

Submission to Environment and Sustainability Commission

Inquiry on Sustainable land management

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I make this call for the following reasons, which I substantiate below:

The argument

Until recently it has been all but impossible to gain planning permission in the UK for new homes to be built on agricultural land in the open countryside. Lammas was the first village to do so, comprising six such smallholdings that are taking part in a unique experiment: six families pioneering a way of living that is not only intended to be truly sustainable by minimising the effect it has on the environment, legally sanctioned by the state's planning system, a system that was changed as a direct result of their efforts.

Lammas is not really a village; its homesteads are too spread out. Each family has around six acres of what was previously one single sheep farm, comprising mostly upland pasture but with some pine plantation. In these six acres the occupants can do exactly what they wish, as long as they provide for at least 75% of their own livelihood from the land and build their own homes. Why is this remarkable? Because it took a long and tortuous legal process before planning permission was finally granted in 2009. The proposal faced unwarranted opposition from Pembrokeshire County Council that could only be overcome by an enforced change in personnel and a change in planning policy and guidance from national government, instituted by the then Welsh Environment Minister, Jane Davidson.

The new policy was called One Planet Development. This evidence, and a book I am currently writing for Routledge, is about this policy - and similar ones elsewhere - and how one can obtain a level of livelihood from the land sufficient to live this kind of lifestyle oneself. It also proposes a more fundamental consideration: a debate about what land is ultimately for, and whether the planning system in this, or other developed countries, works in practice to support truly sustainable land use or whether it inhibits it.

This question gets to the heart of how Wales- and mankind - might survive in the future.

Living within our means

The future will be sustainable or not at all. This truism implies that humanity as a whole will have to learn to live within its means, otherwise millions - perhaps billions - of us will not be able to survive at all. The stark reality is that with a human population rising up to nine billion projected by 2050, we already consume more resources provided from the Earth's land surface and waters than can be replaced sustainably.

The financial crash of 2008 occurred because banks were lending more than they were receiving and people were borrowing more than they could pay back. A potential future ecological crash promises to be much worse than the economic shock of 2008, because unless we consume a great deal less and recycle or reuse a lot more raw materials there's no way we can pay back what we've taken. Just pause for a moment and imagine the consequence of this: refugees, starvation, violence and food banks; and the poor will suffer the most. At least we understand that what we borrow from banks we will have to pay back some day - with interest. We still do not appreciate that we borrow - not take - from the natural world. According to Global Footprint Networkⁱ's calculations, all of humanity's demand for renewable ecological resources and the services they provide is now equivalent to that of more than 1.5 Earths. The data shows us to be on track to require the resources of two planets well before mid-century.

The Ecological Footprint

We know this thanks to an amazing tool. The ecological footprint is a resource accounting tool that helps countries understand their ecological balance sheet and gives them the data necessary to manage their resources and secure their future. The unit used is global hectares per capita, that is to say the amount of average quality land area required to provide all the things we need as individuals and absorb the pollution we create as a result. It is different for the inhabitants of different countries. It is also different for individuals depending upon their lifestyle choices. While it is true that there are concernsⁱⁱ about the accuracy of some of the tool's assumptions, for example the scoring may need tweaking for different types of land-use, there is no denying its general message, and the assumptions are being constantly improved.

The most recent data is from 2010. In that year, the USA had the highest footprint in the world: 8 ha per capita; but it has a biological carrying capacity of 3.9 ha per individual. This gives it a deficit of 4.1 ha per individual. In other words, Americans are using roughly twice as much as they can sustainably manage. The United Kingdom has an average ecological footprint of 4.9 hectares, with a biocapacity of 1.3 ha. In other words, British citizens are using more than three and a half times they can sustainably manage.

It's in this context that Wales, a part of the UK that has jurisdiction only over some of its policy areas and no tax-raising powers, has partially adopted the measure of the ecological footprint to help it determine whether its policies are in line with its constitutional aim of securing sustainable development. Its Sustainable Development Scheme, "One Wales: One Planet" includes an objective that "within the lifetime of a generation, Wales should use only its fair share of the earth's resources, and our ecological footprint be reduced to the global average availability of resources - 1.88 global hectares per person in 2003"ⁱⁱⁱ. In 2006 the ecological footprint for each Welsh citizen was 4.41 global hectares.

One Planet Developments, which are one model of One Planet Living, should, according to Welsh Government guidance, initially "achieve an ecological footprint of 2.4 global hectares per person or less in terms of consumption and demonstrate clear potential to move towards 1.88 global hectare target over time"^{iv}. They are assessed using an ecological footprinting tool devised by the Stockholm Environment Institute (SEI)^v. This body was established in 1989 by the Swedish Government and has a reputation for rigorous and objective scientific analysis in the field of environment and development. It has pioneered the use of ecological footprint analysis (EFA) to evaluate and compare impacts so that production and consumption can become more sustainable and move towards an economy in which there is no waste.

One Planet Development

"Sustainable development is a golden thread that winds its way through all that we do", asserted the civil servant in charge of planning policy in the Welsh Government, in conversation with me about this policy in his office in Cathays Park, Cardiff, in September 2013. Although these words echo strongly those of the UK government's National Planning Policy Framework cited by Communities Secretary Eric Pickles below (page 18), I do believe he meant something different by them, and that there is a genuine commitment to sustainable development in Wales, even though there is not yet clarity about what this will mean in practice.

One Planet Development came as "an exogenous force from elsewhere", he said, referring to Jane Davidson, architect of the policy, which "would not have happened without her... that lay behind the revision of TAN 6 and Planning Policy Wales (PPW)". This key document says:

"Land based One Planet Developments located in the open countryside should provide for the minimum needs of the inhabitants in terms of income, food, energy and waste assimilation over a period of no more than 5 years from the commencement of work on the site. This should be evidenced by a management plan produced by a competent person(s). The management plan should set out the objectives of the proposal, the timetable for development of the site and the timescale for review. It should be used as the basis of a legal agreement relating to the occupation of the site, should planning consent be granted."^{vi}

The Welsh government saw TAN 6 as a way of freeing up the planning system to allow these developments. As the official said:

"It confirms the definition of low impact development to come forward in a way that is sustainable and does not drive a coach and horses through the planning system, which has a duty to protect the open countryside and environment from unfettered development. So it's a mechanism by which we sought to loosen the policy agenda to allow this kind of development but caveat it very very tightly to make sure that the system is not abused by people who just want homes in the open countryside."

Note the fear of 'unfettered development'. "We recognise that inevitably this kind of development is quite niche and will only be of interest to a small number of people in Wales and most people are not touched by this kind of development," said the civil servant. "We need to make sure it does not open the door to inappropriate development." Amongst the 8,000 planning applications a year for housing they are very few and consume a disproportionate amount of a planning office's time and resources.

The Welsh government doesn't know how many One Planet Development applications are in the system at the moment. They don't keep track of it. But at the time of writing, as far as I am aware there are 13 applications at various stages^{vii}.

Low impact development

One Planet Development is a specific and technical subset of low impact development (LID). This was a term coined by Simon Fairlie (a founding residents of Tinkers Bubble, Somerset, a high profile LID, and a former editor of the *Ecologist* magazine) in his book, *Low Impact Development*^{viii}. He defined it as "development that, through its low negative environmental impact, either enhances or does not significantly diminish environmental quality." This is a broad definition but how does it differ from one planet living as since defined by Pooran Desai of BioRegional in his eponymous book^{ix}?

Desai's definition is contained in ten principles: zero waste, zero carbon, the use of sustainable water, transport and materials, restoring biodiversity and using local and sustainable food, and enhancing local community ties, equity, health and happiness. Those signing up to BioRegional's action plans commit to certain targets en route to these aspirations. They largely apply to city dwelling and not rural.

The criteria for LIDs include integrated site management and use, reversibility (leaving the land, after use, essentially as it was before), minimised resource consumption, renewable resource use, onsite waste processing, and positive environmental impacts. It typically, but by no means has to, involves the practice of

Permaculture, a 'holistic' approach to designing land use, buildings, communities and businesses as sustainable systems.

One Planet Development as defined by the Welsh government is a quantified matter and only applicable to new low impact developments in the open countryside. The prime metric is emissions of carbon dioxide equivalent, but biodiversity is also quantified. The use of ecological footprint assessment is a key part of the evaluation process, and the criteria incorporate those for low impact developments but don't mean they have to look like a mediaeval Hobbit home.

Low impact development as practised in the UK and elsewhere has, up till recent years, been characterised by people living in tipis, yurts and roundhouses, or constructions based on wattle-and-daub, pole frames, cob, straw bales, rammed earth, earth-cover and the like, and not necessarily attempting a degree of self-sufficiency. What all of these structure have in common is that they are easy and quick to build, low tech, often based on traditional and vernacular architecture and have low embodied energy/carbon, often sourced from local and/or reused materials.

Low impact living in this sense is different in several ways from that propounded by BioRegional: it is rural-based; it is a deliberate shunning of conventional aesthetics and values; it embodies a desire to use fewer processed and high-tech materials, whether due to a mistrust of them or to be lighter on the earth. It is a conscious move towards lower embodied energy and reduced reliance on the capitalist-industrial world that its proponents regard as responsible for the mess the world is in.

BioRegional's approach^x will suit most people; while criticising official building regulations for not taking embodied energy into account, it believes that it is better to work within rather than outside of the system. Buildings may therefore include high-tech equipment such as heat pumps and mechanical ventilation with air conditioning in a level of airtight construction approaching Passivhaus standard. These buildings may well have a higher embodied energy than traditional LIDs and will consume more energy, but it may be renewable energy. Their homes, like BedZed in Sutton, South London, are typically in cities, so their inhabitants may require less heating and use public transport, but will grow little of their own food.

