

CLIMATE CHANGE, FAITH AND RURAL COMMUNITIES

*How rural communities are affected by climate change and peak oil.
What will be the future?*

Climate change and peak oil are major issues for this century with significant impacts on the future of the countryside. This booklet considers the expected impacts of climate change on UK rural communities in the UK and the contribution that these communities make to climate change.

The paper has at its heart a reflection on the cosmic nature of Christ (Colossians 1.15-20). The authors propose an ethical model based on Colossians 1 as a faith-based framework for responding to climate change within a UK rural context. They show how engaged faith can have a major role in helping rural communities both mitigate and adapt to climate change.

The authors recommend re-localisation of rural communities and call for the church to support community regeneration.



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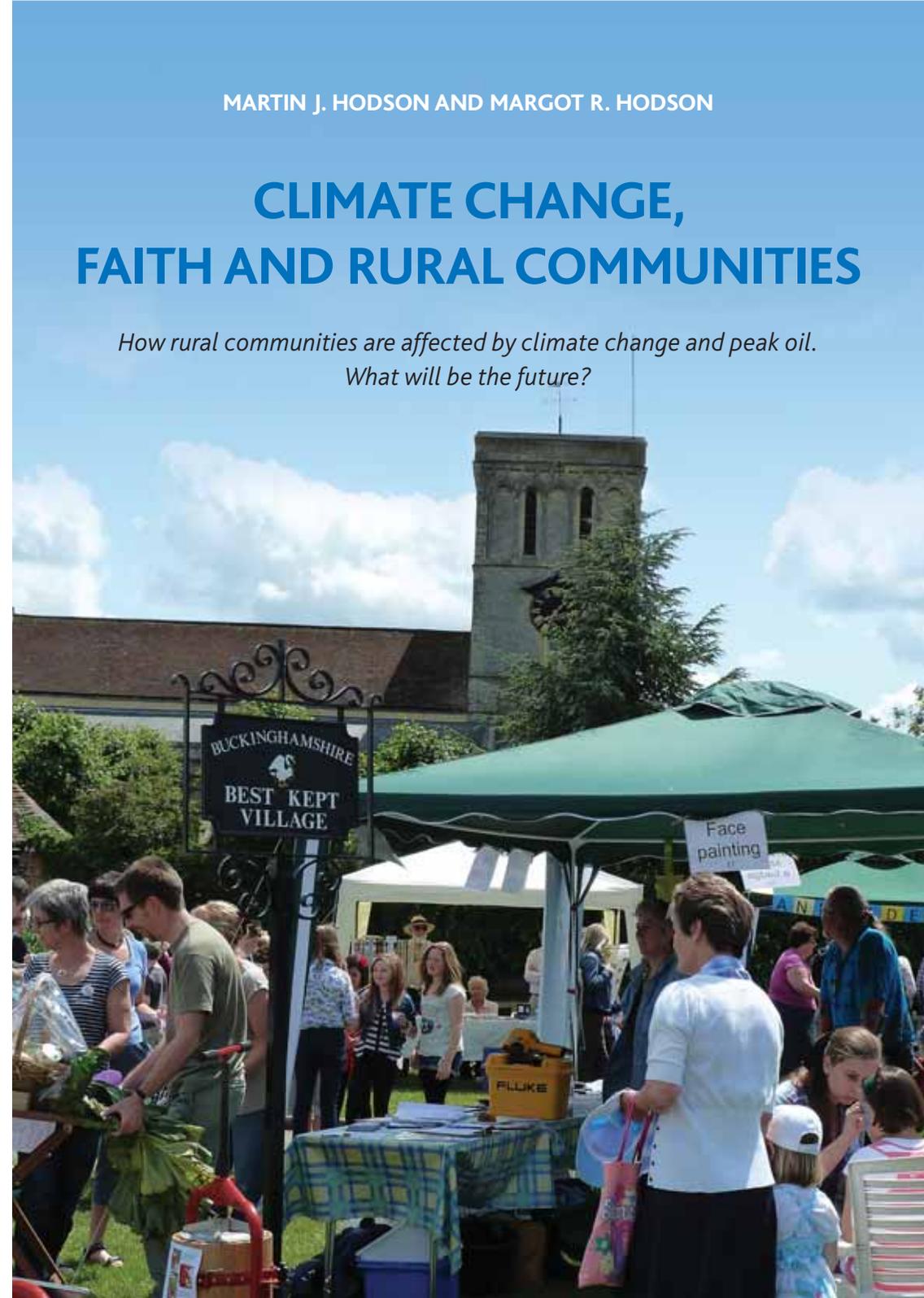


