

Renaissance 5



Springtime in an English woodland. The timing of trees coming into leaf, the flowers appearing, insects emerging and the birds nesting are familiar aspects of a cycle that has been repeated for thousands of years.



Mahatma Gandhi at No. 10 Downing Street in November 1931. Among the many great observations he made was that 'Happiness is when what you think, what you say, and what you do are in harmony.'

The new is in the old concealed, the old is in the new revealed.

ST AUGUSTINE

Sometimes it takes an outsider to bring you up short. I am very fond of the story of Mahatma Gandhi, who did this in the 1930s during a visit to Britain. Asked what he thought of Western civilization, he replied, 'It would be a very good idea.' Although amusing, it was an acute observation about the direction that, even then, Western thinking was taking.

I am sure that the great emphasis in the industrialized world on material progress was not intended to destroy our planet's life-support systems, nor to cause humans stress and dissatisfaction, but I am afraid this is increasingly the result of how our civilization has developed. There is, as William Shakespeare put it, 'a tide in the affairs of men which, taken at the flood, leads on to fortune'. With ever-clearer reasons to be concerned as more and more evidence emerges of the combining problems we face, it seems to me that now is the right time to review our direction of travel and, as Shakespeare advises, to 'take the current when it serves or lose our ventures'. In other words, recalibrate the compass now or risk being lost for good.

For me, and many others, a way of living and looking at the world based on how Nature works and



what might be called the 'principles of harmony' is a logical and attractive alternative to the way we operate at the moment. The core of these principles would be to approach things with a clearer sense of proportion and balance. It would require whole-istic, joined-up thinking; a deeper appreciation of natural beauty and the willingness to see the connections that hold the web of life together. We would need to value Nature's capacity to self-order her complexity; to recognize Nature as our guide, rather than seeing her as a machine that we can abuse to breaking point.

This may sound idealistic, but I say it with my eyes wide open and in full knowledge of the many problems that are now besetting the world caused by our not following this approach.

We have had, and are still being presented with, many disturbing wake-up calls. Recently, for instance, news emerged that for the fourth year in a row more than a third of honey bee colonies in the United States failed to survive the Winter, which means that more than three million colonies in the US and billions of honey bees worldwide have died in recent years. This poses an alarming threat to food security around the world. The fact is that a



third of everything we eat is dependent upon bees for pollination. Scientists say they are no nearer to knowing what is causing this catastrophic collapse, but there is plenty of evidence that modern pesticides have played their part. Given that bees, like nearly every other bug, are insects, I would have thought it was rather obvious, yet we carry on with this narrow-minded, mechanistic approach to industrialized farming with our focus only on high yields at whatever price, lacing the fields with pesticides that kill insects while being told that they do not affect bees. It is quite bizarre how we continue to put our faith in the very substances that are destroying the harmonic cycle which produces our food. It really is a form of hubris and I wonder if those who practise such irresponsible scepticism in these matters will ever see that the emperor is wearing no clothes.

I described at the start of this journey the scale of the crisis we are facing, in terms of climate change, the degradation of Nature and the depletion of her resources. I pointed out how our economic system was a big part of the problem and then set out how, as I see it, we are suffering not so much from an absence of technology or from a dearth of good ideas about policy. The real fault is that this



way of thinking is utterly out of harmony with the rest of the world. I would like now to explore what could be the many solutions we might bring to bear on the main problems we face. Not only are there plenty of examples, but I intend to explain how they work and I would like to outline some of the thinking that many experts tell me needs to be adopted in the world of business and commerce, and at government-policy level, for these solutions to have a really long-lasting effect. This journey will take us through the various areas that I have concerned myself with during the course of this book. What we are about to do is explore different ways of farming that work with Nature rather than against her and see how viable they really are. Then, to investigate how sustainable building techniques and a more rooted approach to town-planning can conjure a more durable and liveable built environment that nurtures rather than depletes a sense of place and community. This is becoming ever more important in view of the huge population-driven expansion of currently unsustainable urbanization all around the world. I also intend to explore approaches to medicine that could be beneficial if they are allowed to be made complementary to mainstream treatments, and I want to give a taste



of just some of the extraordinary innovations and designs that are now emerging from a brand-new form of engineering called biomimicry that is dedicated to following Nature.

Land and life

Perhaps the most direct daily connection that all of us have with Nature and its cycles is through what we eat. Nature feeds us, even though by the time much of our food is packaged and arranged under bright lights in a supermarket it is difficult to appreciate that fact. As we have seen, wrenched from its context, rendered anonymous, and displaced from its origin, much of what we eat is far from what can reasonably be described as natural. So how might we better approach agriculture so that we do not end up going backwards to an age of insecure food supplies, low yields or unaffordable diets, but instead rebuild our relationship with land and food and restore some of our connections with the natural systems that sustain us and all other life?

I am afraid there is still a widespread view of small-scale farm enterprises as quaint alternatives that appeal to niche markets, but there is increasingly firm, expert opinion that the future



of farming must embrace methods that reduce the use of chemicals, rely less on monoculture and cut emissions of the greenhouse gases that add to climate change. However, working with Nature emphatically does not entail taking an 'unscientific' approach to food and farming. It is very much a question of thinking through what science is for, and how we use our knowledge and understanding of the world we inhabit.



Supermarkets have brought us great convenience, but I wonder if at the same time we are losing something rather important, for example a meaningful relationship with our food. It seems to me that the more distant the origin of our food, the further we drift from Nature.