Low impact building dwellers will insist, as Lammas' Jasmine does, that although they dwell in remote areas and so have to clock up 30,000 miles a year in their car, they use less carbon in total than suburbanites in a Code for Sustainable Homes ^{xi} Level 6 home; but this has not been quantified yet.

Personally I think we need to get away from the image of buildings on low impact developments having to look like hobbit houses. They don't need to look like this. They can look like perfectly conventional houses, as Ty Solar, a demonstration house for affordable housing, and housing associations, developed by Western Solar in Pembrokeshire, demonstrates. It is, over its lifetime, negative carbon and costs £75,000 for a three bedroomed house.

One Planet Development is an evolution and improvement upon low impact living, aimed at encouraging relatively self-sufficient sustainable developments in the countryside. It is based on the belief, for which I will make the case, that the countryside can sustainably support a greater density of population than at present, as it did once in the past. To support a greater population, there needs to be a change in land use that will require more labour and an improvement in soil quality compared to that used for typical grazing land. Proponents of one planet living believe that, for example, Wales and the UK can in principle supply all their food needs from the land.

Could the UK feed itself?

To reduce its ecological footprint, the UK must produce more of the food it consumes. Food supply currently comprises 20%-25% of the total footprint of a typical city (between 1.12 gha (Leicester) and 1.52 gha (Durham) in 2007)^{xii}. But could the UK feed itself, as it once did, despite its much higher population? It would certainly entail changes both in land use, agricultural and horticultural practice, and diet, but would there be any benefits? As noted in Zero Carbon Britain's 2013 report^{xiii}, they would include improved health, reduced obesity and vastly reduced greenhouse gas emissions. Other benefits would be reduced pollution from nitrates into watercourses and increased biodiversity, employment and food security: in total, a reduction in our ecological footprint.

Currently 78% of UK land is given over to agriculture. Agricultural food production is responsible for just under 10% of total UK greenhouse gas emissions, or about 44.8MtCO₂e in 2010^{xiv}. Over half (55%) is due to nitrous oxide emissions from fertiliser application. In 2012 we imported about 42% of all the food we ate; this resulted in at least a further 59 MtCO₂e per year. Greenhouse gas emissions from land use change abroad attributable to food consumption in the UK are to up to 100MtCO₂e per year. Emissions from the UK food chain amount to 115 MtCO₂e, including transporting and processing goods.

The ZCB report concluded that the UK could feed itself - but also foresees a massive change in diet to vegetarianism, and giving over much land to growing biofuels. At present only 3% of the UK population is reported to be vegetarian or vegan and 5% partially vegetarian^{xv}, so this would be a major cultural shift.

Simon Fairlie^{xvi} has also calculated the ability of Britain to meet its food needs from our available agricultural land. His 2007 article *Can Britain Feed Itself?* evaluated six land use scenarios ranging from "chemical with livestock" to "vegan permaculture" and again concluded that Britain could feed a population of 60.6 million people with varying degrees of flexibility, but only if its population ate less meat.

A further exercise was conducted by Ed Hamer in the same magazine five years later^{xvii}, by which time the U.K.'s population had increased by a further 2 million. It found that "it is still possible to feed 62.3m people a standard but varied diet with very

little change in the way we farm today", and this could create a further 4,000 jobs. He then raised the question: "how many people could we employ if we radically changed the way we farm?" This question has been investigated by Vicki Hird from the Sustainable Agriculture Food and Environment Alliance (SAFE – now Sustain)^{xviii}. She concluded that: "By switching support away from the richest farm sectors (such as arable) and providing support for sustainable agriculture it is possible to protect the environment, whilst facilitating job creation: a double yield".

Job creation

An attempt to put a figure on the number of jobs that would be created was made by the Soil Association in 2009, which commissioned a report from Reading University that compared yields of indigenous foods that could be produced in England and Wales under organic production (which produces half the greenhouse gas emissions) with the volumes currently produced under "conventional" (non-organic) production. The report used a subset of data from organic certified farms collected by Defra's Farm Business Survey, and scaled the figures up to national level. It found that over 150,000 jobs would be created, almost a doubling of current levels.

Organic land management is, of course, more labour dependent than conventional agriculture, and is a requirement of One Planet Development. It is natural that in a more sustainable world we would have to replace excess carbon emissions with more manual labour as well as with renewable energy. But we can also replace it with animal energy that itself gives us a by-product of manure. Over a million cultivable acres in the UK are given over to grazing horses that do no useful work. Whereas they used to be deployed to pull ploughs and carts or drag felled trees from mixed (note: not mono-crop) woodland, they are nowadays themselves ferried around the countryside in horseboxes pulled by fossil fuel-guzzling 4x4s, a feat which I'm sure will be greeted with astonishment in the future.

The Spanish example

A sustainable future will value jobs over efficiency. This has been proven in Spain by a very successful village-scale "one planet" type development. Marinaleda village in Andalusia hosts a cooperative that manages a farm of 1,200-hectares, deliberately choosing to cultivate crops that create jobs, such as peppers, artichokes, fava beans, olives, green beans and broccoli. All of these require processing in the form of canning, preserving and jarring to create added value and more jobs in factories. "Our aim was not to create profit, but jobs," the mayor Sánchez Gordillo says. His model must be successful since he has been re-elected in every election since the first one he won in 1979 aged 30.

Reporter Dan Hancox^{xix} went there and wrote: "The town co-operative does not distribute profits: any surplus is reinvested to create more jobs. Everyone in the co-op earns the same salary, €47 (£40) a day for six and a half hours of work: it may not sound like a lot, but it's more than double the Spanish minimum wage." It is now transformed into an area of high employment, contrasted with the high unemployment in much of the rest of Spain caused by its economic crisis. "Paradoxically, in light of

Spain's staggering unemployment figures, they still need more people to join their co-operative, and have more farmland than they can currently cultivate," wrote Hancox. According to Florence, a French woman who lives in Somonte, a village an hour away which has emulated this model, its land was some of the most fertile in Spain, but had for decades been used by the government to grow corn, to bring in European subsidies, "creating next to no work, and no produce; the corn was left to rot". As we shall see below, subsidies have distorted land use in Britain as well.

A food revolution

Wales' Commissioner for Sustainable Futures, Peter Davies, is of the view that while it is "not desirable" for a country, community or a household to be self-sufficient in food,

"...there is no question that a significant growth in local food growing and supply is required. There are many benefits in terms of health, wellbeing and social cohesion, and we must accelerate this as there are also clear benefits to local economies. There will still be an export advantage and opportunity for Welsh meat, but we must address the fact we have two parallel universes: sheep and beef and fruit and vegetables. You hardly ever see farmers at gatherings for local food and vice versa. The debate at a policy level is dominated by the dairy and red meat producers, led by the Welsh Farmers Union, because they are big contributors to the national economy. Some community supported agriculture schemes (CSA) cross these boundaries, but they are the exception. The Welsh Farmers Unions needs to be brought into the dialogue, while we also need to address a massive shortage of horticulture skills."^{xx}

The contradictions in our present attitude towards land use are graphically described here by Davies. A food revolution is required. Commercial scale agriculture is dominated by subsidies yet it is still considered not to be sufficiently productive, because genetically modified seed producers like Monsanto and Syngenta use the argument that we cannot feed the world's growing population in order to promote their patented products. One planet living policies alone cannot engender the food revolution. Yet one planet living smallholdings and some Community Supported Agriculture schemes are far more productive than conventional agriculture, without subsidies and using no artificial inputs but organic and Permaculture growing techniques. The parallel worlds identified by Davies need to be unified by dialogue and legislation.

This dialogue would overcome prejudices on both sides. Talking to farmers, such as Patrick Dobbs, I find that prejudices arise on that side because, as he says, "92% of farmers throughout Wales are somehow related to each other," and because they don't believe that anybody doing any other kind of farming is a "professional" (because they haven't been doing it for three or more generations). These farmers believe "they feed the cities" - but mostly only with lamb.

Yet in 2009-10 the average subsidy for sheep farms on the hills was £53,000, while the average net farm income was £33,000^{xxi}, suggesting that the contribution the farmer makes to subsidising his income by keeping sheep was £20,000. Unsustainable farming practices are heavily supported by subsidy in Less Favoured Areas (80% of the agricultural land area of Wales). The UK NEA's chapter on Wales documents that about 37.4% of Wales is Enclosed Farmland, consisting of 34% Improved Grassland and just 3.4% Arable and Horticultural land, a balance which OPD demonstrates can be shifted, as we shall see.

Recolonising the countryside

Encouraging one planet living on a wider scale would be one way to provide employment and livelihood so the UK can improve its food security. But replacing fertilisers, tractors and pesticides with labour means more people living in the countryside. This is extremely difficult within current planning guidelines and culture. They were not designed to make it easy to obtain planning permission for new residential accommodation in rural areas. The OPD policy is designed to address this failure, but has not made it significantly easier so far, as we shall find out later. OPD thus represents nothing less than an attempt at social engineering sustainably to recolonise, and regenerate the countryside.

And why not? Before the heyday of the industrial revolution and the Enclosures Act, the British countryside was much more densely populated. It has since fallen from a maximum of 3.84 million in 1851 to 1.2 million in 2001^{xxii}. By 1911, the population of rural districts in England and Wales had decreased by about one-half since 1850^{xxiii}. By 2010, the population density for Wales was 145 people per sq km, with two-thirds (slightly under two million) living in urban (greater than 10,000 population) areas, concentrated mostly in the south east of the country^{xxiv}. This is demonstrated by the number of derelict stone hells sprouting vegetation, former farm labourers' family homes, that can still be seen dotted around the Welsh countryside despite waves of hippies and wealthier English incomers buying up the most salvageable of them.

