



THE JAMES MARTIN 21ST CENTURY SCHOOL UNIVERSITY OF OXFORD



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SYMPOSIUM: AN AGRARIAN RENAISSANCE?

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On 2 July 2009 the Policy Foresight Programme in the James Martin 21st Century School at Oxford University held a one day symposium on An Agrarian Renaissance?

Sir Crispin Tickell chaired the event.

The first speaker was **Colin Tudge**.

He said that while he did not write off Genetically Modified Organisms (GMOs) as such, he welcomed the application of excellent and appropriate science and technology to farming. The best way forward to meet the future needs of the planet and its growing population was combined knowledge from traditional and new technology. He emphasized that we needed to get the fundamental priorities right, with principles of sound biology put back at the heart of agriculture.

He then outlined three principal options for the future of agriculture:

- First, we could continue with ever more industrialized global farming. This replaced labour with big machines, extended industrial chemistry and biotech, reduced traditional systems from polyculture (mixed farming) to monoculture (single species), increased centralized production and measured success in cash. However this was already proven to be far too dependent on oil, too profligate with water and non-renewables, and harmful to wildlife and the soil. As a nation it left us heavily reliant on food imports and vulnerable to food security issues. In an age of obvious climate change this method was seen to be dangerously inflexible and undesirable.
- Secondly some now embraced the idea of a “sustainable industrial model” envisaged as retaining the best of present day systems, but adapting them to more sustainable methods. This concept was not entirely worked out, but it started from the premise that present-day economics, global institutions, governments and commerce were given. It operated within the global free market, and was still heavily subject to present day industrialized high tech including GMOs.
- He rejected both these options in favour of a third way. If we were to feed everyone acceptably without further wrecking the planet, then we must

design farming specifically for that purpose. This system would be rooted in the bedrock principles of biology (physical reality) and morality (a genuine concern for human wellbeing and for other species). Farming should emulate nature and derive its inputs from renewables, aspiring to waste nothing. Such systems would be naturally highly diverse, balancing crops and livestock together. In general nature was self-renewing and we should follow more closely nature's own guidelines. The husbandry require to achieve such diversity was necessarily intricate. It was in character labour intensive. Therefore it followed that such farms of the future should be small to medium sized, and fully mixed. He called such farming, designed expressly to feed people well and rooted in principles of biology rather than economic dogma, "Enlightened Agriculture". But to achieve it required a radical shift that amounted to an "Agrarian Renaissance". Enlightened Agriculture had a traditional structure and might therefore look old fashioned, but polyculture required an appreciation of science and technology more subtle than the industrial chemistry and biotech which predominated the industrialized present. It was far better equipped to provide the necessary yields over long periods, and in the face of changing conditions.

Much of third world farming was already of this kind. Far from being inefficient it was free from the vast amounts of waste and pollution that we had created elsewhere. We needed completely to re-think quickly and deeply. The Agrarian Renaissance was vital and urgent.

Professor John Beddington (Chief Scientific Adviser to the Government and, Head of the Government Office for Science) spoke next on World Agriculture Priorities and Plausible Ways Forward.

He said that sadly he had to disagree with a lot of what Colin Tudge had said: in particular that small would be better than big. Small scale was not going to feed the world in 2030. He turned to the Ministry of Defence and the Hadley Centre for facts and figures about three major future planetary drivers identified as food, energy and water. They made for some very gloomy predictions.

Future expectations of demand for these 'drivers' were coined by the new slick phrase heading towards the Perfect Storm scenario. Recent global projections for 2030 from the Hadley Centre calculated the different impacts on the planet of a predicted population rise to 8.3 billion by 2030. This increased population included a seven fold increase of middle class people. They were demanding 'better' standards of living which incorporated changing their traditional diets to include much more meat. It was projected that the increased population would necessitate a 50% increase in demand for energy and food, and a 30% increase in demand for water. Enlarged demands were already causing a run down of fertile farmland, increased pollution and shortage of fresh and salt water. Water stresses, drought risk, crop decline, low grain stocks, melting of Arctic ice and many other major environmental hazards added up to multiple environmental stress, which would lead to instability in the most affected areas. More people meant less cultivated land per person for food, cattle feed, (agro)-fuel and fibre production. Water wars, hunger, coastal flooding and multiple conflict areas could be the outcome.