Soil and soul

While researching this book we came across Tim Waygood's farm in Hertfordshire in the East of England. Sitting on a shelf in his farmhouse kitchen there is a framed picture that shows him at his home at Church Farm in the village of Ardeley in 1969. In the photo he is two years old and walking through the middle of a battery hen house. He still lives at Church Farm today, now with Emma and their two children.

Tim's family farmed for generations, but in 1988 the 175 acres that had been in mixed use were finally taken out of production. Despite various steps towards more modern and industrialized methods, it became ever more difficult to earn a living from farming. The farmers best placed to make ends meet were those with bigger land holdings favoured by the official subsidies. Tim's parents effectively gave up. They decided to 'set aside' their land under new European Union rules that paid farmers not to farm and thereby to reduce the over-production that had resulted from earlier subsidies that offered an incentive to increase output. It was these official payouts that had, over the decades, led



to the drainage of wetlands, the clearance of woods and the destruction of hedgerows. More chemical-intensive methods had helped cause precipitous declines in once common birds, animals and plants, all to produce massive surpluses of milk, grains and meat. Then came new financial incentives that were specifically designed to discourage farmers from doing any farming at all.

Tim gained a degree in agriculture, but didn't initially take up farming. Instead he set up several successful businesses, working with dozens of different companies, helping them to refine their strategies. As time went by he became more aware of what seemed to make for true success – which was good health, proper food, good relationships and a decent environment. He was also becoming aware of the different stresses that were appearing: climate change, diminishing resources, disappearing species and economic instability. This led him to begin farming in 2008, but not as his parents had done. He decided to turn Church Farm into an alternative to the global agri-business model with its system of supermarket outlets and the corporate-driven food-processing industry. And as a result his farm looks rather different from other farms in that part of North Hertfordshire.

The vision that Tim and Emma have embraced seeks to build a farm business around traditional methods in tandem with modern technology and knowledge. Their strategy is to fight the economies of scale with what they call the economies of scope; that is, the advantages that come with diversity and local connections. They plan to put farming in harmony with Nature, and to put farming once more at the centre of the rural community. As a result, Church Farm is once more coming to life. Using traditional methods, some organic growing techniques and extensive free-range animal rearing, they aim to produce top-quality food for local markets using drastically less fossil fuel.

Woods and hedges are being replanted, grasslands restored and ponds reinstated. A walnut wood has been planted, and ducks and geese reared beneath the trees. Hundreds of chickens run free-range in orchards that contain more than 700 newly planted trees that will produce some 130 traditional varieties of fruit. Turkeys range in newly planted woods, foraging among the oak and ash saplings. Redpoll cattle graze on fields sown with pasture seed mixes from the late nineteenth century so as to boost their growth from what grows in the fields, rather than using imported animal feed. An old



orchard that appears on maps from the early 1700s has the now rare Lop and Berkshire pigs foraging beneath the trees.



Free-range chickens have become a modern symbol for consumers seeking a more harmonious and natural relationship with food. Animals can be reared in better conditions and this brings benefits for the environment and human health as well.

The areas of old woods that escaped the post-war ecological blitz are once more being managed traditionally to produce timber and fuel wood. The farm is also becoming a valuable social resource. The local authority use the farm as a day-care centre for people with special educational needs. One local person, who previously made the two-hour round trip to Cambridge every day for care services, now

travels a matter of yards from his mother's cottage to be on the farm. As other schemes have found, for many people with special needs helping on the farm and being around animals is a far more beneficial environment than an indoor institutional setting.

Tim and Emma are finding a ready market for their produce. They believe that many people are awakening to different ways of living and seeing, and that there is a renewed appetite to reforge connections with land and food. The battery hen houses are still there, but no longer as brutal tools of industrial farming. One was recently converted into a café and the other is now a farm shop. Both sell food grown on the farm.

The roots and inspiration of Tim's ambitions for Church Farm can be traced to his childhood experiences – for one thing he was always concerned about battery farming. He was also inspired by the many books he read and the various people he met who told him about different approaches to farming and food. I was delighted to hear that another source of inspiration came while he was at agricultural college in Reading during the 1980s. It



was during this time that he heard about my own plans to begin organic farming.

A Duchy Original

The farm where I introduced organic methods more than twenty-five years ago lies on the other side of England, around Tetbury, on the Cotswold Hills in Gloucestershire. The Duchy of Cornwall Home Farm was, until the mid-1980s, typical of many farms in Southern England. For more than forty years land use here was shaped by official policies aimed at boosting production through industrial-scale monocultures. In common with what had occurred at Church Farm, hedges and stone walls had been ripped out, ancient pastures ploughed and yields were increased with artificial fertilizers and pesticides that were applied in liberal quantities, all as part of a new quest for 'cheap' food.

I found it a deeply depressing picture. Instead of natural fertility, the land was made productive with ammonium nitrate – a synthetic plant nutrient made using huge quantities of natural gas and water. The farm had also become isolated from the community and instead of maintaining local



connections had become embedded in an ever more globalized food chain.

In the mid-1980s, after an intense debate and having faced considerable opposition, I finally managed to convert Duchy Home Farm to organic production methods; to step off the chemical treadmill and put the land into the agricultural equivalent of a detox regime – literally. It was quite a shift to move just over 1,000 acres of the farm into a more sustainable and localized food system. The decision was controversial, and I have to say that back then not many people could see the sense of my plan. But times have changed a bit.