Many remote areas of the British countryside would benefit from higher levels of population density provided that it was introduced in a sensitive and sustainable manner. Many areas (about two thirds in fact^{xxv}) of Wales are given over to sheep farming which would not be economic were it not for subsidies. There are two sheep for every three people in the principality: approximately two million. The lamb and mutton currently produced on 3.6 million hectare of rough pasture, approximately 15 per cent of the land area of UK, represent about 1.5 per cent of our national diet, according to Simon Fairlie^{xxvi}. Furthermore tens of thousand of sheepskin fleeces are burnt every year because there is not a sufficient market demand (although with targeted support this could be created, e.g. for insulation, instead of using polystyrene EPS/XPS).

The value of LIDs is undisputed:

"What is most striking is that LID makes positive contributions to all three aspects of sustainability together, without trading off against each other. In this respect LID appears to be an intrinsically sustainable form of development. LID's weakest contribution is economic, but it is arguable that LID does not set out to make large monetary contributions to the economy, as it is a subsistence-based livelihood. There is little evidence either that residents of LID are an economic burden on society."^{xxvii}

The truth is, that because of the CAP subsidies, the opposite is true. Enclosed Farmland may have certain value for provisioning and cultural services in Wales, which needs to be recognised, but it also imposes significant disbenefits in terms of greenhouse gas emissions, diffuse water pollution and losses to biodiversity, which one planet living does not. Each OPD conversion of a sheep farm on a south facing slope in Wales would therefore save an average of £53,000 of taxpayer's money, as well as making the land more productive and reducing carbon emissions from livestock. (North facing slopes can still be used as sheep farming or forestry.)

OPDs or organic smallholdings intrinsically promote a more sustainable level of food production, because whereas farmers constantly complain that they cannot afford to produce fruit and vegetables for resale at a competitive market price, and so do not do so, those choosing to live a low impact life and run a smallholding are happy to do so, and without high levels of artificial input such as nitrogen fertilisers and pesticides which themselves have a global warming effect.

The multiple benefits of OPD

There is therefore a double economic benefit as well as several environmental ones for switching a certain proportion of rural land use to One Planet Living. A level of greater population density increases sustainability in the sense that economic and social benefits are enhanced through greater demand for local services. This encourages more young people to stay in the area, with their families, where there is employment, increasing social cohesion and community resilience.

Even in upland areas, where it is thought that less can be grown, in previous centuries it was cultivated using a form of land use rotation. Simon Fairlie recounts that "upland areas followed a form of 'convertible husbandry' where enclosed fields were grazed by sheep for ten years or more and then were ploughed up for a spell of arable production before being put back to grass"^{xxviii}. He observes that "this cycle could provide enough fertility for the modest output of grain necessary to maintain the local economy without resorting to the more labour intensive business of bringing in nutrients from the outlying saltus". In other words, the sheep fertilise the soil, and remove the need for imported petrochemical fertilisers; but grazing for too long does deplete soil quality, so rotation has a dual benefit.

This form of upland land management, in the future, could be practised alongside OPD, mixed forestry and a modest amount of rewilding, as envisaged in George

Monbiot's book *Feral*. Monbiot argues in his book “against a mass rewilding of high-grade farmland, because of the threat this could present to global food supplies”^{xxxix}. One planet living can coexist with 'convertible husbandry' and a level of rewilding, shading into some form of managed woodlands populated by huntable wild mammals such as deer and wild boar, which have useful functions in clearing land for cultivation and nutrient recycling, as well as large wild fowl. This is a patchwork picture of land use appropriate to its locality that balances the benefits of environmentally friendly management with the need for food security. Just as smallholdings are a micro-patchwork of different vegetable and fruit plots and animal husbandry, as well as barns, workshops and accommodation buildings, so the macro level of land use can become patchwork too. This is inherently more sustainable than the top-down CAP^{xxx}-dominated regional zoning land use policy where large swathes of land are dominated by single activities, such as sheep in Wales and sunflowers in western France.

One planet living increases both biodiversity and agricultural productivity as it utilises permaculture or similar techniques of organic horticulture. Wales and the rest of the UK import considerably more food commodities in all categories than are exported, except in the case of animal feedstuffs^{xxxi}.

The opportunity in Wales

The chance for this land use change to happen in Wales is currently greater than in England or Scotland. Its 2009 Sustainable Development Scheme, *One Wales: One Planet*, which is to be updated in 2014-15 with a new Future Generations (Wales) Bill (previously the Sustainable Development Bill), is complemented by the Living Wales initiative. This is supposed to be establishing a Natural Environment Framework for governance in Wales, based on the ecosystem approach. Sustainable development is a central organising principle through which all these policies will be developed and delivered, and by means of which natural capital will be conserved or enhanced.

The Living Wales policy "recognises the value and importance of the efforts of every individual contributing to a healthy environment, and it aims for prosperous livelihoods, where the provision of public goods and services is well rewarded and where nature thrives... Wales aims to be the first country to explicitly embed the ecosystem approach into governance and grass roots action, based on sound scientific evidence."^{xxxii}

Jeff Cuthbert, AM, Minister for Communities and Tackling Poverty, is on record as saying that the aim of the Future Generations (Wales) Bill is to tackle poverty through the provision of affordable housing and "contribute to long term environmental benefits through consideration of materials and energy efficiency – building more resilient and low-carbon sustainable homes"^{xxxiii}. The Welsh Government is serious about this process and has appointed Peter Davies, as Wales' Commissioner for Sustainable Futures, to provide guidance. He has said that the process must be meaningful, and that it is critical that it "both directly connects to the decision making process in the public sector and to the wider public", as well as "to the UN's Global

Sustainable Development Goals, which will be introduced post 2015, with the intention that all countries will align their contributions towards achieving these goals".

In other words, Wales is one of the most progressive countries in attempting to align its policies and practice with globally agreed standards of sustainable development, taking its people with it along the way. And there is another way in which it is helping to lead the world to a more sustainable type of land use.

Biosphere Reserves

Nestled on the edge of mid Wales, where I lived for nearly 20 years, is an example of another piece of this emerging jigsaw: the beautiful Dyfi Valley. From its windswept hills down to its coastal wetlands and long, sandy beaches, it is one of 621 so-called 'biosphere reserves', testbeds for a new way of living. Surprisingly, this catchment area around the town of Machynlleth shares this status with many World Heritage sites such as the central Amazon, Huanglong in China, Mount Kenya and India's Nanda Devi. It contains a diverse collection of habitats and land use: acid moorland, conifer plantations, mixed woodland, stock grazing pastures, floodplains, rare sand dunes, peat-based wetlands, urban ecologies and more. The status of biosphere reserve is accorded by UNESCO and I believe that the OPD model of land management has a notable analogue in the definition of a UNESCO Biosphere.

UNESCO's World Network of Biosphere Reserves are areas of ecosystems which are internationally recognized within the framework of UNESCO's Programme on Man and the Biosphere (MaB), as explained in its Statutory Framework of the World Network of Biosphere Reserves. Far from being the quarantined nature conservation zones which UNESCO originally supported, these designated locations in the world are, like Lamma, living laboratories of how human beings can successfully and sustainably live alongside nature while preserving and enhancing biodiversity. Lest it be thought that most are in developing countries, there are also examples in Germany, Hungary, Italy, Japan (Yakushima Island), Ayer's Rock and Macquarie Island in Australia, eight locations in Russia and nine in the USA.

What do these areas have in common? In order to achieve biosphere status, a region must have a conservation function, to preserve genetic resources, species, ecosystems and landscapes; a development function, to foster sustainable economic and human development, and a logistic support function, to support demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development.

In practice this means that each reserve contains three elements. Firstly there are securely protected core areas for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and education. Each of these is surrounded by a clearly identified buffer zone, which is used for cooperative activities including environmental education, recreation and research. Finally there is a flexible transition area, which may contain a variety of

agricultural activities, settlements, industry and other uses, in which local people work together to manage and sustainably develop the area's resource^{xxxiv}.

You can see what this has in common with OPDs: both represent an attempt to accommodate the struggle between human needs and the needs of the rest of the planet. Both seek to reconcile humanity's voracious expansion and appetites with the planetary life-support system upon which it depends, but which can exist independently of us, given the chance. Both are developing models and templates for how to do this. Both have an educational role. Both result in an interlocking patchwork of different but complementary land uses.

There we have that word patchwork again. There is a simple reason why a patchwork design for land use is more productive and good for biodiversity, at whatever scale: it is because the place where two eco-systems or habitats meet (e.g. woodland and meadow) is generally more productive and richer in species than either habitat on its own. In ecology this is called 'ecotone' and is defined as a transition area between two biomes. Maximising the number of edges and their length is therefore a key principle in Permaculture design.

It is within the context of all of these considerations that one planet living must be seen to represent a valuable and evolving planning tool for governments anxious to reduce their countries' ecological footprints.

To live closer to the earth

In the end, it's down to people. To live closer to the earth is a dream that captivates many, but for all but a minority of those it remains just that: the reality of doing so is either too extreme or too hard to reach for it to be attained. It looks romantic, when viewed in the summertime as the sun is shining, surrounded by flowers, fruit and vegetables with the birds singing nearby, but away from many of the power-hungry luxuries that are taken for granted in the majority of homes in the developed world, and in the midst of winter as the rain lashes down and the wind howls around, you still have to go out and tend the land, and it can feel very different. For those who live like this, which includes of course our farming communities, such weather outside of one's dwelling can actually enhance the feeling of cosiness inside. It's normal: it's the way it is, it is rarely seen to be intolerable, it's part of life.

