong Kong's statistics and the decline of farming in the region made me think of the words of Michael Ableman and what he termed as '*the crisis of participation*'. While there is a definite urban/vertical farming movement gathering pace in the city, new programmes of support for small scale farming in rural areas is needed before the land, skill and connection is forever lost. Kadoorie felt like a few hectares of hope in a land of concrete and stainless steel.

9.4. A taste of China - Shandong Agricultural University, Tai'an

Agriculture is a vital industry in China, employing over 300 million farmers out of a population of approximately 1.4 billion. Through my work at the Royal Agricultural University I was asked to teach business planning to Food Science students at the Shandong Agricultural University (SDAU) in Tai'an city. A two-week stint allowed me to get a feel for food and farming in this part of China, and to meet a number of local experts and fellow lecturers.

Shandong's population (*see* https://www.britannica.com/place/Shandong-province-China) is predominantly Northern Mandarin-speaking and of Han (Chinese) origin, but there are small concentrations of Hui (Chinese Muslims). According to the web source, "*the population, more than half of which is classified as rural, is fairly evenly distributed over the level, cultivated areas of the province….. The success of agriculture in Shandong since 1949 is attributable to extensive investment in irrigation, flood control, and soil-conservation measures; drainage of alkalinised and salinised land; and increased mechanisation… The leading food crops—wheat, corn (maize), soybeans, kaoliang (a variety of sorghum), spiked millet and sweet potatoes—account for most of the total cultivated acreage of the province*." Peanuts (groundnuts), cotton, tobacco and hemp are also grown. Livestock

plays an important role too with pigs, sheep, yellow oxen, and donkeys the main stock. Sericulture (silkworm farming), is another important Shandong activity.

I asked Professor Ge Wenguang from the Agricultural University of Hebei about the structure of the organic movement in China. She highlighted that formal attempts to assure organic production have been mixed due to food fraud and lack of consumer trust. I think this will improve with time. She also suggested that farmer cooperation was still low and that small fragmented businesses still dominate. There is much more to do here.

Agri-tourism, suggested Lily Shi, Lecturer from the Hebei College of Landscape and Travel, is a booming sector in China and one in which my students showed entrepreneurial interest. As more people become urbanised there is a desire to reconnect with their rural heritage and family culture. We discussed the opportunities for travel exchanges, visiting scholars and teaching cooperation.

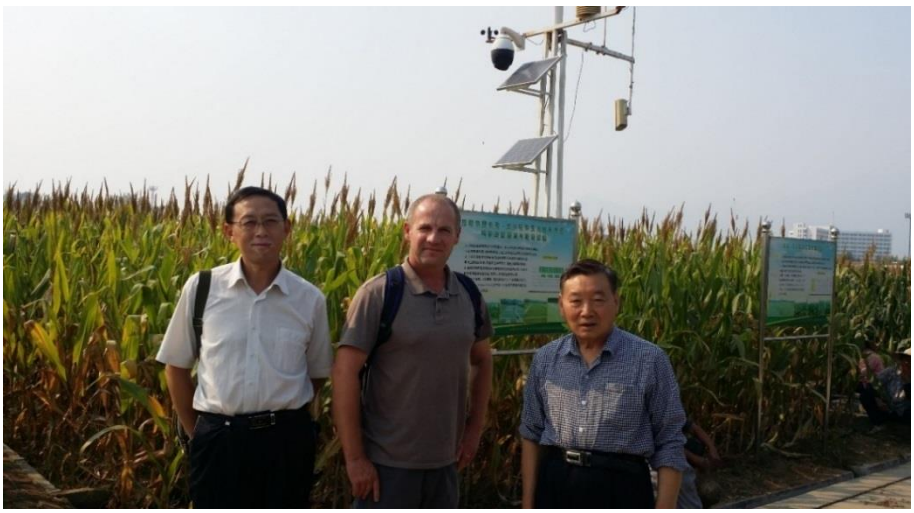

Figure 27: Visiting SDAUs research station with Professor Juing, Lecturer in Food Science

A visit to SDAU's research station with Professor Juing, SDAU Lecturer in Food Science and Technology, revealed some interesting work on maize. Maize production seemed to dominate the region with most of it going into livestock feed to meet the ever increasing, exponential, demands for red meat and milk (which the Government has vowed to tackle). I didn't see any cattle grazing outside – maybe these farms are further afield and indoors?