Today Home Farm no longer relies on artificial chemicals; fertility is sustained by plants, animals and the careful management of everything by rotating the use of the land. Key to this approach is the natural nitrogen-fixing properties of clovers and the use of animals. For three out of seven years the land is planted with clover and grass. This is then grazed by animals, which return fertility to the soil in their droppings while at the same time they convert sunshine into meat and milk. The grass and clover is also cut to make silage to feed animals in Winter. To me it makes perfect, logical



sense to farm in this way, in partnership with Nature, rather than in a destructive and exploitative relationship that, by definition, cannot last because it gives nothing back to Nature in return for what she gives us.

Organic systems effectively mimic the way Nature works. Like Nature, they do not produce waste nor pollute the atmosphere. The whole system is geared to the miraculous ingenuity of Nature and proves that this ingenuity can be harnessed not just to grow things, but to reduce the quantities of greenhouse gases in the atmosphere. The soil itself acts as a very effective carbon storage system, which means that organic farming techniques help us in the battle to mitigating climate change emissions.

What is really important to understand is what organic farming is *not*. That is to say, it does *not* depend upon the use of chemical pesticides, fungicides and insecticides. It does not rely upon artificial fertilizers, the prophylactic use of antibiotics, any growth-promoters or GM technologies. Nor does it use industrial rearing systems. Instead it recycles animal waste or composted organic waste to build up the soil's fertility; it employs



homeopathic treatments for livestock wherever possible and those animals are fed on grass-based regimes, as Nature intended.



It is vital that we pass on ideas about sustainable agriculture to younger generations. I am delighted that Prince William has an interest in farming. Here we are together walking around Duchy Home Farm back in 2004.

180 brown and white Ayrshire dairy cattle quietly chew the cud in the cowshed and here again the approach is different. The essence of the organic system is balance and so, to maintain the health of the livestock and of the land, the stocking rate is not too high. Antibiotics are also only used very sparingly, unlike cattle reared by intensive methods where such drugs are used to *prevent* disease rather than to treat it – an approach that has also progressively increased the prevalence of micro-organisms

that are resistant to these antibiotics, including ones that cause disease in humans. The animals in the cowsheds at the Duchy Home Farm munch the silage collected from the fields in the previous Summer. It smells sweet and fresh. They wander around on a deep bed of straw which, with their dung, is periodically collected to make compost that, in turn, is used to increase soil fertility. With the arrival of Spring, the cows will graze outside.

Each field is periodically left to rest and put under clover and grass. When the animals graze this grass they add to the process of restoring nutrients naturally to the soil. Earthworm casts are everywhere. These and a whole host of other organisms work away at recycling organic materials, converting 'waste' into usable nutrients that will power and sustain the next cycle of growth. In this way it is natural processes that sustain productivity. There is no need for fertilizers made from fossil fuels.

When fertility is restored and the land is ploughed again, first wheat is planted. This crop needs high fertility; then comes a crop of oats, then beans and barley in combinations that bring down the fertility of the soil in a planned and optimal manner before, once again, the land is put back



under clover and grass which is then grazed, and so the cycle of rebuilding fertility naturally begins again.

While the fertility of the land is being restored, the animals that grazed there provide meat and dairy products, thereby earning income and supplying food between rotations of arable production. The rotations are planned so as to disrupt the breeding cycle of pests and avoid the routine use of insecticides and herbicides. It is a harmonious cycle that works for both people and the land and which respects Nature's cyclical economy.

Vegetables are also grown – carrots, potatoes and onions, among others. These are mainly grown to supply local markets. There is a vegetable box scheme and a 'veg shed' where people can buy food directly from the farm. Local schools and shops are supplied with organic produce as well. Grains and milk supply the Duchy Originals company that I set up in 1990 for making organic biscuits, bread and ales, amongst a range of other products.

It is not only the soil that has been restored. Since the organic conversion of Home Farm, some seventeen miles of hedges have been replanted. Using traditional skills, these living fences have been



put back following decades of encouragement to have them removed. After watching these hedges grow I have greatly enjoyed learning and applying the traditional skill of hedge-laying. It is a surprisingly challenging and energetic occupation that tends to be pursued by refreshingly down-to-earth characters from all over England who wend their way to Highgrove for a friendly competition each Winter. The results are wonderful, for not only do traditional hedges create effective boundaries for livestock between fields, they also prevent soil erosion, help to harbour wildlife and shelter bird life and are just as beneficial to insects, which can otherwise be in short supply on intensive farms.

The farm is run as much as possible with closed loops or so-called 'virtuous circles', whereby the means to produce food is originated on site. For example, as was the case before the age of globalization, the farm woodlands are back in active use, with timber used for construction and fuel. Insects, birds and plants are benefitting from the resumption of traditional woodland management, in particular using a hazel coppice rotation that is a constant renewable, natural source of biomass fuel.



In addition to relying less on fossil energy and the emissions they cause, organic systems also help to protect the global environment in other ways. The quantity of organic material in the soil, for instance, is significantly increased so it stores more carbon and thus reduces the amount of carbon dioxide in the atmosphere. This, perhaps, should be more widely understood. One shocking estimate I saw suggests that the worldwide degradation of soils because of intensive industrialized farming systems has led to the loss to the atmosphere of between half and nearly three-quarters of the organic carbon in agricultural soil.



Members of the pea family, including this red clover, naturally build up soil nitrogen in ways that are beneficial to other plants. By using rotations of such plants it is possible to increase fertility in

soils to grow crops without resorting to artificial fertilizers. These increase emissions of greenhouse gases and are made from finite natural resources. They also cause serious pollution of the environment, leading to losses of biodiversity.