The people who are doing it now, whom I have met, are currently to be considered pioneers. They are on a par with the first settlers who left from Europe for North America or Australia, except they are settling much closer to home. Consider the analogy with the Centre for Alternative Technology (CAT), near Machynlleth (it's no coincidence that it's within the Dyfi Biosphere: key individuals in the administration of that project were previously employed by CAT). This was an abandoned slate quarry in 1974. Those who colonised it with the dream of creating a living laboratory for what was then termed alternative lifestyles and technologies were considered outliers: radicals, dreamers and certainly pioneers. For some time CAT has been at the heart of the establishment in Wales and beyond, its views widely sought on how to

live sustainably, based on the real experience of doing so. The early settlers in the quarry struggled to create soil, to self-build their homes, to secure a water supply, electricity and power, as well as feed themselves, and many of those who live in low impact developments now have gained skills and knowledge by either attending courses at CAT or reading their publications based on this experience. As an off-grid settlement itself, it can easily be seen as a forerunner of Lamma and Hockerton.

Life was hard for these pioneers, but it doesn't have to be for those who choose this path in the future.

Making it easier

To survive on this planet humanity needs to undergo a paradigm shift in the way it lives. We've already seen that this is because, in the words of Herbert Girardet: "the collective ecological footprint of humanity now significantly exceeds the regenerative capacity of the earth"^{xxxv}. Explicitly referring to ecological footprints, Girardet, who lives on the edge of Wales near the Forest of Dean, observes that "under current trends, humans will require the biocapacity of two earths by 2030". The concept of regenerative cities, introduced by the World Futures Council of which he is a founder, stresses the linkages between urban systems and ecosystems. Our expanding cities currently excessively rely on the countryside for food. Concurrently, green belt land is treated differently under planning laws, making it very hard for anyone to secure permission to erect a dwelling even if they are proposing to work the land.

The paradigm shift that is required boils down to a change in attitude towards development and land use. To be effective, one planet living has to be a principle that is applied equally everywhere: in city and countryside. We know that most people like living around nature, that it enhances the quality of life. The first European Quality of Life Survey, which examined "urban-rural differences", showed that people living in the countryside are likely to be happier than people of the same income level living in the city^{xxxvi}. While cities need to become more "biophilic"^{xxxvii} so the countryside needs to become more densely populated and productive. Many cities are already seeing declines in population. What can be done in terms of planning policy to support such moves?

The health benefits of living with nature

Many studies have documented the health benefits of direct contact with nature that supports the case for fostering One Planet Living. Of all the possible types of contact with nature that people can have, the one with the greatest benefit is regular use of their own green space, whether it is a garden or smallholding. In the UK National Ecosystem Assessment this type is given the highest of all monetary values, should it even need to be given one to justify supporting the policy, of between £171 and £575 per person^{xxxviii}.

The UK NEA report lists numerous benefits of contact with nature that would reduce the burden of those living in low impact developments upon the National Health Service, including improvements in both self-esteem and mood, recovery from stress,

blood pressure, heart rate, vitamin D deficiency, the benefit upon health of consuming fresh food, as well as others such as improved community building. These results are reinforced by a survey of 12,000 people over five years, conducted by the University of Essex on behalf of the mental health charity MIND^{xxxix}, who took part in an 'ecotherapy' project comprising green exercise activities. It found that participants reported improved self-esteem, a greater desire to see friends and family, and more drive to become involved in their community. Participants were involved in creating a new wildlife garden, building an outdoor shelter and growing vegetables, or were able to just take the time to relax outside.

"There is a clear link between the amount of accessible greenspace and psychological well-being. The more frequent the visits to nearby green spaces, the lower the incidence of stress. Individuals with easy access to nature are three times as likely to participate in physical activity and, therefore, are 40% less likely to become overweight or obese."^{xl}

Is Permaculture more productive than conventional agriculture?

Yes, but it depends what you mean by productive. The Permaculture Association itself laments the lack of peer-reviewed scientific research. The closest comparable study was completed in 2012 at Cumbria University into the mixed growing of different vegetables. It found a slight improvement in productivity as compared to monoculture growing: 3.1 kg per square meter compared to 3.5 kg in the high diversity plot. This study^{xli} comprised 24 different sites throughout mainland Britain. It admits that these differences are "not significant" and that the low diversity plot was "more productive for the same amount of effort: on average, 3.4 kg were harvested from a square-metre of the low diversity plots for every hour of effort put in, and the high diversity plots yielded 2.3 kg." However, 3.5 kg per square metre equates to 35 tonnes per hectare, which is over 4 to 5 times greater than average UK wheat yields of around 7-8 tonnes per hectare on the best soil.

Vegetables compared were, in the low diversity plot: peas, radish and perpetual spinach (beet), and in the high diversity plot: the same, plus onions, lettuce, beetroot, sweet corn, coriander, runner beans, kale, marigolds and rocket. The authors speculate about the benefits of mixed vegetable growing: "Different plants have different rooting zones so could be combined to maximise use of the soil area, rather than competing in a single layer, and can also benefit each other, for example by fixing nitrogen or providing food for pest predators or for pollinators."

The intermediary conclusions to be drawn from what we know so far are that labour intensive gardening is much more productive than conventional dairy or arable agriculture; but using Permaculture methods don't necessarily increase productivity compared to non-Permaculture organic horticulture. However, this is a very narrow metric: there are other benefits to Permaculture besides quantity of yield, including, but not limited to: increased biodiversity and soil conditioning, community cohesion, and nutrient, water and waste recycling.

The planning cul-de-sac

It is surprisingly hard to get to live and work on the land. But why, given the evidence that it is good for you, and for the planet? To find the answer, we have to peel back the pages of history. Ever since land enclosures began apace in Tudor times, ordinary people have been gradually dispossessed from the land that was theirs by common right, with land ownership concentrated in fewer hands. Such evictions were often accompanied by a loss of common rights and resulted in the destruction of whole villages. Before enclosure, much of the arable land in central England was organised into an open field system, with practices very akin to modern Permaculture techniques. There is now only one place in the entire country where an original mediaeval cultivation system remains in place and is still farmed: Laxton in Nottinghamshire. It shows what all 'One Planet Living' and Permaculture-cultivated areas show: that such labour-intensive horticulture is more productive than widespread farming techniques, and yields greater soil health and biodiversity.

To cut a long story short, the enclosure process culminated in the Labour government of 1947 passing the Town and Country Planning Act, which was designed to stop ribbon development and unscrupulous capitalist development of the countryside. For example, it preserves green belts, and is still the only protection we have to stop large areas of Britain becoming like the Irish countryside, littered with hideous breezeblock dwellings.

But, as Chapter 7's DIY Planning Handbook^{xliii} says, it "has created a scarcity of building land that has forced low income people out of the countryside and made rural England, in the words of a recent Cabinet Office report, "the near exclusive preserve of the more affluent sections of society." Chapter 7 is the planning office of campaign group The Land Is Ours. It "campaigns for a planning system which actively encourages sustainable, low impact and affordable homes" and dispenses planning advice to people seeking to/or already embarking upon living on the land, engaged in land-based livelihoods.^{xliiii}

The current planning system: illogical and inefficient

The overriding philosophy of land use now is to keep people and greenfield sites separate. Time and again you hear planning officials say that their purpose is to stop "unfettered development" on greenfield sites. They are, justifiably, frightened that the "floodgates" (another word they use often) will open to conventional housing; desirable homes for commuters who work elsewhere. This is certainly not in the interests of the environment, but perhaps it is time to re-examine this attitude, to create a new sense of perspective that permits sensitive development of the countryside so that the country as a whole can live within its means.

The contemporary division of land function affects its value: the price of agricultural land tends to be between £4,000 and £10,000 per acre, whereas land with planning

permission attached to it can be as much as £200,000 per acre. Woe betide any planning department that interferes with this pricing arrangement.

In parts of the UK there are people who have acquired some agricultural land, and secretly lived on it for years without planning permission in tipis, benders, yurts or caravans, while they did battle with planning officials, sometimes eventually winning retrospective planning permission. This usually comes with conditions attached. For example, Ben Law^{xliv}'s is a silvicultural tie, forcing him to run a woodland and charcoal-burning business on the land. What is more, only Ben Law himself can do this, to prevent him from selling up.

A more reliable and secure route, but one that by no means guarantees a home at the end of years of trying, and which is not open to communities only households, is to purchase an area of agricultural land and submit an 'agricultural prior notice consent form' to the planning office for an agricultural workshop or barn. Such buildings are known as 'permitted developments', and therefore do not require planning permission. Consent can in theory take as little as 28 days but often takes longer. It is then perfectly legal to situate a temporary mobile home on the land while the workshop is being constructed and the business being set up, for up to five years. After this period has elapsed, the next step would be to apply for planning permission to construct a permanent dwelling, which involves presenting a cast-iron case that it is necessary to live on site in order both to run the business, perhaps in order to look after livestock all year round, and that the business generates sufficient income to support the household.

In Scotland, while acquiring a croft for rent or purchase is just as expensive as buying developed land, it's now possible to purchase new land for a croft. One applies to the Crofter's Commission and can thereby obtain planning permission for one house on a working croft. This follows the passing of the 2010 Crofting Reform (Scotland) Act, which charged the Commissioners with the task of developing a Plan that would help retain populations in remote communities, through the occupation of crofts. The Crofting Act requires that all tenants and owner-occupier crofters reside on or within 32km of their crofts and have a duty to cultivate. The guidance says: "This includes horticulture, keeping livestock including poultry and bees, growing of crops and the planting of trees"^{xlv}. Chrissie Sugden says that it is "common for crofters in a crofting 'township' (a group of crofts) to own/lease 'land in common' which is managed by a 'Grazings Committee'. Grants are available for crofters and Grazings Committees towards the cost of fencing, agricultural buildings and (for crofters) a house"^{xlvi}.