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MARTIN J. HODSON AND MARGOT R. HODSON

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Front cover photo:

Haddenham Village Fete on the village green, 11 June 2011. St Mary's Church can be seen in the background and the Haddenham in Transition stand in the foreground. In the bottom left is the apple press bought with funds raised from local events.

Back cover photo:

Thermal image of St Mary's Church, Haddenham taken on 20 December 2009 during the annual carol service. The heat escaping from the windows can clearly be seen by the green and yellow colours. These contrast with the walls and the roof which are fairly good insulators. Most heat was found to be escaping from the boiler house!

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Climate Change, Faith and Rural Communities was first presented by the authors as a joint seminar at the Faith and the Future of the Countryside Conference in Swanwick, Derbyshire on 4 November 2010. The conference marked 20 years on from the national Faith and the Countryside Report and was attended by 21 bishops and eight Methodist district chairs. The conference was chaired by the Bishop of St Albans and explored economic and environmental issues in rural communities and future of the rural church in the 21st century.

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ABSTRACT

Climate change is a major issue for this century with significant impact on the future of the countryside. The first part of this paper considers the expected impacts of climate change on rural communities in the UK and the contribution that these communities make to climate change. Climate change is complex and interacts with many other factors. One aspect is exposed through a consideration of the impact of Peak Oil. Having presented the interaction between physical, biological and human issues, the paper has at its heart a reflection on the cosmic nature of Christ (Colossians 1.15-20). The theological reflection explores the themes of interconnectedness and eschatological hope. An ethical analysis builds on the theology to develop a Christocentric model for holistic mission. The authors propose their model as a faith-based framework for responding to climate change within a UK rural context. The final part of the paper shows how engaged faith can have a major role in helping rural communities both mitigate and adapt to climate change. Practical examples lead on to discussion of the value of a faith based approach. The authors conclude that faith in the countryside for this century needs to be sustainable in its praxis and holistic in its mission. They recommend re-localisation of rural communities and call for the church to support community regeneration.

INTRODUCTION

Climate change is now a topic that is in the news almost every day, with worsening predictions for the future (Houghton, 2009). This booklet focuses on rural communities in the UK, but first we will put this topic in its global context.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) released its fourth assessment report (IPCC, 2007). The headline predictions were that by the end of the century: global temperature would probably increase by 1.8-4.0°C with the possibility that the increase might reach 6.4°C; sea level would rise by 28-43 cm (excluding ice melt); tropical storm intensity would probably increase; and droughts and floods would become more frequent and intense. Since 2007, further scientific work has increased our understanding of these phenomena, and it now appears possible that we could see as much as 1.4 metres of sea level rise this century (SCAR, 2009). Many people live in areas that are just above sea level and, for example, nine million people in Bangladesh are currently living on land less than one metre above the sea. Sea level rise combined with all of the climatic changes predicted has led to the suggestion that we could see 200 million environmental refugees by 2050 (Myers, 2002).

It now appears possible that we could see as much as 1.4 metres of sea level rise this century

It is difficult to speculate on future refugee migration patterns and their potential impact on UK rural communities, and this is beyond the scope of the present paper. Climate change is also likely to cause major impacts on biodiversity, 'with species distributions and relative abundances shifting as their preferred climates move towards the poles and higher altitudes' (GEO-4, 2007 p168), and the likelihood of many extinctions. Finally, climate change could have serious economic impacts, with Stern predicting that 20% of world gross domestic product (GDP) could be lost, but also indicating that only 1% (Stern subsequently revised this figure to 2% in 2008) of world GDP was needed to solve the

problem (Stern, 2006). Although the COP15 Copenhagen climate change conference in December 2009 was widely seen to have failed, world governments agreed that a maximum 2°C increase in global temperature should be the target (Houghton, 2010). Although the COP16 meeting in Cancun in 2010 had a more positive outcome there was still no agreement on targets for emissions reductions.