I would like to say that in light of the success of all these elements to create a successful organic farming system, there is wider cause for optimism, given the evidence that has now been collated by various bodies. The Rodale Institute in the United States, for instance, has calculated that if more sustainable farming methods were adopted to increase the organic carbon in the soil on the world's 3.5 billion acres of tillable land, then the farmland would be able to accommodate up to 40 per cent of our current carbon dioxide emissions. Moreover, their research estimates that this can be achieved with no decrease in farmer income or yields. In this way, organic and other, more sustainable farming systems become a method that converts carbon dioxide into a food-producing asset as it also improves the quality and structure of the soil – hence the principle of 'virtuous circles'. However, despite these sorts of findings, little will change until the resistance of the agribusiness Establishment to such findings has been overcome.





Farm fertilizers are one of the main reasons for the enrichment of many bodies of water with unnaturally high levels of nutrients. This causes blooms in algae that in turn create imbalances that can lead to the collapse of the entire ecosystem.

David Wilson has been the farm manager at the Duchy Home Farm for the past 25 years and he and I have also worked out a plan to begin experimenting with 'biodynamics'. This approach to food production takes farming a step closer still to the natural processes that govern agriculture and all other life cycles on Earth, especially in relation to the health and resilience of the soil – ultimately the most important resource we have. Early results have been promising. The farm is also experimenting with low-till ploughing techniques, which re-

duce the amount of diesel needed to power tractors and increase the organic matter in the soil – on both counts reducing carbon dioxide emissions.

I hope it is clear that the whole system is very much based on how Nature works, and thus is more in harmony with Nature than industrialized farming. There is minimal waste; the running of the farm is wherever possible done through cycles, loops and virtuous circles together with plant and animal diversity. Weeding is done mechanically rather than relying on herbicides and, I am pleased to say, the proof is in the pudding. We produce a great deal of healthy food.

And yet, despite the fact that I have just described what organic farming does *not* do and does *not* use, it is apparently not accepted in official circles that organic, or more naturally produced food products, are any healthier than the industrialized versions. I wonder why this is so when, as I mentioned earlier, such colossal sums are spent every year by British water companies to remove the pesticides and other chemicals that leach into the water supply. I can only presume that all that expense is necessary because such chemicals are considered damaging to people's health if they are left in the water sup-



ply? And what about the long-term effects of the overuse of antibiotics and growth-promoters in the farming system? Surely there is now sufficient evidence to show that the overuse of such things has had a profound effect on the human population's resistance to antibiotics? All these factors surely need to be taken into consideration when we seek to define the meaning of the term 'healthy food'.

A turning tide

I have certainly discovered the hard way that if an organic approach to the way we produce our food is going to work properly, all of the other dots in the picture must be joined up. At the moment that is not the case, certainly when it comes to what happens to the food once it leaves the farm gate.

It is remarkable how fast times can change and new ideas become the established way of operating. Today we have a globalized, 24/7 food supply system and this is now considered the norm in a large number of countries, and yet it is a very recent phenomenon. Before the age of cheap oil and mass transit systems using planes, vast container ships, motorway networks and huge distribution centres, most food was grown and sold much more locally.



In SouthWest England a community group, called Transition Towns, interviewed older residents to gather stories of how life was in the town of Totnes in Devon before the age of oil-fuelled globalization. Some remembered how most of the vegetables were grown nearby, some in the middle of the town, including produce that was taken on barrows to shop fronts just a few yards away. Today those gardens have gone – replaced with supermarket car parks – but, I wonder, can we reverse this continuing trend by creating, for instance, local networks of farmers who supply local shops, schools, hospitals, prisons and defence establishments? It is not complicated. All it needs is good leadership and good organization.

Fortunately, some people are doing this. One example I have come across involves the catering manager at the Brompton Hospital in London sourcing food from a ‘hub’ of local farmers in Kent, opening up the hospital kitchens again, hiring a restaurant chef instead of having to rely on pre-cooked food brought in from elsewhere, reducing waste because patients were actually eating better food, cutting down on the constipation treatment needed to remedy bad diets (which costs the British National Health Service some £100 million a year)



and, thus, achieving a virtuous and more sustainable circle. Ever since I saw this innovative and effective initiative in operation I have tried to interest other hospitals to adopt such an approach, but it is not an easy task.

Another idea already up and running that I have helped to promote works amid the rolling green hills and mountains of Mid Wales, one of the most beautiful landscapes in the British Isles. The land has been used for centuries for farming, especially for rearing sheep, which is about all that some of this landscape can sustain. Sheep farming, though, has become an increasingly marginal activity. Many farmers have given up trying to compete with cheap imports and, as a result, a source of local produce has declined. It is a victim of a narrow financial 'bottom-line' approach to agriculture which I feel very strongly needs to take a wider view.

Upland sheep-rearing is not just about food; it is an essential activity for maintaining the characteristic upland environment, as well as the human communities that depend on it. This is why in 2008 I helped to set up the Cambrian Mountains initiative with a group of farms in Mid Wales – to supply Cambrian Mountains lamb and beef while at the



same time seeking to protect and enhance the incredibly beautiful environment there. The animals are predominantly Welsh native breeds and reared with traditional methods passed down in farming families over many generations. The lambs are born, grown and processed locally and produced in accordance with a set of environmental principles. It is, for me, another small example of harmony in practice.

The Cambrian Mountains initiative shows how sheep and cattle reared with more traditional methods could be an important part of a more sustainable rural economy, especially if people once more become used to eating older sheep in the form of mutton. Raising awareness about mutton, a once commonly eaten meat that has a really delicious flavour and texture, is the purpose of the Mutton Renaissance campaign. I initiated and helped launch this campaign in 2004 to support British sheep farmers who were struggling to sell their older animals, and to encourage a renewed appreciation of the special quality of mutton.