All this was set against an alarming depletion of the world's natural resources. Food riots in the first half of 2008, and the spike of food prices, was an example of how all too easily such situations can become major flash points. Only massive inputs from the G8 had averted a major catastrophe. It was not simple to deal with the dramatic economic differences and policies and aid agreements between countries. Trade agreements were complicated and difficult to manage. We needed more international regulation, not less. These major global problems needed scaled up support to deal with them. Biotechnology could help provide some of the solutions. There was no doubt that more efficiency in agricultural practices was necessary. A 40% crop loss due to pest and disease was not acceptable. GM could provide some solutions

for improved drought and saline tolerance and resistance to pests and disease. It was true that large corporations needed watching and monitoring, and global institutions were set up to guard the public interest and were working hard to protect fair play. This was not always easy to administer.

To be most efficient on the scale required by the Hadley Projections, world agriculture needed to be on a big scale. It was no longer a simple world and simple solutions were not the answer for the complexities of globalization. It was well understood that agriculture needed to operate with far less inputs, not least from fossil fuels, and with much greater efficiency in water use. The Government was clear that more support for rural communities and traditional skills was desirable and that animal welfare was important in the public mind. Far from shunning sustainable agriculture it was doing much to promote it. He agreed that small scale agriculture would play a part, but as a predominant global system it would not feed the world.

Professor Robert Watson (DEFRA Chief Scientific Advisor) spoke on World Agriculture Priorities and Plausible Ways Forward.

He began by outlining global agricultural problems in general terms. The problems were simple to identify, but all carried major implications. At the moment global food production exceeded population growth. Nevertheless one billion people went hungry due to uneven distribution. There had been a recent doubling of cereal prices causing the first alarming modern-day incident of food rioting. There were huge changes in world diets with a much greater demand for meat from countries like China and India. These new demands were heavy burdens for agriculture to carry. There needed to be vast improvement in water use globally. Measures to counter the alarming decline in fertile soil worldwide were necessary. We needed to heed animal welfare, incorporate much greater biodiversity, vastly reduce post harvest waste, incorporate more equitable distribution of food, take better care of our fisheries and reduce perverse subsidies and trade agreements. Taking due heed of climate change would bring opportunities, but also set challenges in different cropping patterns. All this would amount to the whole context of farming as we know it having to change.

There was no doubt that agricultural methods over the past sixty years were responsible for huge environmental degradation. Governments now recognized the value of indigenous and traditional farming knowledge. Small scale farming has its place and would remain dominant in such places as Sub-Saharan Africa, many parts of Asia and other parts of the world, but not China any more: it was moving ahead in an industrialized way.

To make small scale agriculture viable, we had to empower the small farmer and retain or rebuild the skill base required. This was not always easy in our own country, let alone in other places. This was very much a political problem as well as an agrarian one. Future sustainable farming and food strategy should be at the centre of an over-arching policy framework for farming and food. It must identify how governments could work within the whole food chain to secure a sustainable and viable future for farming and the food industries. The future had to be a mix of traditional knowledge, science and technology, working together for big and small farmers. GMOs could help a lot of problems. But it was essential to understand fully the risks and benefits from new technologies. Environmental safety, human health and biodiversity were now at the heart of research programmes. There was much stricter monitoring than ever before. The changing context of farming produced many research scenarios and projections to choose from and governments were consulting the experts.

Agricultural production needed to double in the next 25-50 years to avoid the projections of hunger and poverty worldwide. Global food security would be achievable, but business-as-usual policies, practices

and technologies had to evolve to enable this. Innovation along the whole food chain, involving all relevant stakeholders, was critical. Above all we needed the right global institutions in place to make sure of even distribution once healthy crops had been harvested. There was no turning back from globalization and all its downsides. We had to learn to live with it but try and put in place protective improvements.

Professor Martin Wolfe (of the Organic Research Centre – Elm Farm) spoke on *The Future of Farming: Whole Systems Biology*.

As both a research scientist and farmer, he presented a crash course in 'Whole Systems Eco Farming' as operated in Britain. Eco-system farming required a sound understanding of many complex agricultural disciplines. It was a delicate mix of science and art. Its very nature was to mix agro-forestry, cropping patterns and livestock all together. Planting trees for shelter, fruits and materials, breeding livestock for a variety of uses not just for meat and running them along side the crops, and planting patterns needed an intricate knowledge of sowing mixtures and intercropping. Multipurpose breeding and multi-sowing patterns formed an integral part of eco-system farming.

When in place this system should be able to meet most of our needs for food, shelter and heating from one homogeneous organic unit. Traditional technology of grassland, grazing, rotational cereals, horticulture, soft fruits and vegetables, farm mechanics, were all brought into play. An understanding of natural ecosystems and their interdependence was paramount in this system. Perforce the farming units would be small to medium sized as labour generally replaced fossil fuel. Encouraging natural wildlife, plant and fauna and working with the land instead of against it reduced pests and diseases as nature had intended.