Also in Scotland, The National Forest Land Scheme and the Woodland Crofts scheme allow communities to apply to buy land owned by the Forestry Commission in Scotland that falls within their designated boundary, even if the land is not for sale. It is applicable to 'communities of interest' (i.e. groups of people who aren't necessarily resident in the same area), which is often how intentional low impact communities describe or constitute themselves, and provides an opportunity to create new woodland crofts.

The situation in England

Here, the planning system is riddled with inconsistencies, as witnessed by contrasting Ben Law's judgement with the following. In September 2013, English communities secretary Eric Pickles over-ruled a planning inspector's rejection of 100 homes on top-quality farmland. The inspector had judged the proposed housing estate to be in conflict with the local plan (decided by local people), unsustainable in transport terms (inadequate roads and public transport) and prejudicial to development of a front-runner neighbourhood plan.

The development, at Nantwich Road, Tarporley, was opposed by Cheshire West and Chester Council, but, astonishingly, Pickles invoked the "presumption in favour of sustainable development" to overrule them. He accepted that the scheme would destroy some of the best and most versatile farmland, mostly Grade 2, contrary to national planning policy, but rejected concerns that it would harm the character and appearance of the area or its environmental quality.

In his judgment he said: "If adequate levels of development are to be catered for, now and in the future, the planned release of greenfield land appears inevitable". "Sustainable development concerns other issues," namely housing supply. "In these circumstances he considers that housing land supply policies are out-of-date and paragraph 14 of the National Planning Policy Framework^{xlvi} is therefore engaged." This states that: "Sustainable development should be seen as a golden thread running through both plan-making and decision-taking". I was not the only one to read this with incredulity.

The presumption in England in favour of sustainable development is now less well-defined and therefore open to abuse or interpretation than it was prior to the simplification of the planning guidance by the Coalition. Potential support for OPL used to be found in the planning policy statements, which required planners to "support development that delivers diverse and sustainable farming enterprises, support other countryside-based enterprises and activities which contribute to rural economies" and "provide for the sensitive exploitation of renewable energy sources", all things that low impact developments do. In relation to agricultural developments, planning policies should "enable farming and farmers to become more competitive, sustainable and environmentally friendly" and "diversify into new agricultural opportunities"^{xlvi}.

Yet heavy brakes on development were applied in determining planning applications for new development on agricultural land, where the inspector must decide whether the people who will live there really will "engage in farming, forestry or any other rural-based enterprise" ... "for a reasonable period of time" and whether they really do "require one or more of the people engaged in it to live nearby"^{xlvi}. This included a financial test.

That was bad enough. But since 2012, even more confusingly, the new English national Planning Practice Guidance, Part Two¹, calls on local authorities to take account of “market signals” including land and house prices, rents and affordability. While the emphasis on affordability is welcome and part of sustainable development, there is a danger that “market signals” overrides other concerns such as sustainable land use.

While this uncertain state of affairs continues, real sustainable development applications such as Landmatters in Devon, have stringent conditions set on them; even six years after being given permission to stay on the land they cultivate the residents are still not allowed to build permanent dwellings. This is discussed further below in the section on planning inconsistencies.

The red herring in the room: cultural prejudice

Given the laborious planning application process which must be endured to establish low impact living rights on greenfield sites it's not surprising that those who currently manage to do so are unconventional and exceptional people. Often they don't look like 'normal' people who work in offices and factories. This cultural difference has given rise to a canyon of misunderstanding on both sides of the planning divide. It has even led to misconceptions amongst those who should, perhaps, be more sympathetic to the strong desires of these people to connect back to the land.

During the course of a conversation I had with Peter Davies, Wales' Commissioner for Sustainable Futures and the chair of Cynnal Cymru, he questioned "the degree to which [OPD applicants] are culturally aligned to the heritage of rural Wales, which is important in terms of sustainable development and the longterm cultural dimension". He said "there is a line that says they are parachuted in and they are culturally so different that they don't contribute". When I pointed out that several members of Llammas were learning Welsh, their children were learning Welsh in the local school, and that the majority of the most vociferous opponents to one planet development applications in Pembrokeshire were, in fact, English incomers themselves, he concurred, as he did to the point that the same was said about the colonisers of a certain quarry in mid-Wales near Machynlleth, favoured at the time by Prince Charles and the Duke of Edinburgh, which became the Centre for Alternative Technology.

The cultural issue is a red herring. It was pointed out to me recently by an architect that in a city as well it can take up to ten years before a new development of houses, a street or block for example, can properly feel integrated with its surrounding community. Back in the countryside, a 2002 study by the Countryside Council for Wales into low impact developments (LIDs) actually found that:

"LID residents, as a result of the very 'local' nature of their lives, usually form strong linkages with local services and facilities, and contrary to some opinion, relationships with local communities are usually good and sophisticated. Although incomers are a feature of LID, so are Welsh people, sometimes with local origins, while the proportion of LID residents speaking

Welsh exceeds the national average, and there are many links to Welsh culture."^{li}

Nevertheless, it's easy to see that cultural differences can lead to prejudice affecting planning decisions. But is it to do with culture alone, or are there structural reasons why it's only certain kinds of people that are pioneering these type to development? I believe that there are, and they are a direct function of planning law and culture itself. Ronald Coase was an economist who developed the theory of transaction costs in his paper, *The Nature of the Firm*^{lii}. In his Nobel prize acceptance speech, he said:

"If the costs of making an exchange are greater than the gains which that exchange would bring, that exchange would not take place and the greater production that would flow from specialisation would not be realised. In this way, transaction costs affect not only contractual arrangements but also what goods and services are produced."^{liii}

The cost of putting in a planning application

What are the 'transaction costs' of setting up a low impact development through the planning system? They are extremely high and require a massive amount of time and dedication. My interviewees gave me the impression that they had on average spent over 300 hours during two years on their applications. Of course only exceptional individuals or groups will be willing to invest this much for so little financial return! The return for them will come, they believe, in other ways. When asking them their reasons for this huge investment of time, besides wanting to live "closer to nature", they tend to be fairly abstract, such as "wanting to close the loop in my lifestyle" (Cassie at Lammas) and in general having a much higher than average commitment to ecological principles.

Such exceptional individuals and groups will inevitably be identified as culturally different from the mainstream. It is therefore a self-selecting process of exclusion. Because of the degree of familiarity required with the planning system, they may (though not always) be highly literate and intelligent, as well as highly practical and multi-skilled in terms of building, crafts and horticulture. They will also need to have sufficient capital to invest in both the land and materials for infrastructure. This is an unusual combination, one that was shared by the founders of the Centre for Alternative Technology, whom I dubbed *Crazy Idealists* in an eponymous book I edited in 1995 about its history. It is undoubtedly the most practical and determined of idealists who end up changing the world.

Peter Davies recognises that the degree to which Lammas and other OPDs provide data has wider applicability to sustainable living. "On their own they are not replicable to scale; we have to look upon their development as points of learning that we can apply more broadly, rather than considering them to be a template for scalable implementation," he believes. And, he's right: most people would not choose to live this way. The question, in planning terms, is how do we facilitate a graduated solution?

Inconsistencies in the planning system

The system as it stands is unfit for purpose: it is cumbersome, riddled with contradictions and does not prepare the UK for the future. It is open to abuse at a local level, despite the introduction by the Coalition government of localism and local development plans. Everywhere it seems that the more sustainable you try to be the more paperwork and barriers are put in your way, and the contrary is true: the less sustainable you are easier it is.

The last four planning appeals for One Planet Developments in Wales have been turned down by local authorities for seemingly arbitrary reasons, or reasons which have little to do with the guidance issued and everything to do with cultural prejudice or fear of “unfettered development”. This has led to the setting up of the One Planet Council, of which I am a member.

Contrast this with the decision to grant permission to build a 2,800 sq ft house alongside an existing farmhouse also on agricultural land at Eglwysrwrw in North Pembrokeshire. The house was built by former council leader John Davies (Cwmbetws Ltd) on his farm in 2005. The application was based on the need to house a herdsman to look after a herd of cattle that he no longer owned when the application was decided. An account of the planning decision^{liv} reveals that no conditions were attached and not a shred of evidence was presented in support of the application. There are many examples of this nature throughout the countryside although in most of them the bias is not nearly so blatantly obvious.

Planning consultant Michael Howlett^{lv} pointed out to me: “Lammas are monitored on an ongoing basis and face harsh financial penalties if they do not meet the targets set for them in terms of providing for their own needs. The Cwmbetws application couldn't even be justified when it was decided and there is no ongoing analysis. There are no targets for Kevin McCabe to meet either and no monitoring.”

Two arguments for not building in the open countryside built into planning guidance are: that it reduces transport impacts and the impact of installing services. Given that one planet living involves the self-provision of services such as water, sewerage and power, only the transport impacts should be a consideration in this type of planning application. It is highly questionable the extent to which transport should be considered a major factor. Whilst it obviously results in a lower ecological footprint to live close to most journey-destinations such as school, employment and shops, people often live in one town and work in another, commuting every day, as pointed out by Michael Howlett^{lvi}.

There is no test that anyone in an urban environment has to undergo relating to the distance of their dwelling from their workplace before they are permitted to live in that dwelling and it is absurd that it should ever be so. It's just a presumption that they will require fewer or shorter journeys. Given this, it behoves planning authorities to attempt to ensure that there are plenty of employment opportunities in close proximity

to all housing provision, and for improved rural transport provision. This is an argument for mixed land use, not against low impact development in rural areas.

As Howlett says, "'Conventional' houses built within development boundaries face no monitoring - nobody ever checks if the landscaping plans that are demanded by the planners have been implemented, so the majority of new houses still have barren gardens with only turf and hard surfacing, the only sop to sustainability is that they have to pass Building Regs and SAP calculations".