A shepherd and herding dog with sheep, Beddgelert, Snowdonia National Park, Wales. Traditional upland farming has created characteristic landscapes of great beauty, while at the same time sustaining livelihoods and producing wholesome food.

I might add that I have also put a considerable amount of energy into highlighting another product from sheep-rearing that has also, incredibly, fallen into neglect – and that is wool. Some farmers now find so little financial value in wool that they are forced to destroy what they produce. On its own this is madness, but the picture is even more topsy-turvy than at first appears. It is an example of the ultimate insanity of our disconnected way of life. Owing to the supposed lack of demand for this truly renewable product, all because of the competition from man-made fibres that are based

on oil products, a new breed of sheep has been 'engineered' that does not need shearing. Believe it or not, the breed is called 'Easycare' and there are already 500,000 of them not producing wool in the UK. All this, despite the fact that wool has so many beneficial properties and is endlessly renewable. Apart from its use in clothing, it offers a particularly effective form of insulation for houses; it is nonflammable, whereas man-made synthetic fibres catch fire much more easily; it does not produce toxic fumes and the kind of dust particles that can contribute to the growing epidemic of allergies in the developed world; it is long-lasting and it has unique properties to retain heat. In short, it is one of Nature's gifts and we are either throwing it all away or breeding a sheep that does not produce it any more.

The reason I feel so passionately about wool and mutton is that they are products intimately linked to the maintenance of a continuous, harmonious pattern of existence and production that not only sustains many of the landscapes that help to define our identity and nurture our very souls, but also sustains entire communities of people who have a profound understanding of the local conditions. These people are the very backbone of what simply



has to be a living countryside if we wish to sustain the future security of both food and Nature's services. This is why I have been trying to find ways of raising awareness of the potential for such a wonderful resource like wool and I am delighted that so many green building firms are now using it to insulate houses. However, it needs the volume house-builders to take wool much more seriously than they do if the tide is to be turned for good.

Variety of life

Likewise, we need farmers, growers and retailers to think about widening the variety of the produce they grow and offer for sale. I have already explained how Nature displays a tendency towards variety and away from uniformity and yet we seem to be heading in the opposite direction. Take something as simple as the humble apple. There was a time when thousands of different varieties of apples were grown in the UK. Some of these have been found to be nutritionally different from the modern varieties that are produced in globalized monocultures, not to mention their inherent resistance to many of the diseases that affect the modern hybrids. Some of the older apples are as much



as sixty times richer in biphenols, an important nutritional element with antioxidant properties. Before apples were transported around the world on container ships using vast quantities of energy and producing huge emissions of greenhouse gases in the process, the UK enjoyed over 1,000 varieties. Different varieties also ripened at different times, ensuring a year-round supply. The industrialization of fruit production has meant the loss of this wonderful variety in favour of a few globally dominant types. What is also not a little depressing is that, amazingly, the majority of these are imported, even at the height of the English apple harvest. For me this is yet another symptom of our disconnection and short-sightedness that we are supposed to accept as the norm; a world that is effectively eliminating agricultural biodiversity in the name of 'efficiency'. Farmers have been persuaded to rely on fewer and fewer varieties of almost every food species – usually those bred to do best in chemical and water-intensive monocultures. Some of us over the years have tried to draw attention to the long-term dangers of pursuing this course, but inevitably have been systematically shouted down.





The rich biodiversity of fruit, vegetable and grain varieties generated by farmers through millennia of selective breeding is being rapidly depleted as we come to rely on the fewer and fewer varieties most suitable for globalized industrial farming methods.

Despite this, I am inspired by the various organizations and individuals who continue to fight against this erosion of diversity by running seed libraries and encouraging the propagation of the scarcer varieties. I know of many gardeners who are planting older varieties of vegetables, for instance, and then trading seeds with friends. Movements in developing countries are also fighting the swamping of local farming by genetically modified and other industrial-scale methods. And this struggle extends beyond the orchard. There are also increasingly active efforts to halt the loss of traditional

farm animal breeds. Indeed, if it had not been for the heroic efforts in the UK of the Rare Breed Survival Trust over the past 40 years, we would have lost many more native breeds to extinction. I have been proud to be their Patron for very nearly thirty years and have done what I can on the farm at Highgrove to help preserve the gene pool of a range of rare or endangered breeds. I have done the same with rare varieties of apples and vegetables.

The Survival Trust's work has focussed on the maintenance of endangered native breeds of farm animals, many of which were overlooked for widespread use during the 1950s and 1960s in the face of the industrialized, monocultured approach to farming. Many were even allowed to become extinct, or nearly so, because they were regarded as lower-yielding and thus of less immediate value. Yet many of these animals are better adapted to a range of different environments, including grazing conditions, and produce better quality meat because they mature more slowly. Thankfully, many traditional breeds have once more found favour, but they are in existence only because of the dogged determination and herculean efforts of a very few dedicated people who have struggled against the onslaught of the industrial leviathan.





Cattle at the Baylham Rare Breeds Farm, near Ipswich in Suffolk, England. This rare collection was threatened with destruction by the UK's first outbreak of bluetongue disease.