New science, although lamentably underfunded in this field, was under way and producing interesting results such as breeding for semio-chemicals, a means by which plants signalled for predators to consume their pests and diseases. The climate change predicament, soil quality, water issues, air quality, biodiversity were not challenged by this system. These problems were seen as having to be tackled simultaneously, and eco-system farming did this. A change from commodity farming to small mixed farming would lead to ecosystem farming, or even to what had been called 'Enlightened Agriculture'. 2.5 billion small farmers in the developing world used agro-forestry and inter-cropping with a variety of local methods and indigenous mixtures. The European Union recognized agro-forestry as viable in certain circumstances. The economics could balance out and a good living was possible. This kind of agro/ ecosystem farming rejuvenated rural societies and regenerated the countryside. It looked after the Earth and worked with it, rather than subjugated it. A shift from commodity farming to eco-system farming would lead to an agrarian renaissance.

In discussion the following points were made:

- **Dr Tom Macmillan** discussed the Government's role in innovation. It could start by dramatically increasing its funding into the ill equipped bio-research sciences. This was a growing area but deplorably underfunded. There should be a process and a goal towards supporting social sustainability at all levels. The fiscal deterrents and incentives were not there.
- **The Rev Dr Nick Read** wanted to use Hereford as a case study for an agrarian renaissance. Agricultural colleges were closing and their courses in universities being limited. He saw an opportunity to use the countryside in Hereford as a land-based college to train people directly

on the land in a variety of agricultural skills. It was the role of government to raise the kudos of farming. At the moment farmers scarcely earned a living wage. The industry needed a huge influx of money and new entrants to give it its proper worth and enable it to do the job of feeding people on a par with its true value to society. In Cuba for instance being a farmer was one of the best jobs and it was remunerated accordingly. Food was too undervalued which was ridiculous when it was a fundamental requirement.

- **Kath Dalmeny** referred to the juggernaut of the prevailing practice of large scale industrial farming. It was run by large manufacturers who had vested interests other than the quality of food or the health of the planet. Amongst other things it caused social failure and soil depletion and needed disproportionate inputs and subsidies to keep it afloat. It caused waste, huge pointless food miles, and was subservient to the markets. Government was too fearful of making decisions to opt out of the present prevailing system but should be encouraged by the many organized groups to trust that small was good and did make economic, social and sustainable sense. They needed to take the lead and put food and farming at the centre of our culture. At the moment there was little evidence that the government led on this in any way. This kind of stand still had currently rendered the rain forest to be worth more dead than alive. New mechanisms were needed to put farming centre stage and bring the right rewards through the system.
- **Graham Harvey** referred to the value of traditional grassland grazing to rear beef and other livestock. With the extra demand for beef world wide, it needed to be carefully thought out how best to meet this demand. Instead there was the crazy practice of ploughing up pasture land to grow grain to feed to cattle being housed in heated sheds. This was clearly ridiculous. Keeping cattle inside caused diseases and required a whole range of additional technologies. Upland pasture unfit for cultivation was being left vacant when it could feed cattle for free. Ploughing up pasture land to plant grain to feed cattle was the very antithesis of a sustainable policy.

After lunch the symposium was resumed.

Tim Waygood spoke on **The Agrarian Renaissance: Reconnecting People, Land and Food.**

As a Hertfordshire farmer from a long line of Hertfordshire farmers, he said he had devised a plan for franchising diverse and workable farming systems based on sound agrarian and business principles which he called "The Agrarian Renaissance: Reconnecting People, Land and Food". On the 175 acres of his own farm, which included 30 acres of woodland, he had created a working prototype franchise model based on agrarian renaissance principles.

He said that the enterprises on his farm now included a food and farming society, a rural care hub, workshops, a traditional skills hub, a full social events programme, a linked farm vet partnership, supporting educational programmes, a farm café, and a farm shop. All this would be maintained by customers, the farm membership and co-producers. A paramount aim was to be able to sell good local food, sustainably produced, at supermarket prices which promoted good management and cooperation along the complete food chain from plough to plate. Along with its workshops and social hub the farm would continue to operate core farming projects to include cattle, sheep and poultry; a main vegetable growing area; a mixed orchard with 130 different local and regional varieties; clover, herb and mixed-lay grassland; areas of wildflowers, bird cover, and conservations strips.