China is a vast country of extremes with particular issues and problems. I came away enjoying the politeness of its people and surprisingly gentle pace of daily life, and a deeper respect for their efforts to face future challenges. Through the smog I felt the warmth of the sun.

On the Sunday before I left for Beijing and home, I was awoken by the city's air raid sirens. Quite an alarming sound I can assure you! Turning on the TV news I was reminded of the obvious tensions in the area (North Korea is just over the horizon) and the nation's hunger for additional natural resources. But then came two reports that suggested an alternative future; one story announced China's new gene bank, the largest in the world, committed to protecting biodiversity; and one story

covered the United Nations summit in New York where China reported back, positively, against the UN's Sustainable Development Goals.

Globalisation and China's policy of 'soft power' and world trade domination (with the UK playing nothing but a small bit part) will continue, but maybe a more mature, greener and more sustainable economy is putting down roots. I feel I will be back in China again one day.

10. Conclusions

Bringing such a broad and holistic exploration together into a set of conclusions is not easy. However, below are the key concluding themes arising from my study.

1. Tell our story and celebrate our industry

My study has reconfirmed my belief in the farming industry. While there are numerous problems and glaring disparities, farming is a career and way of life full of heritage, great people and promise. No other industry delivers so much; from food and fuel to fun, flora and fauna. While the industry has borne the brunt of much criticism over the years, and quite rightly so in many cases, we also have many of the answers to society's ills at our fingertips - there are great opportunities ahead if we work together. Let's tell our story and celebrate. It is easy to forget, when bogged down in mud, paperwork or routine, how wonderful and colourful farming is sometimes. Travelling has reminded me why I love farming.

2. Put soil health first

The clearest conclusion from my study is the importance of soil health. Without a fully functioning soil we do not have the foundation for a sustainable farm business. Without good soil management our yields will not meet the needs of the future. While this is recognised in all the countries I visited I still saw and heard of examples of bad practice. We must do more for soil organic matter, and improve our understanding of bacterial and fungal activity. Minimal tillage, cover crops, composting and better rotations that include grasses and herbs, are all crucial. And improved soils must span all labels – whether organic, biological or conventional – with the use of natural and agro-ecological processes being the norm.

3. Celebrate the role of small farmers

Small farmers across the globe deliver so much. From the peasant farmers in Romania and China, to the part time graziers in Ireland and the family farms in North America, the smaller farm remains the bedrock of the industry and of fragile rural communities. Their production is not fully captured by traditional GDP measures, and associated economic and social multiplier effects are complex. To avoid a spiraling crisis of participation we need to celebrate and support the role of small farmers and seek more eyes per acre.

4. Nurture people

It is often easy to overlook the role of human capital in a farm business. Without good people a business is nothing. A sustainable farm business needs people with passion, energy, skills and knowledge. We need people who are prepared to work hard for just reward and progression. A sustainable industry needs leaders with vision and inspirational communication and management skills. The most impressive businesses I experienced engaged with others at all levels. The best programmes and policies understand stakeholders' motivations and leverage points.

5. Seek outcomes not output, effectiveness not efficiency

If we measure the wrong things we get the wrong answers and develop the wrong strategies. I have seen too many businesses focus on output (tonnes per ha, litres per cow etc.) at the expense of outcomes (net profit, improved soil, happier workforce etc.). Drives for efficiency and economies of scale, such as larger farmed units with a simplified system, can result in a reduced set of outcomes. A sustainable farm business will seek balanced economic, environmental and social objectives and targets using a more holistic approach. A sustainable food and farming policy will consider the range of public goods and not just focus on food security. A change of mindset is needed here.