The UK has been assessed as the 12th best country in the world to live in as climate change becomes apparent during this century

The UK has been assessed as the 12th best country in the world to live in as climate change becomes apparent during this century (McCarthy, 2008). This grading takes into account both the likely climatic impacts, and the ability of a country to act in mitigation. So the UK and its rural communities are probably going to be among the least affected, initially, by the direct impacts of climate change. However, this ranking is relative, and though the level of impact will be less, it could still be severe. These communities also contribute to global climate change.

In 1990, the *Faith in the Countryside* report was forward-looking in including 'the greenhouse effect' as one of the environmental challenges needing to be considered in a rural environment (ACORA, 1990 p36). The recommendations showed an awareness of the impact of transport (ACORA, 1990 p46) but the full complexity of the effects of human-induced emissions of greenhouse gasses within a rural context had yet to be understood. The major difference now from 20 years ago is that the scientific basis for human induced climate change has become very strong and the topic has come far more into the public arena.

In this booklet we will first investigate the effects of climate change on rural communities, the contribution of rural communities to greenhouse gas emissions, and the related topic of Peak Oil. The central sections of our paper will contain a theological and ethical reflection on these issues. Finally we will consider some of the adaptation and mitigation strategies that rural communities are already beginning to adopt.

Climate Change and Rural Communities: what is the current situation?

The impacts of climate change on rural communities

So far we have assessed the impacts of climate change on a global scale, but the remainder of this paper will focus on the UK, and specifically on its rural communities. UKCIP (2009) have produced climate projections for all areas of the UK until the end of this century under three emissions scenarios: low (decreased global emissions from present); medium (similar emissions to now); and high (increased emissions). Here we will take the example of the most likely results by the 2050s under medium emissions. Under these conditions average summer temperatures for the UK would rise by between 2.0 and 2.8°C, mean winter precipitation would increase by 9-17%, mean summer precipitation would decrease by 13-23%, and mean sea level rise will be 13.9-21.8 cm. Under almost every scenario UKCIP investigated, the UK will have increased temperatures, wetter winters, drier summers and significant sea level rise.

Under these conditions average summer temperatures for the UK would rise by between 2.0 and 2.8°C

A sea level rise of just 0.4 m, very likely by the end of this century, would increase the number of properties at risk from flooding in Eastern England from 270,000 to 404,000 (POST, 2009). Traditionally, 'hard' defences, consisting of sea walls and groynes, have protected about half of the coastline of the UK, but it appears that government policy is moving away from this and towards a more integrated and risk-based approach. It seems probable that some areas will be too difficult or expensive to defend against sea level rise. In these areas the land will be lost this century, and any associated rural communities will be severely affected or lost altogether.

Extreme weather events are likely to increase as the world warms, and the UK will not entirely escape these problems. During this century we are likely to see fewer very cold winters, which will be beneficial as fewer people will die from the effects of the cold. However, there will almost certainly be more heat waves. The 2003 heat wave in Europe led to many heat-related deaths, and this could be a foretaste of what is to come. In the future rural areas are likely to suffer somewhat less from the direct effects, as cities show a heat island effect and are 5-11°C warmer (Patz *et al.*, 2005). However, most rural communities are generally less well served by health services than urban areas and this might be expected to have a negative impact in future heat waves.