These modest acts of resistance are helping to maintain the vast history of knowledge and vital biodiversity embedded in the different varieties of animals, vegetables, fruits and seeds that are still (just) with us. They are the result of the efforts of the long-dead gardeners and farmers who, over the centuries, honed traits in plants and animals that will doubtless be of immense value to us in the future – indeed the not-too-distant future. If we hope to have any chance of weathering the storms to come, then it seems critical to me that we maintain and use this diversity that has been handed down

to us as the result of many hundreds of years of careful stewardship. The ball has been passed to us and we have to keep running in the same direction, *with* the grain of Nature, and thus towards a more harmonious food system, rather than sticking with the one that has taken root during the last half-century or so, however convenient it may have appeared to be. I might add that it is a system few people asked for or wanted. It is a system imposed from the top down on communities and individuals whether they like it or not, with the justification resting on that somewhat nebulous idea of 'the market'.



I am often struck by how so many people seem to have an almost instinctive wish to feel a connection with the land and cycles of growth. This is a garden and allotment at the St Pancras

Alms houses in London. It seems that even in the heart of great cities many people want to reconnect with Nature's rhythms.

Restoration

In addition to attempts to conserve crop plant diversity, various initiatives are under way to restore more natural ecosystems and to use these to produce food in more harmonious ways. For example, in the USA considerable effort is going into the conservation and restoration of North American prairie habitats, in part through encouragement for ranchers to employ a practice called rest-rotation grazing, in which some pastures are rested while others are temporarily grazed – a far more natural use of the prairies – rather than straining and twisting this fragile ecosystem to breaking point.

Others are going further by looking at the potential to raise bison instead of cattle. These great herbivores were driven to the brink of extinction during the nineteenth century, in part deliberately to undermine the economy of the indigenous people. These animals could be brought back from their present low numbers as a more natural grazer, the value being in the fact that they are capable of producing meat without destroying the delicate



prairie vegetation and soils. The North American native people understood this, and perhaps the more recent inhabitants of the prairies could learn much from those who lived there for millennia before the arrival of ploughs and machines. I must emphasize again that this is not to argue against the use of science and technology, but rather to combine technology with the wisdom that so often comes from closer coexistence with Nature. This wisdom is, itself, part of the 'science' of understanding and working with Nature, but it was arrogantly discarded in the twentieth century as being merely 'primitive' and irrelevant.

The modern 'conventional' view is that we must persist and expand the style of industrial farming that is characteristic of the North American prairies in order to 'feed the world'. And yet, there are plenty of people who are deeply concerned about genuinely 'sustainable' or durable farming and who believe that with the impact of climate change and the diminishing availability of 'cheap' oil, the prevailing view is, at best, debatable. It certainly seems to me that in the present circumstances we need a far more informed debate about the way to restore resilience to farm systems by mimicking more natural cycles. After over thirty



years of considering this issue and working on the solutions myself, I can say with some confidence that the only truly durable and resilient farming systems are those that are attuned with Nature. In other words, the ones that give back to Nature as much as they take from her. Only this kind of farming system will feed the world in the long term, and this is why I believe we need to begin right away with the transition towards this more natural form of farming.



Moves toward more sustainable farming on the North American prairies have led in some areas to the increases in native bird populations. This is a male sharp-tailed grouse in its dancing display during the breeding season on the Nebraska tallgrass prairie, USA.

I wish I could say that it is only a matter of time before this happens and that I am greatly encouraged by the changes that are now taking place.

Certainly there are moves both in more affluent, developed countries, where some people are making strenuous efforts to adopt more sustainable approaches, and in developing countries where farmers are looking for ways to manage land with methods that lead to more secure incomes, to local food security and to create a more resilient environment. However, at the moment, any such moves are offset completely by the continuing pressure from the big retailers for ever more efficient production systems. Official thinking is just as bad. There are constant efforts to introduce GM technology and to encourage 'efficient,' economy of scale systems of farming which, of course, means that small farmers and entire communities are effectively driven off the land. Is this what people really want to see happen, given that genuine food security is intimately linked with communities of small farmers all around the world? It is important to recognize that if the kind of 'big' thinking I have mentioned is not tempered by a more rounded and integrated approach – and fast – then we will witness the comprehensive and disastrous destruction of both community and natural capital on a scale that is impossible to exaggerate. It is this big element in



the game that has to be somehow persuaded to take a more rounded view.

Land, forests, and food

In 2009 I was lucky enough to see at first-hand the work of the Amazon Permaculture Institute, which has worked since 1997 to transform an area of deforested land near the Amazonian city of Manaus in Brazil. Not only had the rainforest been cleared, but the soil had become degraded and, as a result, farming was rendered impossible. The group of organizations that established the Institute, including the National Council of Rubber Tappers, set out with the aim of showing how it is possible to produce food without destroying the rainforests.

I was staggered to hear how the United Nations Development Programme estimates that in Brazil alone there are some 65 million hectares of degraded land. Placing this vast area under much more sustainable and biodiverse ecosystem-based systems of production, combined with rainforest restoration, could not only produce huge quantities of food, but could also take pressure off the rainforests and so preserve the vital services these ecosystems provide for the world. This is the think-



ing behind the work of the Amazon Permaculture Institute.



I have been enormously impressed by different small-scale projects that show how it is possible for us to work more with the grain of Nature. In this picture Carlos Miller (left) and Ali Sharif explain to me efforts to save the Amazon rainforests in Brazil. During this trip I was very flattered to be declared a 'Friend of the Forest' by the Governor of Brazil's Amazonas state for speaking out to save threatened ecosystems.

Their ambition, I discovered, is to create a fully integrated sustainable system. And this is indeed what they have done. Water is collected from rainfall and used water is cleaned and recycled on site. Vehicles are powered by used cooking oil collected

locally while a methane biodigester uses pig waste to make the gas that powers the cooker in a café. Although it works on a small scale, the aim is to demonstrate to both rural and urban communities how it is possible to engage in genuinely sustainable farming practices – again working in harmony with Nature rather than against her.