6. Build diversity and complexity

For too long we have followed reductionist science and policies of specialisation. My Nuffield Farming journey has proven to me the value of diversity at all levels. We need diversity of farm types, entrepreneurs and enterprises within farms. We need a diversity of plants in our grassland swards providing different rooting depths and nutrient attributes. We need a cropping and habitat mosaic not based on over-simplified prescriptions. We need biodiversity – from pollinators and earth worms, to rare breed genetics. We need a diversity of people. Diversity and complexity brings increased resilience (to, for example, climate change) and economic, agronomic, environmental and social benefits.

7. Seek regenerative agricultural systems

Our soils, ecosystems, biodiversity and natural resources are being continually depleted. We are far from achieving a sustainable level of existence and development. While we can find some success e.g. better air quality in the UK, more hedges planted than removed, we are still on a crash course to self-extinction. While our house in the West may be in better order, most of the world is yet to face the task ahead. Their priority is economic growth and basic food security. To help turn the tide I believe we must move away from simplistic policies based on sustainability and the status quo. We must be bold and seek and support regenerative systems - practices that put more back than they take out. Regenerative agriculture can rebuild soil, enhance habitats, strengthen rural communities and create new business opportunities. Organic farming approaches are key here but conventional technologies and innovation play a role too.

8. Move to a true cost paradigm

It can be said that it is more profitable to farm unsustainably than it is to farm sustainably. The drive for cheap food is forcing this race to the bottom. The external costs of our food system are passed on to others or ignored. We need to develop a new system, a true cost paradigm, that places fair monetary value on the benefits and impacts of different farming and food production systems. We should introduce policies that correct damaging practices and support the development of systems that deliver positive environmental and public-health outcomes.

11. Recommendations for the future

Considering my journey and resulting conclusions, what recommendations can I offer the industry and my Nuffield Farming sponsor? On a more personal level, what does it mean for my farming business and my role as a university lecturer? My recommendations and suggested actions, taking into account the implications of Brexit, follow:

11.1. Industry

a) UK government should work with all farming, food and environmental stakeholders to develop a new integrated food and environment strategy with regenerative agriculture and soil at its very heart. Food security goals should not drive this strategy – output should be balanced with the diverse range of economic, environmental and social outcomes. The strategy should seek a new partnership between local consumers and producers, nurture people within the industry and celebrate the smaller farmer.

b) The industry should work together to develop a new support mechanism for UK farmers that rewards the provision of valued environmental and social public goods. New models of delivery should be considered and a true cost paradigm introduced. The scheme should be based on results (those providing the most public goods receive more) and be simple, practical and value for money.

c) Industry should work and support rural entrepreneurs promoting diversity of enterprise, cooperation and good leadership. Particular emphasis should be placed on developing new enterprises that draw on and build (not deplete) natural and social capital, for example, local food initiatives, appropriate renewable energy schemes, agri-tourism/eco-tourism projects and educational activity.

d) Industry should press for improved food legislation and labelling, backed by an industry campaign, to help consumers choose, value and pay the true cost of UK produce of defined quality. British should mean British, grass-fed should mean 100% grass-fed, and the farm brand should be the farm of origin.

11.2. The National Trust

a) The National Trust should further engage with the Government and wider industry, leading the development of strategies and support mechanisms that reward multi-functional and regenerative agriculture. Whereas the industry should not focus on food security at all costs, the Trust should seek a range of outcomes too.

b) The National Trust should be bold and innovative, and trial new models of support, communication and advice delivery e.g. testing the reverse auction or payments for results models, building exemplar sustainable farms and estates.

c) The Trust should ensure their holdings are attractive and open to young farmers and rural entrepreneurs, helping to nurture the next generation and human capital.

d) The Trust should recognise and celebrate the role of the smaller farm, particularly in HNVF areas.