All this worked towards forming a secure community with lots of healthy biodiversity creating a true agrarian renaissance in harmony with the ground from which all needs were derived. It required sound diverse scientific knowledge together with sound business acumen. Not everyone needed to don muddy boots, or be the outdoors type. There was plenty of scope for office skills, caring for the elderly and infirm, devising educational programmes, attending to the running of the franchise, the veterinary partnership, the social programmes and for the artistically minded promoting events and entertainments. He intended to provide a blueprint for a complete change of mindset: a rural regeneration of renewal and revival of country life. It had common goals with urban renaissance. Both urban and rural renaissance programmes were fast growing movements with aims to attain replicable communal franchises designed to use less fossil fuel, less waste, cause less social isolation and less environmental degradation.

Professor Bob Orskov spoke on **The Realities of Third World Farming with emphasis on agroforestry, complementary multiculture and total resource management.**

He gave some illustrative examples of third world farming which had the overall message of 'never waste anything, use everything'. It was an excellent contrast with Western ways of waste and over consumption. Much of what we heard and saw could not be easily replicated in Europe, but it set the mind to thinking that the idea of total resource management could be better managed in our own society.

He discussed methods of strip farming and mixed planting which included appropriate livestock under the trees or among the planted crops. It was surprising what cattle could eat and turn into food without too much difficulty. In Mongolia for instance where almost everything was in short supply, cattle ate horse dung. Use could be made of most things either as food, or for fuel.

We were given the figures on yields of mixed cattle and goat grazing in palm oil cultivations in Malaysia showing acceptable profitable margins. By contrast we saw sheep grazing under various tree plantations in England. This method of running livestock with crops and forestry kept the grass down and the natural

fertilizer up. There was a charming tale about growing ducks, fish and rice together in Vietnam, where the ducks by eating their natural diet carried out the weeding of the rice crops and the fish fed on the duck droppings in the water. In these societies their outlook started from the premise that if there was waste, there was something wrong with the management.

He gave incidences of "multipurpose" animals which could be used for selling their milk, and related milk products, or blood, or meat, or swapped in payment for a wife. A cow was a very valuable animal in such parts of the world! Mostly the livestock would maintain themselves which made for labour efficiency and natural management of ecosystems, all made possible because small scale family farming units were the norm. Unlike our massive industrial scale units where we corralled cattle and then have to deal with all the health and feeding problems this caused. Pigs in Asia were fed on all the leftovers and kept as family pets whilst alive. Although the family pig lived in a small concrete confined space, it seemed happy enough, perhaps because of the interaction with people visiting it often with food and the variety of their diet. Nothing was wasted from the pig when it was slaughtered. Rather as in the days when most folk in England kept a pig in the back yard, and the family would live off it for most of the year, eked out with quantities of home grown vegetables.

He said that all this recalled how we used to live in the preceding centuries in Britain when it was common for each family to look to its own needs to feed, clothe and heat itself. Nowadays our health and hygiene laws would prevent our living like this, but there was much to be remembered and admired about third world multicultural and total resource management. In this respect much could be learned from Asia.

Tara Garnett spoke on *Livestock and Greenhouse Gas Emissions: A Complex Relationship*.

She said that it was acknowledged that raising livestock was accountable for around 80% of agricultural greenhouse gas emissions. It was time to make concrete decisions about what we should do to reduce this impact on agriculture and the planet. Our intensive rearing methods were cumbersome, heavily reliant on fossil fuels and created many animal welfare problems. We fed livestock grains which we ourselves could be eating, and we had grassy uplands going to waste. We should dramatically increase livestock grazing on land unsuited for other purposes. This would involve a huge change in our objectives for intensive rearing, going back to quality not quantity, with new criteria of supplying food for need, rather than demand, and production kept within those constraints. We should eat cereal and protein crops directly instead of giving it to cattle. It meant a step change in our thinking of why and how we should be producing our food in the future.

Ruth Layton spoke on *The Role of Livestock in the Future of Agriculture*.

As both a livestock farmer and a vet, she had noted a stark contrast between our big budget farming, with all its complicated livestock feed rations, animal welfare problems, processing and chemicals inputs against those farming in the third world on minuscule budgets. Despite our inputs, in the end the West seemed no further ahead. Third world farming appeared to be centuries behind us, but it cared for its livestock better and generally interfered less with nature. It produced a sufficient supply of a good quality product.