Extreme weather events are likely to increase as the world warms, and the UK will not entirely escape these problems

The major effect of climate change on rural communities in the UK will almost certainly be on agriculture, and changes in agriculture will then affect other aspects of rural life. Carbon dioxide has a fertilizing effect, and theoretically an increase of CO₂ in the atmosphere should result in increased yields of crops. In glasshouse crops CO₂ is routinely released to increase yields of crops such as tomato. However, in many scenarios the positive effects from CO₂ fertilization are likely to be more than outweighed by the effects of drought, flooding and extreme weather events (Nelson *et al.*, 2009). Floods caused by exceptional weather in the UK in summer 2007 had a considerable impact on agriculture. A total of 42,000 ha of agricultural land were flooded in Yorkshire, East Midlands, West Midlands and in the South East. The most affected arable crop was wheat with almost 12,000 ha flooded. "ADAS (2007) estimated that between £11.2 and £24.2 million were lost as a result." It is likely that climate change will lead to a northern movement of crops, but the parameters involved are complex. Audsley *et al.* (2008) used a metamodel system to investigate likely changes in agricultural land use in East Anglia and North West England. They showed that in both areas grassland would be badly affected by the 2050s with the most severe climate change scenario.

Another potentially important effect on agriculture is that animal diseases may change in range as the climate warms. Although the movement of the Bluetongue virus northwards from Africa since 1998 is a complex phenomenon (Wilson and Mellor, 2009) increased winter temperature, allowing the virus and its vectors to survive further north have been implicated (Gale *et al.*, 2009). In the future other important animal and plant diseases may also move further north in the warming climate.

Beyond farming, climate change will impact on the ecology of rural areas. In particular, some of our native tree species may be unable to adapt. Again the likely changes are complex (Saxe *et al.*, 2001), but net ecosystem production may be increased in the north as conifer forests spread, and decreased in the south by the loss of deciduous forests. Bird distributions are also likely to change as the climate warms.

Bird distributions are also likely to change as the climate warms

RSPB (2009) produced a climatic atlas showing the likely distributions of European birds by the end of this century. The effects are likely to be dramatic with some species moving to entirely different ranges, and the average overlap of the future range with the present range is only 40%.

Rural communities and their contribution to climate change

There is some evidence that human agricultural activities have influenced the atmospheric concentrations of CO₂ and methane long before the Industrial Revolution. Ruddiman (2005) suggested that humans might have begun to influence their climate with the onset of agriculture at the end of the last Ice Age 11,000 years ago. Forest clearance and conversion of land for growth of crops began around 8,000 years ago and probably increased CO₂ concentrations in the atmosphere from that time. One of the major sources of methane emissions are rice paddies, as they provide an anaerobic environment for methanogenic bacteria. The use of paddies for rice growing was discovered around 5,000 years ago in southern Asia and, according to Ruddiman, methane concentrations began to rise at that time.

Ruddiman's, as yet unproven, 'Early Anthropocene Hypothesis' is that these emissions prevented the world from moving into the next Ice Age, and thus agricultural activity may have had a considerable beneficial effect.

Now, however, we are in danger of releasing such large quantities of greenhouse gasses that we risk unstoppable runaway climate change, with extremely detrimental consequences. Worldwide, agriculture contributes to emissions through land use in four ways:

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deforestation leading to CO₂ emissions; rice cultivation and associated methane emissions; methane from enteric fermentation in cattle; and fertilizer application, which leads to nitrous oxide emissions. These processes encompass almost all CO₂ emissions, 54% of methane emissions, and 80% of nitrous oxide emissions tied to land use (IPCC, 2007). FAO (2006) estimated that livestock activities contributed about 18% of total anthropogenic greenhouse gas emissions, being responsible for 9% of carbon dioxide, 35-40% of methane and 65% of nitrous oxide. Undoubtedly, global emissions from agriculture are very large, but in the UK the figures tend to be lower. For example, agriculture is responsible for 38% of methane emissions or about 2.9% of global warming potential from all gas emissions in the UK (Garwes, 2009).