A fourth kind of contradiction is to be found in the guidance to planning offices about approving planning applications in national park areas. Of course, such areas need to be protected from "unfettered development" and visual beauty is a key consideration. However there are large areas of national parks which are common farmland and/or hidden from public view. The guidance stipulates a requirement to "protect and enhance the environment", but this is open to widely varying interpretations and indeed the two terms could be seen to be contradictory. "Protection" could mean keeping an unsustainable sheep field or monoculture forest the way it is. "Enhancement" could mean improving biodiversity and sustainability. We also find the same phrase in the Natural Environment Framework for governance in Wales mentioned above: "Sustainable development is a central organising principle ... by means of which natural capital will be conserved or enhanced." Clearly some clarification is in order.

One planet living near urban areas

"The thing that drives me most insane," says Mark Waghorn, who runs an architectural practice specialising in sustainable building, "is the arbitrary line drawn by planners between the town and the countryside, because it doesn't allow towns or villages to grow organically in response to the needs of the communities. It doesn't allow the layering effect of permaculture: multiple uses over time." There is an even stronger case for permitting low impact developments within or on the edge of existing settlement boundaries.

The Land magazine has urged that there should be slightly different rules for encouraging OPDs on the edge of urban areas. Waghorn cites an example in Cwm Bran, near Newport, not far from the Severn bridge, where a proposed project was situated on a main road surrounded by houses, with the settlement boundary bordering but outside of it, and green fields at the back. "The planning officer decreed that it was in the open countryside. It's too either-or," he says. "OPD makes you do a transport assessment plan, makes you site near to a transport mode or town but you should get more credit for being near a town, schools, shops, etc."

Inconsistencies in Building Regulations

A typical modest new house built to the Code for Sustainable Homes, which new build homes in the UK only voluntarily have to adhere to, will emit perhaps 20 to 25 kg CO₂/m², perhaps 2,500 kilos of CO₂ per year. This is half that of the UK's average existing homes. A beautiful, hand-built family house (Trecnwc in Glandŵr,

Pembrokeshire) applying for retrospective OPD status at the time of writing has a SAP calculation showing that it generates more energy than it uses. Net emissions are -3.39 kgCO₂/m² (kilos of carbon dioxide emitted per square metre of floor area per year), effectively removing the need to emit 243 kilos per year. The builders, a young couple known as Charlie and Meg, with a toddler, are appealing a demolition order. Why? Because it's in the wrong place, Pembrokeshire National Park, even though it can't be seen from the road.

Trecnwc achieves the required minimum Level 3 rating under the Code but wouldn't score much higher despite this because the system favours volume house-builders and major building product suppliers. It does not gain any points for using natural materials because the Building Research Establishment's "Green Guide", referenced by the CSH, does not contain any ratings for straw bale construction, green roofs, cordwood or lath and plaster. The Guide does, however, list 108 different variations for twin-skin concrete block / brick wall constructions; all rated either "A" or "A+", despite the enormous environmental impact of cement and concrete. Natural, sustainable materials are almost entirely absent from the lists, which are monopolised by the mainstream manufacturers who can afford to have their products tested and listed. As there are no ratings for the natural materials used in this lovingly crafted house, the points cannot be obtained, despite the fact that using local, natural materials that lock up carbon in the structure is undoubtedly more sustainable. The other Green Guide sections concerned with materials (MAT2 and MAT3) cover chain of custody and again favour large scale producers who can afford to have each stage of their supply chain certified and documented. Highly environmentally unsound materials can score as long as the correct documentation exists. Equally there is no place in the Code for using recycled or waste materials. Michael Howlett comments:

"Despite being a Code for Sustainable Homes assessor, I would question its validity as a tool for assessing sustainability. It doesn't actually tell you very much about a building other than that a highly bureaucratic, rigid and inflexible process has been followed. A house built to Level 3 of the Code might have exceptionally good standards of insulation and fabric energy efficiency, provision for bicycles (that may or may not ever be used) and a detailed user manual. Then again it might have minimum levels of insulation but have 'Secured By Design' high-security windows, a rotary washing line, rainwater harvesting and some bird boxes in the garden. In addition, the Code completely ignores scale and quantity."

Affordable housing

The UK is in crying need of affordable housing. According to the housing charity Shelter, "There are more than 1.8 million households waiting for a social home – an increase of 81% since 1997^{lvii}. Two thirds of households on the waiting list have been waiting for more than a year^{lviii}. Nearly 41,000 households with dependent children were living in temporary accommodation at the end of December 2012^{lix}." Could change in land use priorities favouring one planet living provide some affordable housing? Undoubtedly.

Low impact dwellings are intrinsically cheap to build, being made predominantly by self builders and their associates, using unpaid labour. The cost of the land and the materials minus the labour brings the overall average cost down to within and sometimes well below £60,000. But we cannot expect most people to wish to build their own home, however easy those who do so claim it might be. It is still time-consuming, necessitating living in temporary accommodation on the site for some years while earning a livelihood and constructing the dwelling. Whilst this can be extremely rewarding for those who do it, it is not for everybody and will not help to make one planet living significantly more accessible.

Far better to produce a kit type house which can easily be constructed by purchasers that is both cheap and comes pre-approved for building regulations and standard planning conditions, all other things being equal. Then, aspirants to one planet living would just have to find the capital to purchase the land and such a house, financing for which could come from ethical building societies and banks such as the Ecology Building Society and Triodos Bank. To my knowledge at least two developers are pursuing such a model.

Ty Solar Homes is a project launched by Western Solar Ltd, created to develop low-density affordable housing and micro-generation in an integrated unit. It also seeks to source 80% of its materials and expertise locally in Wales and create to local employment and has already produced a working prototype of a solar powered 2-storey three-bedroom 100sqm home to Level 5 of the Code for Sustainable Homes at under £75,000. It uses the Ty Unnos system which allows (and therefore promotes) the structural use of native Welsh softwood.

The second is being developed by Mark Waghorn Architects. It is a modular system of timber framed, pre-fabricated and highly insulated components raised above ground level. It would be modular in one direction only: i.e. you can add modules along its length to make it different sizes. It would involve the use of structural insulated panels (SIPs). It would ideally use local timber in a tried and tested framing system. The aim is to make it available for price starting at £50,000.

Reforming the planning system

The planning system undoubtedly needs to be modified in order to accommodate the changes in land use we are advocating and to remove the above inconsistencies, but that is not such a challenge as it might seem.

To be made easier, the planning requirements, and the transaction costs on both sides, need to be simplified and embedded in national legislation. After all, they are high on the local authority side too. "These types of applications are quite complicated, quite protracted," the Cardiff civil servant in charge of planning told me. This is a process that is slowly happening in Wales, as its constitutional aim to promote sustainable development across-the-board is being written into the Future Generations Bill

(formerly called the Sustainable Development Bill) that will mandate all public bodies to take account of sustainable development in the decision-making.

"It will be a definite step forward," Davies says, "because at the least there will be a requirement to comply or explain why not for public sector, for example in the transition to a low carbon economy. The focus will be on outcomes, as defined by the UN Sustainable Development Goals, and the measurements of progress will be sustainability indicators." At present, these indicators are woefully inadequate but are being revised. For example there are only two indicators for biodiversity and they are both to do with birds. "They must be reviewed," Davies agrees, "in order to get some ownership of them within policy and society as a whole - they are not fit for purpose."

The role of planning in Wales

The future of One Planet Development policy in Wales

At the time of writing this is uncertain. The policy will be reviewed in 2017, five years after its inception. Given that the Minister has changed, it no longer has the impetus that it did and resources are not in place to monitor the progress of projects. The new minister responsible for sustainable development in the Welsh government has taken the topic out of the environment portfolio and into the regeneration portfolio, principally dealing with the provision of social and affordable volume housing and social equality. "I'm not so sure that this particular policy experiment, if I may call it that, is high up on the new minister's agenda," said my senior civil servant contact.

The Welsh government recognises that OPD applications are difficult in that planning officers who are used to dealing with mainstream volume housing planning applications have to think outside the box and sometimes have to go against everything that they may believe and have supported before, in terms of containing developments within settlement boundaries and ensuring that all the necessary services provisions are there. To this end the government published guidance to try and help planning officers think through the issues in terms of what practices are associated with one planet development and made funding available to local authorities to buy in technical expertise to allow them to evaluate planning applications which they don't feel they have the skills to assess. They could for a while also apply to the Welsh government for an improvement funding grant to procure specialist services in the form of training to help them deal with applications. But not a single local authority applied for this funding.

Local planning departments cannot be forced to undertake the training or in fact to do anything by central government. The same civil servant said:

"There is an implied threat, I guess, if local authorities don't follow policy then policy decisions are subject to subsequent challenge if they are contrary to national policy or the plan is not sound but the system does not allow for direct intervention either here or in England to force local authorities to train

people. They are responsible for their own staff if they don't do it, and these are management issues for local authorities to address. At the end of the day we have a subsequent potential role in the system in that we can call in or hear planning appeals where applications are refused. We can't intervene in a planning decision at a local authority level at an early stage. Our powers to compel are quite limited."

The Welsh government has commissioned research on the effectiveness of planning committee decisions at the local level. This recommends that:

"Training should be mandatory, regular, and provided by a central source such as the Welsh Government." and that "Training is needed for specific issues, including: affordable housing; Code for Sustainable Homes; viability; climate change; design; and SUDS. Training is especially important after an election or reshuffle – training should occur before joining the planning committee."^{ix}

While this list does not specifically mention OPD, it is perhaps implicit in that most of the topics included in the list are ones that have emerged in the last decade, as has OPD. The reforms will address the fact that local authorities struggle with making certain decisions, particularly because of the political nature of their role. This can introduce bias. "Because of their loyalty to their constituents, many councillors find it difficult to see the bigger picture. There is therefore a conflict of interest. If they can make the decisions, then somebody else should."