Today the land restored by the permaculture project is covered with trees that were selected to fix nutrients and restore the chemical balance in the soil. There are pigs, cows, chickens, goats and fish ponds. I was told how more than 5,000 students and farmers have so far visited the project, taking away with them a powerful inspiration as to what is possible when a different view of the land is adopted by the people who use it. The project provides a stark contrast to the ravages wrought on the Amazon basin by the globalized market for commodities, especially for timber, beef and soya beans, produced with exploitative and destructive industrial methods.

The message from the project is that with careful planning and the correct approach it is possible to produce food and livelihoods from formerly degraded and abandoned land.



I came away from seeing their work convinced that it would be possible to create a much more diverse tapestry of agro-forestry in many parts of the world. Such an approach would help to ensure biodiversity 'corridors' that could link existing forest and plantations that are not just vast monocultures of one type of tree or crop. It might also be possible to empower local community associations to manage this pattern of biodiverse agri-forestry so that they could better care for their own environment. Not only would this enhance 'Nature's capital', it would enrich what I would call 'community capital'.

Once you start looking at what is happening you realize just how many projects like this there are in the world. There are many examples in the tropics alone of how people are trying to establish a much more harmonious relationship with the land and with the natural systems that support people's livelihoods. One example is the uplands of Sri Lanka where a landscape that was once entirely clothed by dense tropical rainforests has been cleared to make way for tea plantations. Unfortunately, these farms are now encroaching on what is left of the forest – what is supposed to be a World Heritage Site. And so a local organization



has begun a programme to encourage the farmers to adopt a similar approach to agro-forestry. They aim to reduce the use of agro-chemicals, to intercrop tea fields with other plants and to put in place measures to reduce soil erosion. Hundreds of farmers have taken part in training courses and have learned how to improve soil fertility using the shade of trees and hedgerows that also provide fuel wood and fence posts. The foliage is used to make green manure.

The Luangwa Valley in Zambia is typical of much of sub-Saharan Africa: an undulating landscape of mixed woodland dotted with smallholder farms. The main crops produced for local food are maize and sorghum. Increasingly, however, and in part because of official policies to promote the growing of crops for international markets, farming has shifted from growing local produce to cash crops like tobacco and cotton. The effect of this has been to reduce soil fertility and to increase soil degradation. Having been forced to cultivate new land, farmers are encroaching on forests – including protected reserves that harbour animals including eland, hartebeest, kudu and elephants. Local trees have been cut to provide the wood fuel used to cure tobacco.





China's Loess Plateau, where soil has been lost due to heavy over-grazing.



The same place, but with the effect of carefully planned tree planting, terracing and measures to conserve water. One key to success here was working closely with the local farmers to ensure they fully understood the benefits of restoration for their long-term livelihoods.

As farmers make this shift they are more inclined to poach wild game and to make charcoal from trees to augment their diets and incomes. To improve this situation, in 2002 something called Community Markets for Conservation set about teaching more sustainable farming methods to stabilize the loss of the forest and to conserve wildlife. Farmers learn about zero-tillage farming, how to apply home-made fertilizer individually to each plant and how to use the previous year's crop waste rather than burning it. As a result the soil holds its moisture, weeds are suppressed and the soil has become more fertile. Poultry has been promoted as an alternative to game meat and honey production has been encouraged to provide an additional source of income. Farmers also receive assistance in processing, packaging and marketing their produce, and within a very few years these farmers' food security has been improved, nutrition has diversified and wildlife populations are more stable.

In China, too, there are hugely inspiring examples of how even grossly degraded land can be brought back into productive farming, in the process slowing down soil erosion, reducing the build-up of sediment in rivers and so lessening the risks of flooding. The Loess Plateau in North Central China,



for example, is an area the size of Belgium which, over the course of ten years, has been completely transformed. What was a barren, brown landscape a decade ago, a place completely denuded and degraded, has been brought back to life in the most miraculous way. The comprehensive programme began with the planting of trees, particularly on hilltops. These trees made sure that the soil could once again retain the moisture when it rains, rather than all the water flowing away down the hillsides, leaving nothing but desert-like conditions behind. Once the structure of the soil was restored, terraced fields were built on the degraded hillsides and the soil in them was augmented with plenty of organic matter. These terraces were planted and managed using a careful system of crop rotation.

The transformation is staggering. Large areas of once barren and unproductive land have returned to life, producing food and sustaining entire communities. I was utterly amazed to see the difference, and hugely encouraged because this same approach could be applied to many other similarly blighted wastelands, providing an ecosystem-based approach to agriculture which, in addition, can help to mitigate the effects of climate change.



I have come across many other examples of programmes and projects that are trying to introduce more benign approaches. I have followed the progress of a French organization called Action Carbone, for example, which manages a wide variety of schemes. They have distributed solar cookers to communities in Bolivia and Peru to replace those that run on wood, gas kerosene or bosta (manure), thereby replacing cookers that emit up to a tonne of CO₂ annually with ones that run off the Sun and do not produce harmful fumes. In Madagascar they have launched a scheme that turns the organic waste of the city of Mahajanga into compost for local agriculture, reducing by 120000 tonnes the amount of CO₂ emitted during the running time of the project. In India they are deploying small-scale anaerobic digesters that recycle kitchen waste and animal manure. These improve the living conditions of farmers and their families and offer the possibility of protecting the Indian forests from over coppicing. They also have a programme running in Niger which plants forest and fruit trees to improve food security and decrease poverty in a population badly affected by the reoccurring food crises there.