11.3. Conygree Farm

a) At Conygree Farm we should show further commitment to regenerative agriculture by developing our current organic and Pasture Fed system further - turning sunlight into Sunday dinner. We will develop our soil management and tall grass grazing skills and knowledge.
b) We shall consider new farming enterprises such as pastured chickens that complement our existing structure and meet our key aims. We shall work with others where necessary, in partnership, to build and deliver these new enterprises.
c) We will research and develop a new agri-tourism-based enterprise on the farm drawing on our environmental assets. This activity will also facilitate additional connection with the consumer and new educational opportunities. We shall seek to thrive without EU subsidy.
d) I shall step up and support change at strategic level, working for organisations such as the Pasture Fed Livestock Association that seek to promote more sustainable farming and food systems.

Figure 28: I will seek to promote more sustainable farming and food systems at strategic level working with organisations such as the Pasture Fed Livestock Association

11.4. The Royal Agricultural University

a) I shall develop some of my Nuffield Farming themes by undertaking additional research. Collaboration opportunities exist with the academics I have met.
b) I believe there is growing interest in regenerative agriculture, agro-ecology, sustainable farm business and food chains, and eco-entrepreneurship. These subjects should be embedded further in a holistic curriculum.
c) Rural tourism is a growing sector across the globe. I shall continue to pursue this area developing new programmes and modules as demand requires.
d) Knowledge exchange and extension should be at the heart of the RAU, turning research into action in the field. I shall work to help develop the RAU's industry links and farmer focused impact.

12. Final reflections

My Nuffield Farming experience has been a joyful challenge. I have had many sleepless night thinking around my topic, planning trips and reflecting on my findings, gaps and ideas. Fitting travel around a full time job, a part time farm and a growing family has not always been easy, but we did it, and I made lifelong friends along the way.

Looking back at my original study aims - I think I have addressed them all, at least in part. I have also learnt numerous things I hadn't considered. There is much more to do and I feel I have only just begun. My journey is not complete and my quest for a more sustainable farming industry will continue.

On a personal level I finish my Scholarship period feeling inspired and enthused, with more confidence. I increasingly see things from a deeper and global perspective. I have new ideas for my farm business and my teaching at the RAU. I have recently stepped up to be a Director of the Pasture Fed Livestock Association.

My Nuffield Farming journey was more than just an international study tour. Many hours have been spent Googling, researching, reading and emailing. I have found lots of other projects, people and places that I would like to visit and engage with in the future, given time. I have found new authors and thinkers.

The numerous contacts made and initiatives experienced in the UK over the last 18 months, none of which are covered here in this report, have also been a valuable part of my journey. The rewilding and tourism work of Charlie Burrell on the Knepp Estate in West Sussex, the organic ethos followed by David Wilson the farm manager of Duchy Home Farm near Tetbury, and the various pasture-fed farmers I have met along the way, have all left a positive imprint. The energy and direction of all those involved in the Oxford Real Farming Conference, the Sustainable Food Trust and Agricology movement at Daylesford also deserve a mention.

When we visited Brussels in February 2015, Brexit was not on the agenda. We discussed how we could improve CAP and how we could better work with, and influence, our EU partners. I don't think we saw a Leave vote coming – we weren't that mad! But leave we will and we must now make the most of it.

I am not sure yet how Conygree Farm will survive if support for all our conservation work is withdrawn. Hopefully, by putting some of the lessons learnt on my Nuffield Farming adventure into practice, we will thrive. I worry for the medium sized family unit and farm tenants – little scope to expand and no time or capital for further diversification. Intensive agriculture maybe the biggest winner.

The challenge for the industry is to build new integrated policies and mechanisms for farming, food and the environment that deliver the full range of public goods. This will take time, clear thinking, leadership, communication and a decent budget. Brexit should be seen as an opportunity to build a more sustainable, dare I say, regenerative system that works with nature, not against it.

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