Agriculture is not the only source of emissions from rural areas and a number of the issues outlined by the Commission for Rural Communities (2007) have direct or indirect impacts on climate change. They found that urban areas had higher levels of accessibility to services (e.g. banks, Job Centres, petrol stations) than rural areas. More households in urban areas were within easy reach of a regular bus service than those in rural areas. Car ownership, even amongst the poor, was greater in rural areas, almost certainly because of poor public transport. The Commission concluded (p 32) 'the car remains central to the way most rural people access services.' Undoubtedly, this reliance on the car means that rural people are often unable to use means of

transport that have lower carbon emissions. Rural housing was also a matter addressed by the Commission (p 38), and the percentage of people living in poor housing conditions is higher in villages and hamlets than in urban areas. This means that fuel poverty tends to be higher in rural areas, a factor that is exacerbated by the much higher percentage of houses with solid walls in rural areas. So the rural housing stock is less easy to insulate, and is likely to have higher carbon emissions from heating.

The Peak Oil dilemma

Whilst climate change has become a very common item in the news, the related phenomenon of 'Peak Oil' has only recently begun to be accepted as a potential problem. It has long been recognized that our oil supplies will eventually run out, but we will be affected by oil supply problems well before that time. The concept of Peak Oil was first enunciated by M. King Hubbert in 1956. He predicted that in the United States domestic oil production would peak in 1970, and fall thereafter. He was ridiculed at the time, but turned out to have made a very accurate prediction. Oil production in the UK (from the North Sea) peaked in 1999, and has fallen steadily since. Many other countries have also gone past their peaks in production (Hopkins, 2008 p22). If oil production curves from all the countries in the world are combined, then it is logical to assume that there must be a global curve, with a global peak in production at some point. The precise date of this peak is very uncertain, with some environmentalists claiming that it has already happened, or will very soon, and many oil producers suggesting that it is decades into the future. UKERC (2009) produced a detailed report assessing a large amount of data from many sources. They concluded on p171, 'On the basis of current evidence we suggest that a peak of conventional oil production before 2030 appears likely and there is a significant risk of a peak before 2020. Given the lead times required to both develop substitute fuels and improve energy

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efficiency, this risk needs to be given serious consideration.’ Transport has been considered to be an issue in rural communities for a long time and it has been recognized that vehicle emissions are contributing to the greenhouse effect (ACORA, 1990 p83). Peak Oil has come on to the agenda much more recently. Though it is now being taken seriously at government level, the severe impacts it will have are not yet fully appreciated by many rural organisations.

When global demand for oil outstrips supply there are likely to be a number of serious consequences

When global demand for oil outstrips supply there are likely to be a number of serious consequences. Although demand decreased following the world recession that began in 2008, the overall trend is for demand to increase. So when we reach Peak Oil there will be a considerable rise in the price of oil and all oil-dependent products. Economic globalisation has been developed with the assumption of low transport and production costs. As the economic situation changes, the global market will change dramatically. A number of areas will be affected, and we will now briefly consider these.

Perhaps the most obvious effect of Peak Oil is an increase in transport costs. Petrol, diesel and oil will all become much more expensive. The first to be affected will be poor people and poor countries, but eventually even the rich will be affected unless viable alternatives become available on a much greater scale than at present. Rural communities with longer distances to travel, and already poor public transport networks might be expected to be worse affected than urban areas. One obvious problem for rural communities concerns schooling. At present rural children often travel long distances to school each day. What will happen if transport costs are greatly increased?

The second problem associated with Peak Oil is that many products, from plastics to medicines, are made out of oil products, or use energy from oil in production. A particular case of importance to farmers is nitrogen fertilizers, which are nearly all made using energy from gas or oil.

Considerable amounts of energy are used to grow our food, to harvest it, to process it, and then to transport it to wherever it is eaten. Once we have passed Peak Oil it is likely that our energy supplies will be considerably reduced. Rural areas have the potential to produce more of their own food than is currently the case, and this will be necessary.

It is often asked what the interaction between climate change and Peak Oil will be? Peak Oil might cause a decrease in emissions, which would be a good thing. However, it is also possible that coal will be converted into oil to make up for shortages in supply. This is a very energy intensive process, and would lead to an increase in emissions.