Changing the conditions for granting planning permission

Conditions for granting planning permission for one planet living-style development on rural land are granted by attaching certain conditions.

The s106 conditions imposed under the now defunct Clause 52 in Pembrokeshire were that occupants of low impact developments must obtain at least 75% of their livelihood from the land around their dwelling, and be limited to 8 trips per day in a vehicle. This will be seen as the most extreme of conditions to be attached to permitted low impact development, one that is highly restricting given the vagaries of the weather. 2012 was particularly bad all over the UK and anyone relying to a large extent on their own cultivation for the majority of the subsistence found it incredibly tough. The TAN 6 condition is only a slight improvement, bringing this down to either 65% of all subsistence, or 30% of food and 35% of livelihood coming from the land.

Contrast this with a s106 requirement in Nottinghamshire, England, for the residents of Hockerton Housing Project in 1994, where, instead of a percentage of income, a fixed number of unpaid hours (300 per year per household) must be spent on the land and in addition 300 paid hours per year supporting the joint business which runs tours and educational events, hosts away-days and consulting on both new and retrofit energy efficient building. Given that a standard working year consists of 1,650 hours, this leaves 64% of the working year available to do anything else.

This seems to me to be both fairer, more achievable and manageable, as well as helping to secure the planners' prime directive of preventing such developments becoming owned by people who do not want to use the land, and who will instead commute to jobs elsewhere.

On car use, the Clause 52 requirement for vehicle trips to be curtailed in number to eight per day (inward or outward) was irrational since the trips may be of any length. The TAN 6 stipulation on transport restrictions is an improvement. The guidance for transport says:

"Planning applications should be accompanied by an assessment of the traffic generated from the use of the site by its residents and visitors. The travel plan accompanying the planning application should clearly identify a preference for low or zero carbon modes of transport including walking, cycling and car sharing schemes. Where proposals are distant from larger towns and villages they should be located near public transport routes to minimise use of the private car."

Taken sensibly this should certainly help to facilitate low impact developments such as they can be further mainstreamed. The worry is that the political attention has now shifted away from one planet development and towards affordable housing in Wales, and towards deregulation in England. Unless there is a concerted effort to pursue the advantages, and there are many, of low impact development backed up by robust evidence, it's yet possible that Wales' experiment could be seen in the future as an aberrant cul-de-sac. It would be tragic were this to be the case.

The Town and Country Planning Association, a housing and planning charity, issued a year-long research project, *Planning out Poverty*^{lxii}, in October 2013 which argued that planning has become "increasingly disconnected from peoples' lives because it no longer deals with the issues people care about". Kate Henderson, the report's co-author and TCPA Chief Executive said: "The reinvention of 'social town planning', which has been effectively residualised for 30 years, requires a re-visioning of planning within wider social policy, rather than being left within a legislative *cul de sac*." Dr Hugh Ellis, another co-author and TCPA Chief Planner, commented that "no attention is being paid to the positive potential of spatial planning to provide solutions to many aspects of our most difficult public policy problems."

Spatial planning decisions impact hugely on sustainability through the physical organisation of accessibility to land, services and key employment opportunities. Planning could play a more positive role by integrating more fully (within both local and national public policy) with sectors such as regeneration, environment, food policy, transport and health. But to do this, planners themselves must have the necessary skills and opportunity to increase their understanding of the issues: places, Permaculture, ecological footprint analysis and the lived experience of communities. This should be integrated in Continuing Professional Development (CPD).

Calon Cymru: a one planet living spatial planning proposal

Calon Cymru is an aspiration for a network of communities along an existing railway line that passes through 100-odd miles of rural countryside, mostly in Wales. The Heart of Wales line stretches from Shrewsbury to Swansea stopping frequently at many tiny stations. At many of these settlements deprivation exists; there are disused plots of land and a scarcity of employment opportunities. The proposal is for a series of One Planet Development applications along the line that would take advantage of its transport opportunities.

The function of the group, which includes architects, is to help people looking to start One Planet Developments. Calon Cymru has been involved in town regeneration projects and linking them to the surrounding countryside. New developments would include spaces for workshops and offices so that people could work the land and gain employment. One example is Allt Cefn Crug, a 70 acre woodland outside of Llandovery, owned by the Hooper family, who built an A-frame timber house in 2011, and practiced sustainable woodland management producing charcoal, construction timber and firewood. They had a retrospective planning application refused, and on appeal, in January 2013, Calon Cymru representatives, along with Llandovery tenants and residential association, all gave support. But the appeal was refused and the family has sold up. Examples like this are terribly discouraging.

But Calon Cymru is not giving up. It is acclimatising the communities along the line to One Planet Development principles so that the concepts are not alien to them. "We'd like to see the railway better used," says Mark Wagmore. "In some places along the line there are no towns, so new settlements could be built there. The property market for farmlands and farms is likely to see opportunities because many farmers are approaching retirement and nobody wants to use these farms, so a 350 acre farm being bought for One Planet Development would be an amazing opportunity".

All of these issues should be addressed in the National Planning Policy Framework to prioritise poverty and sustainability, and the National Planning Practice Guidance should be amended to include guidance on increasing sustainability consistently across-the-board, to aim towards one planet living - a global average ecological footprint for the whole of the UK - backed by new legal duties and the development of a 'new vision' for the planning profession.

I dream of a future when the number of forms you have to fill out, the amount of red tape you have to negotiate, the amount of data you have to collect and process and submit to the authorities, is proportionate to the amount of carbon you emit as an individual or as an organisation. Instead, it seems very much like it's the other way round right now. These transactional costs for low impact development must be reduced to the bare minimum while respecting the requirement to avoid inappropriate development on green field sites. We are at the very bottom of a learning curve for that paradigm shift in planning terms, but at least we have turned the corner.

Sitting inside Paul and Hoppi Wimbush's smallholding at Lammas, seeing the flowers, the productive land, the ducks, hens and cows, and their modern house, powered by solar and hydroelectric energy with all mod-cons, I see no reason why they should have had to fight so hard to be able to live like this. I see no reason why so many more should be denied the chance either, by a political system that is so behind the times. Anyone visiting here would feel the same. It may not be for everyone, but anyone should be able to practise One Planet Living.

Conclusion

We all know that you can only deal with planning decisions on the basis of planning law and planning guidance. These are the clumsy tools that provide a common language which both sides have to speak in order to articulate their viewpoints. In one sense it doesn't matter that the viewpoints are poles apart. This is the common ground on which we do battle. It is a battle in some areas more than others. Certain people don't want this kind of development and will use every tool in that armoury to find an excuse to turn it down. They don't want to create further precedents that will potentially admit into their domain a type of people against whom they are prejudiced. The floodgates that they are trying to keep closed are not just against any kind of habitable development in rural areas but against certain sections of the population: in their eyes, scruffy, largely English hippies. Even though they are the pioneers that others later follow. That's not how they see it.

So we have to go back to the planning guidance. I believe that the bar was set too high with the One Planet Development guidance. It's entirely unreasonable to expect a tiny group of people to put in over 300 hours work over more than one year to produce a management plan containing the meticulous amount of precise detail justified by the type of evidence that the inspector will credit with authority going five years into the future. This is the kind of work that large developers do for large projects. For both the appellants and for planning departments it constitutes far too much work. Neither side want it. Something has to change. It's not working.

- i *The Ecological Wealth of Nations*, Global Footprint Network, 2010, and other information available at <http://www.footprintnetwork.org/> Retrieved October 2013
- ii *Measuring sustainability: Why the ecological footprint is bad economics and bad environmental science*, Nathan Fiala¹, *Ecological Economics* Volume 67, Issue 4, 1, pp519–525, Elsevier, November 2008
- iii *One Wales: One Planet, The Sustainable Development Scheme of the Welsh Assembly Government*, May 2009
- iv Technical Advice Note 6 (TAN 6): *Planning for Sustainable Rural Communities*, Welsh Assembly Government, July 2010
- v <http://wales.gov.uk/topics/planning/policy/guidanceandleaflets/oneplanet/?lang=en> (accessed 22.10.13)
- vi *Planning Policy Wales* Edition 5 November 2012 Section 9.3.12
- vii Pembs Coast National Park (Beeview farm)
 - Pembrokeshire (Bryn yr blodau and Cornerwood - under appeal)
 - Monmouthshire (Dan and Sarah Moody): appealing
 - Two pre-applications in process: Pembrokeshire (Rob Smith) and Pembs Coast National Park (Sue Gillooley)
 - Discussion stage with Paul Wimbush at Lammas: Powys (Kate Mobbs Morgan), Pembrokeshire (Jacqui Banks), Carmarthenshire (Salena Walker), Carmarthenshire (Bron Daioni), Pembrokeshire (Ian Ratcliffe)
 - Powys (Peter Barker)
 - Flintshire (Warren Dingle farm - resubmitting pending a great crested newt survey).
- viii *Low Impact Development: Planning and People in a Sustainable Countryside*, Simon Fairlie, Jon Carpenter, 1996
- ix *One Planet Living*, Pooran Desai and Paul King, Alastair Sawday Publishing, 2006
- x See <http://www.oneplanetcommunities.org/> Retrieved October 2013
- xi The Code for Sustainable Homes, a voluntary environmental assessment method for rating and certifying the performance of new homes defined by researchers at English consultancy BRE and drafted into UK policy. The code provides nine measures of sustainable design: energy/CO₂, water, materials, surface water runoff (flooding and flood prevention), waste, pollution, health and well-being, management and ecology. It uses a 1 to 6 star system to rate the overall sustainability performance of a new home against these nine categories, with 6 being the best performing.
- xii *Ecological footprint of British city residents*, Alan Calcott and Jamie Bull and CarbonPlan, WWF, London, 2007
- xiii *Zero Carbon Britain: Rethinking the Future*, Allen, P. et al., Centre for Alternative Technology, Machynlleth, Wales, July 2013