We produced quantity of supply but wasted about 40% of the product from processing, supermarket sell-by dates or from our own fridges. Both cultures needed to learn from each other. More and more developed countries were demanding quality food more sympathetically produced. People were

interested in, and informed about, the type of system their food was coming from. The bad old days of battery reared hens had all but gone due to public outcry. In this country we had banned rearing pigs in crates due to public disgust. More and more people cared where their food came from: the next big step was to get them to care about the waste of food in our society. If we addressed ourselves to waste and over production, we could adapt our rearing programmes accordingly.

Tom Lines spoke on **Global or Local Markets?**

He said since around 1982 globalization had rocketed at an astounding rate. There were so many policies that were now globally, rather than nationally determined. Many of these were based on the principle that economic development was derived from trade, and food security was to be found in global markets. But who gained and who lost? Globalization favoured buyer-dominated supply chains from developed rich countries. Small countries with rural and agrarian societies lost out most, being hampered by private and public standards in rich countries. They were too remote from world markets, and prices in commodities from metals to food stuffs fluctuated too much for smaller contributors to be able to compete. National power needed to be restored to governments to determine their own local policies. The balance of power on international supply chains needed to be rectified and support for indigenous agriculture and production of staple foods should be set up so that small didn't automatically mean poor on the global stage.

Andrew Whitley spoke on **Making a Meal of It.**

He began by quoting an old Russian proverb which said 'bread is the head of everything, it all begins with bread.' In our own culture we thanked God for our daily bread, but over recent years our daily bread had become less the staff of our daily life. Plant breeders had developed cereal varieties which yielded functionality and efficiency for large industrial food processing. This had resulted in many traditional varieties of grain, which had greater nutritional density, being dropped by most farmers. Modern milling varieties, selected for their quantitative rather than their qualitative value had inhibited uptake of various nutrients which had led to anomalous changes in the composition of the protein. There could be a possible connection with the new and growing wheat intolerance related to this stage of wheat growth. The predominant method of cropping grains stripped the soil of health-giving nutrients, which then had to be artificially fed back into the soil through fossil fertilizers.

The methods of processing grains after harvest could be described as The Great Nutrient Robbery. For instance, having removed all the natural Vitamin E in the wheat germ to grind the grain into white flour, the germ was then sold back to us at huge cost via the pharmaceutical industry in capsule form, the processing of which took up huge energy fossil inputs. The nutritious wheat germ was either thrown away, or fed to cattle. The manufacturers then fortified our sadly depleted loaf with artificially developed iron, vitamins and calcium. The demand for long term shelf-life freshness from supermarkets was met by adding additives through the industrialized bread making process.

All these costly blunders could so easily be rectified if bread were made as it was designed to be. The science of bread making was a fascinating trial of discovery. It started with growing traditional nutritional varieties of grains. These varieties generally complemented the earth's needs as much as our own. If milled sympathetically they retained their full nutrient value. If fermented and baked more slowly the loaf naturally had a longer shelf life. The only way to produce nutritional bread was to make it and bake it wisely with all that we now knew with recently acquired science of the subject. An Agrarian Renaissance would link plant breeders, farmers, processors and consumers in local associations, similar to the

paysans-boulangers of France. Only thus would health emerge from the soil and people be fed well.

CONCLUSIONS

In conclusion, **Colin Tudge** identified what amounted to a simple dichotomy in agricultural strategy. Some – who in general were the “powers-that-be”, governments and industrialists and their advisers – began with present-day economic norms and political treaties, and worked outwards from there. This produced the kind of farming we had now: highly industrialized, geared to the maximization of output and “value adding”, all achieved at minimum cost. To cut costs, labour was reduced: in traditional systems it was by far the most expensive input, which meant that husbandry was simplified, which meant more and more machinery and industrial chemistry. This in turn required more capital output which required greater and greater economies of scale. Hence farms became bigger and simpler, with greater and greater inputs of everything except human labour and on-the-spot ingenuity. The result of all this was demonstrably disastrous, with a billion now chronically undernourished, a billion more suffering from a combination of excess and deficiency (of essential nutrients) and a billion – mostly ex-farmers and their families – now living in urban slums.

Those who were demanding change argued that we must begin with the principles of common morality (what is right to do? What is just?) and with sound biology (what is the Earth really capable of?). The economy, the medium through which ambition was translated into reality, should then be devised accordingly. To begin with an economic dogma and out-dated political treaties made no sense at all. We might expect this to be disastrous, and so it was proving. However the powers-that-be were committed to the status quo, and were not going to change their ways. So people at large had to create something new for themselves. This is what “Renaissance” implied.

Susan Lee

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