It is now certain that we must move away from fossil fuels, and do so rapidly

It is now certain that we must move away from fossil fuels, and do so rapidly. They are a major cause of global warming, and may in the case of both oil and gas, peak in world production very soon. We have not discussed here the very real problems of energy security for the UK, and this is another factor that suggests we should cut the use of fossil fuels as quickly as possible.

CHAPTER TWO

A theological and ethical response to climate change in a rural context

Theological reflection: Interconnectedness and Christ

The theological reflection in Faith in the Countryside chose a number of images and texts to investigate the relationship between God, humans and the rest of creation (ACORA, 1990 pp7-24). We take one of those texts, Col. 1.15-20, to consider Christology and creation in greater depth. Christ will be considered as the agent of creation, the sustainer of creation and, as redeemer, the one who holds creation together. The Nicene Creed describes the Son as eternally begotten of the Father. This implies that 'creating' is an eternal and dynamic characteristic of God. In the Ancient Near East there was not a strong distinction between creation of the natural world and the human and social order. For many centuries humans have been interacting with nature and changing our world. This is consistent with being made in the image of a creating God who has given us responsibility for the rest of creation (Gen. 2.15).

In Colossians Christ, in being described as the firstborn, is chief over creation and the source of all things. Two conclusions can be drawn from this: first, if Christ is the source of every element of the universe, then no part should be treated dismissively. Our role should be to interact with the world to enable all to flourish. Our leadership of creation should be for mutual benefit and not solely for our own gain. Secondly, if Christ, the redeemer, is the source of all things and is chief over creation, it means that redemption is built into the fabric of creation. Our creating Father God created the cosmos through the agency of his redeeming Son.

If Christ is the source of every element of the universe, then no part should be treated dismissively

Our human response to the negative impacts of climate change can be one of despair. However, if we keep at the centre of our thinking the belief that redemption is for the whole creation, then we should meet these difficulties with a purposeful hope. Our task is to discern how we can point towards environmental redemption won for the

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cosmos on the cross. This does not diminish human redemption, which is of a different order (Deane-Drummond, 2008 p103). As we move forward in this task we can know that Christ is not only chief over the universe but is head of the Church. Paul gives Christ's pre-eminence over creation as the reason for Christ's ecclesial headship. Church and cosmos are therefore connected by Christ. We can now further clarify our role in the dynamic ordering of creation. If we, as redeemed humans are the body of Christ and he is the one who sustains the cosmos, our task is to be active partners in renewing our earth. We are not left to work out our stewardship alone but are strengthened by Christ to fulfil the role of co-creators (Weaver and Hodson, 2007 p101).

Finally Christ as the redeemer of the cosmos is the one who holds it together and through the cross has reconciled all things by making peace. The culmination of God's cosmic redemption is now revealed. The saving power of Christ holds creation and will not let it slip into chaos forever. On the contrary, he is working toward bringing all things into a final state of reconciliation and peace (Isa. 65.17-25; Rev. 21.1-22.6). As we work alongside our risen Lord, we know that he is not only with us but holds the very fabric of creation together. We can look toward this century with trust, because no matter how difficult things become, ultimately Christ promises to bring a hopeful future.