I could go on, but I hope it is clear from this snapshot of the kinds of transformation which can be achieved that for genuinely sustainable food production to be achieved in many developing countries, the main problem is not an absence of sophisticated technology. Much more important is to engage the power of that 'community capital' I have already referred to. Empowering local people and helping them to improve soil fertility with local resources is far more productive. Education is also an important factor to get right – an education that teaches connections and certainly puts an emphasis on using water more efficiently and sustainably. It is worth noting here that common to so many of the success stories I have just mentioned is that the farmers were encouraged to grow older, traditional crop varieties rather than modern hybrids that do not need such profligate quantities of water as their modern counterparts, the hybrid varieties. And last, but not least, the whole system needs to be underpinned by good microfinance – of the kind that does not trap people into debt, but supports them.



New priorities

The focus in all these cases is much the same: to

move away from policies and practices that promote what is often the myth of 'cheap' food and towards those that promote resilience and durability. In this way, livelihoods become more secure too. Local production reduces the dependence upon fossil fuels, which cuts pollution. Reducing the use of chemicals also cuts pollution, so people's health stands a better chance, as it does for animals and for what is, surely, our ultimate resource and the essential basis of a secure and common future – the soil.

I am not saying that all food should be produced on a small scale and for local consumption, or that international trade in farm produce is automatically undesirable. And I am absolutely not saying that we do not need technology. We do need it, but it should be part of a more balanced and comprehensive system that works as benignly as possible with Nature rather than through a vicious circle system and a technology that only solves one problem without looking at what caused it in the first place, never mind the other problems that might be caused in the process of solving the one in hand.

Considering the enormous challenges we face to preserve vital biodiversity, to prevent soil erosion,



restore tree cover, harvest and conserve water, store carbon in soils and trees, revive degraded land and produce much-needed food, it is surely incumbent upon the large agri-business companies to say how their future operating model will be fit for purpose? At the moment I simply do not see this being articulated, but instead hear only attacks on the shortcomings of what are still regarded as alternative systems.

Curiously, and in direct response to some of the critics, what I am advocating here in many respects amounts to a more intensive approach to agriculture that produces higher yields. Recent research has shown that in Brazil, for example, they have enjoyed increases of up to 250 per cent in the yields of maize by using green manures and cover crops. Meanwhile, on Nepalese farms there have been yield increases of 175 per cent where similar agro-ecological techniques were adopted. In Tigray, in Ethiopia, the location of the terrible famine that shocked the world in the mid-1980s, yields have increased by a factor of three to five since people began composting instead of using chemical sprays. These are all encouraging results and I am very pleased to say they have found backing from one very unexpected quarter.





Ethiopian farm at sunrise. Infamous for a terrible drought and famine, some farms in this East African country are emerging as examples of resilient and sustainable agriculture. Bucking trends of recent decades, farmers have improved food security without the need for artificial chemicals. It seems that in many circumstances traditional methods can produce sufficient food, if the conditions are created for them to thrive.

This came in 2008 when a comprehensive review on the future of farming was published. At a packed press conference in London 400 experts, drawn from across the world who had been working through a process called the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), set out a vision

for the future of food production. I expected this exhaustive process to have concluded that all the answers lay in yet more technology and industrialization of production, with plaudits for genetically modified crops, more sophisticated chemicals and the need for even more extreme monocultures. But it didn't. Instead the report concluded that continuing with these approaches would exhaust our resources and put our children's future in jeopardy. It said that a narrow focus on increasing food production would undermine our agricultural capital and leave us with an increasingly degraded and divided planet.

The authors called for a different way forward for farming, and for new organizations and different economic and legal frameworks to combine productivity with the protection and conservation of soils, water, forests and the biodiversity of life in all these natural resources. Crucially, they concluded that the way to help the poorest farmers was not through the sale of expensive seeds, pesticides and fertilizers, but by helping them to revive or adopt traditional methods suited to their land – to render them less vulnerable to the failure of a single monoculture crop or a sudden drop in the price of global commodities which are factors that are always



utterly outside the farmer's control. No matter how hard they work nor how many chemicals they have bought, these external factors, of course, only worsen their crippling debts.

This all proves to me that a durable system has to be resilient to such outside factors, and that means the roots have to be strong. In other words, for a community to enjoy strong food security, it must rely on a system that works from the roots up. It must be locally based and self-sustaining and not dependent upon outside inputs and the vagaries of what comes down from the top – just like Nature, in fact, where everything grows from the roots up, not the other way round.



More natural and nutritionally balanced diets can improve educational performance. From field to plate, there are many reasons

why we should wish to have a more harmonious relationship with our food. In this picture pupils tuck into a wholesome lunch at St Martin in the Fields School, Lambeth, South London.

Sustenance

At the other end of the food-making process I think there are many more solutions worth considering. One thing I find deeply troubling is how, for many in modern societies, there is a great chasm in their understanding of where food comes from and how it is produced. Many schoolchildren in more developed countries, especially those in families on low incomes in urban areas, rarely see fresh vegetables in the kitchen, never mind watch them growing in the ground. For these young people the connections with food, and thus the natural cycles of production, are truly severed.

They are cut off, literally, by the packaged and processed nutrition that lies between them and the land, the source of the sustenance that feeds their minds and bodies. Not only is there commonsense reason to be concerned about this, but also plenty of research. Some shows how children fed with properly prepared organic food for school meals behave better and concentrate more than those fed