xiv *Greenhouse Gas Emission Projections for UK Agriculture to 2030*, Economics Group, Defra, August 2011, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69225/pb13622-ghg-emission-projections.pdf Retrieved 22.10.2013)

xv *Public Attitudes to Food Issues*, GfK NOP survey for the Food Standards Agency, 2009 Available at: <http://tna.europarchive.org/20111116080332/http://www.food.gov.uk/multimedia/pdfs/publicattitudestofood.pdf> Retrieved October 2013

xvi *Can Britain Feed Itself? The Land* issue 4, Winter 2007-8, <http://transitionculture.org/wp-content/uploads/2007/CanBritain.pdf> (accessed 28.8.2013)

xvii *Can Britain Farm Itself?*, *The Land*, issue 12, Summer 2012 <http://www.thelandmagazine.org.uk/articles/can-britain-farm-itself-2> (accessed 28.8.2013)

xviii *Double Yield: Jobs and Sustainable Food Production*, Vicki Hird, SAFE Alliance, 1997

xix *Spain's communist model village*, *The Observer* newspaper, 20 October, 2013 <http://www.theguardian.com/world/2013/oct/20/marinaleda-spanish-communist-village-utopia>, (accessed 22.10.13)

xx In conversation, September 2013

xxi The Institute of Biological, Environmental and Rural Sciences (IBERS), Aberystwyth University, Farm Business Income statistics for 2009-10: TABLE B3 Hill sheep farms http://www.aber.ac.uk/en/media/departmental/ibers/pdf/farmbusinesssurvey/statisticalresults/outputsinputsincomes/0910/0910Iy_11d.pdf Retrieved August 2013

xxii Overton, Mark; *Agricultural Revolution in England 1500–1800*; Cambridge University Press (1996); ISBN- 978-052156859. Data after 1850 taken from British censuses

xxiii Schwartz, Robert M., *Railways and Rural Development in England and Wales, 1850-1914*, MA, USA: Found at https://www.mtholyoke.edu/courses/rschwartz/rail/railways_rural_develop.htm, retrieved August 2013

xxiv Office of National Statistics figures at <http://www.ons.gov.uk/ons/rel/regional-trends/region-and-country-profiles/key-statistics-and-profiles---august-2012/key-statistics---wales--august-2012.html>, retrieved August 2013

xxv *UK National Ecosystem Assessment* Technical Report. UNEP-WCMC, Cambridge, 2011.

xxvi *Rewilding and Food Security*, *The Land* magazine, issue 14, Summer 2013 <http://www.thelandmagazine.org.uk/articles/rewilding-and-food-security> (retrieved October 2013)

xxvii *Low Impact Development – Planning Policy and Practice*, Final Report, University of the West of England, Land Use Consultants, Countryside Council for Wales, December 2002

xxviii *Rewilding and Food Security*, *The Land* magazine, issue 14, Summer 2013 <http://www.thelandmagazine.org.uk/articles/rewilding-and-food-security> (retrieved October 2013)

xxix *Feral: Searching for enchantment on the frontiers of rewilding*, George Monbiot, Penguin, 2013

xxx The Common Agricultural Policy of the EU, which distributes subsidies selectively to certain groups of farmers

xxxii *UK National Ecosystem Assessment* Technical Report. UNEP-WCMC, Cambridge, 2011, p. 980, Chapter 20

xxxiii *A Living Wales – a new framework for our environment, our countryside and our seas*. Consultation Document, Welsh Assembly Government, Cardiff, 15 September 2010.

xxxiiii <http://wales.gov.uk/about/cabinet/cabinetstatements/2013/futuregenerationsbill/?lang=en> Retrieved October 2013

xxxv http://www.biosfferdyfi.org.uk/?page_id=284 and <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/main-characteristics/> Retrieved 28.8.2013

xxxvi *Towards the Regenerative City*, Herbert Girardet (with Stefan Schurig, Anna Leidreiter and Fiona Woo), Expert Commission on Cities and Climate Change of the World Future Council, 2013

xxxvii *First European Quality of Life Survey: Urban-Rural differences*, European Foundation for the Improvement of Living and Working Conditions, Dublin, 2006

xxxviii As defined by Edward O. Wilson in his book, *Biophilia*, Cambridge: Harvard University Press, 1984, as "the urge to affiliate with other forms of life" and expanded upon in relation to urban planning in order to promote greater well-being among citizens in *Biophilic Cities: Integrating Nature into Urban Design and Planning*, Dr Timothy Beatley, Island Press, 2010

xxxix *The UK National Ecosystem Assessment: Technical Report*. UNEP-WCMC, Cambridge. 2011, Chapter 22, Table 22.16

xl *Ecotherapy: The Green Agenda For Mental Health*, University of Essex and MIND mental health charity, October 2013, http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf Retrieved October 2013

xli *The UK National Ecosystem Assessment: Technical Report*. UNEP-WCMC, Cambridge. 2011, Chapter 23, p. 1154

xli *Mixed Vegetable Polyculture Trials*, Dr Naomi van der Velden, University of Cumbria for the Permaculture Association, 2012, available at <http://www.cumbria.ac.uk/Public/SNRO/Documents/Research/NKVeldon2012MixedVegResultst.pdf> Retrieved October 2013

xlii *DIY Planning Handbook*, Chapter 7, This Land Is Ours, 2013. Chapter 7 is the planning office of campaign group The Land Is Ours. It "campaigns for a planning system which actively encourages sustainable, low impact and affordable homes" and dispenses planning advice to people seeking to/or already embarking upon living on the land, engaged in land-based livelihoods. Its website is <http://www.tlio.org.uk/chapter7>. It takes its name from Agenda 21 Chapter 7c, on Human Habitation Settlement. Agenda 21 is the non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development agreed by all nations at the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, in 1992. Chapter 7 says: "All countries should...strengthen the indigenous building materials industry, based, as much as possible, on inputs of locally available natural resources...promote the increased use of energy efficient designs and technologies and sustainable use of natural resources...promote the use of labour-intensive construction methods...develop policies and practices to reach the informal sector and self-help builders...discourage the use of construction materials and products that create pollution during their life cycle. All countries should, as appropriate, support the shelter efforts of the urban and rural poor by adopting and/or adapting existing codes and regulations to facilitate their access to land, finance and low cost building materials."

xliii For a detailed discussion of this process, see *Low Impact Development*, Simon Fairlie, Jon Carpenter Publishing, 1996

xliv Ben Law is one of the prime campaigners for low impact developments. He won retrospective planning permission for a permanent dwelling for his timber house at Prickly Nut Woods in West Sussex which was voted as their favourite home by viewers of Kevin McCloud's Channel 4 *Grand Designs* TV programme. He writes regularly for *Permaculture* magazine apart and makes a living from coppicing, training apprentices and running courses on sustainable woodland management, eco-building and permaculture design. He also runs occasional open days in response to popular demand and manages a specialist eco-building company The Roundwood Timber Framing Company Limited. He is the author of *Living in a Wood in the 21st Century* (Collins, 2013), *Roundwood Timber Framing: Building Naturally Using Local Resources* (Permanent Publications, 2010), *The Woodland Way: A Permaculture Approach to Sustainable Woodland* (Permanent Publications, 2013) and *The Woodland House* (Foreword by Kevin McCloud, Permanent Publications, 2010)

xlvi <http://www.crofting.scotland.gov.uk/> Retrieved October 2013

xlvii *How To Get Planning Permission on Non-Development Land*, Chrissie Sugden, *Permaculture* magazine, July 2011 <http://www.permaculture.co.uk/articles/how-get-planning-permission-non-development-land> Retrieved October 2013

xlvi https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf Retrieved October 2013

xlvi *Planning Policy Statement 7: Sustainable Development in Rural Areas*, UK Government April 2004, available at <http://webarchive.nationalarchives.gov.uk/20120919132719/www.communities.gov.uk/archived/publications/planningandbuilding/pps7> Retrieved October 2013

xlix *Ibid.*

l Available at <http://planningguidance.planningportal.gov.uk/> Retrieved October 2013

li *Low Impact Development – Planning Policy and Practice*, Final Report, University of the West of England, Land Use Consultants, Countryside Council for Wales, December 2002

lii *The Nature of the Firm*, R H Coase, in *Economica*, Volume 4, Issue 16, pages 386–405, November 1937, Wiley, accessible free at <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0335.1937.tb00002.x/full> Retrieved October 2013

liii http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1991/coase-lecture.html Retrieved October 2013

liv <http://freespace.virgin.net/oldgrumpy.mike/Cwmbetws%20analysis.html> Retrieved October 2013

lv in email correspondence.

lvi In conversation with the author, October 16 2013. Michael's practice is based in Pembroke Dock, Wales.

lvii The UK Government's Housing Strategy Statistical Appendix (HSSA), at <http://data.gov.uk/dataset/england-hssa-housing-strategy-statistical-appendix> Retrieved October 2013

lviii Shelter analysis of English Housing Survey 2010/11 (latest available data)

lix UK Office of National Statistics figures: Statutory homelessness in England: October to December 2012, available at <https://www.gov.uk/government/publications/statutory-homelessness-in-england-october-to-december-2012> Retrieved October 2013

lx RTPI Cymru Study into the Operation of Planning Committees in Wales, Final Report, Fortismere Associates with Arup, Cardiff, July 2013

lxi *Planning Out Poverty: The Reinvention of Social Town Planning*, The Town and Country Planning Association, October 2013, available at http://www.tcpa.org.uk/data/files/Planning_out_Poverty.pdf Retrieved October 2013