Ethical reflection: a practical model to relate theology and praxis

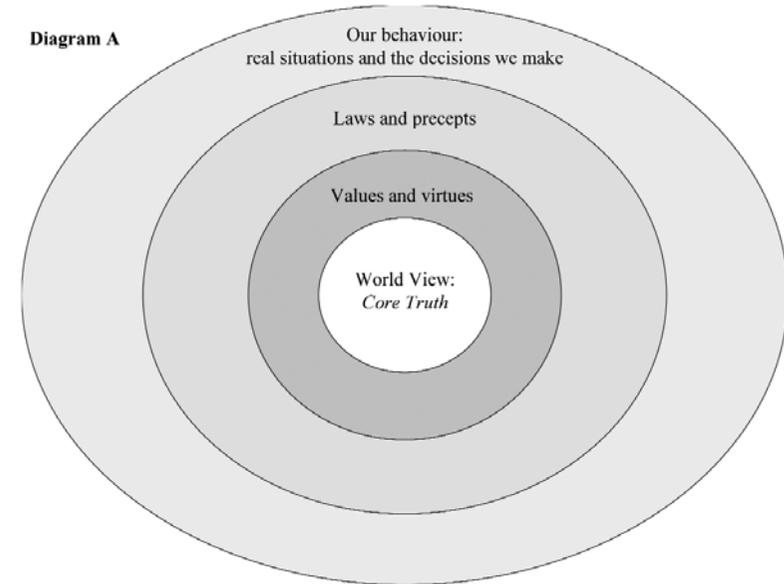


Diagram A: A model for faith-based ethics where an underlying worldview is used to generate values and virtues that in turn shape practical precepts and laws. These are then used for engaging with the world (Maddox, 2006).

Environmental ethics is a growing discipline providing significant tools to those looking for a faith-based approach to responding to the climate change. A key starting point in environmental ethics is to identify the underlying worldview of any ethic that is used. These are normally described as: ecocentric, where the highest value is the ecosystem; biocentric where each organism or species has value; or anthropocentric, where humans are seen as having the highest value (Hodson and Hodson, 2008 p15). An ethic that is theocentric places the highest value on God. This is attractive to those wishing to make a

Christian response but needs further definition. The dynamic relationship between Christ, cosmos and Church, proposed in the theological reflection provides a robust belief structure on which to build a Christocentric ethic.

Maddox (2006) proposed a useful model for faith-based ethics. Taking an underlying worldview of a culture, he uses it to generate a series of values and virtues that in turn shape practical precepts and laws. These are used as a basis for engaging with the world (diagram A).

This approach can be developed to build an environmental ethic based on the theological reflection of Col. 1.15-20. The resulting model is a practical tool that can be used to guide our response to the current environmental challenges in rural communities (diagram B).

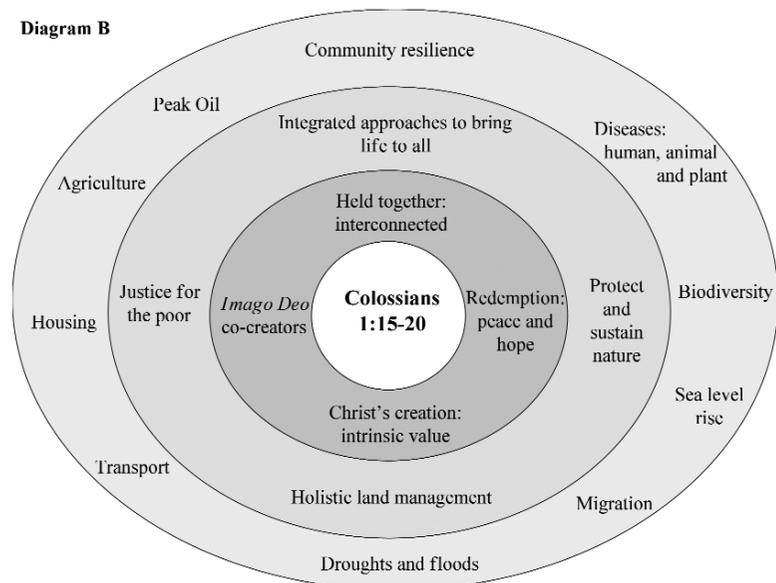


Diagram B: An environmental ethic addressing climate change and rural communities based on Diagram A and a theological reflection of Col. 1.15-20.

A world-view that places Christ at the heart of creation as set out in the reflection on Colossians, generates a distinctive set of values. The intrinsic value of all elements of creation comes from Christ's creating role. Christ as redeemer and his holding all things together provides a context of hope for any Christian engagement with the world and affirms interconnectedness. Christ as image of the invisible God is a reminder that humans are made in God's image. Christ's roles as supreme over all things and head of the church give a dynamic responsibility to be co-creators and make his Kingdom visible on earth as in heaven.

These values may generate precepts and laws. Perhaps the key imperative is to be holistic and balance the needs of humanity with those of the rest of God's creation. Taking this approach will mean a major shift for many Christian communities, who may at present only see their actions toward humans as part of their Christian discipleship.

If we truly believe that Christ is first over the cosmos holding it together and head over the church, which is his body, then there is a dynamic relationship between church and cosmos. As Christians we are not simply another player adding our hands to the many fighting environmental causes. Instead we have a crucial role to play as Christ's body, demonstrating his resurrection power to bring peace and the hope of a restored creation in the age to come. How we work that out in practice will be explored below.

We have a crucial role to play as Christ's body, demonstrating his resurrection power to bring peace and the hope of a restored creation in the age to come

CHAPTER THREE

Applying a faith framework in rural communities to address climate change

A role for rural communities in mitigating climate change

Undoubtedly, the challenge of meeting the threat of climate change is very large. In 2008 the UK government passed the Climate Change Act, which set a legally binding target of at least an 80% cut in greenhouse gas emissions by 2050, with at least 34% by 2020. Both targets are against a 1990 baseline. In May 2010 the Labour government was replaced by the Coalition, but fundamentally similar policies have been followed so far and Prime Minister, David Cameron, has made it known that he wishes this administration, 'to be the greenest government ever' (Weaver and Barclay, 2011).

Essentially, we need to move away from fossil fuels very rapidly, but it is unclear whether the alternatives available can replace them. MacKay (2009 p114) concluded 'We've established that the UK's present lifestyle can't be sustained on the UK's own renewables (except with the industrialization of country-sized areas of land and sea).' So nothing short of covering large areas of the UK with wind turbines, solar panels and biofuel crops would be sufficient.

If this were to happen it would have a very large impact on the UK countryside, and on the rural communities within it. Nuclear energy is another possibility, but again MacKay (2009 pp166-167) suggests that large numbers of new facilities would be required if the UK went that route. So how can rural communities and their churches begin to approach the problem of making large cuts in emissions?

The agricultural sector is coming under increasing pressure to decrease emissions as it is responsible for around 6.5% of all emissions from the UK (ADAS, 2009). As yet there is no target for the sector to

We've established that the UK's present lifestyle can't be sustained on the UK's own renewables

reduce its emissions, but agriculture must play a part in the 80% reduction required by UK government by 2050. Gibbons *et al.* (2006) suggested that the most cost-effective methods of decreasing emissions from UK agriculture were: the abolition of intensive beef production; reducing the storage of manures with associated increases in the regularity of manure spreading; replacement of grass by concentrate feed in milk production; and application of less mineral nitrogen to grassland. The recent report from CAT (2010 pp189-234) envisages a far greater role for carbon sequestration in soil and other repositories in the future.

Considerable retrofitting will be required to improve the energy efficiency of buildings

For housing, although new construction allows the incorporation of new energy systems and the implementation of greater energy efficiency, 65-70% of the housing stock in the UK still extant in the 2050s will have been built before 2000 (Foresight, 2008 p14). This implies that considerable retrofitting will be required to improve the energy efficiency of buildings, and as we have already seen the rural housing stock is likely to be more problematic in this respect than the urban stock. Foresight (2008 pp67-75) suggested four potential scenarios to investigate alternative ways in which energy systems and the built environment could develop in the UK this century:

- 1) Resourceful Regions. Here political trust is lessened globally, but there is still international trade. Fossil fuels still provide most UK energy, but with increased efficiency.
- 2) Sunshine State. Climate change and expensive energy have decreased international solidarity. Localism is seen as the solution to energy problems.
- 3) Green Growth. Peak Oil and climate change have become serious concerns. New technologies are suggested to be the solutions.
- 4) Carbon Creativity. Carbon trading is established and all goods and services have a carbon price. Power stations have carbon capture and storage, and decarbonisation is a central theme.

As yet it is uncertain which, if any, of these scenarios will be adopted by the UK government, and to some extent the eventual choice may be driven by factors that are external to the UK. We would suggest that the Sunshine State and Green Growth possibilities look the most likely at the moment, given the UK government's desire to decrease carbon emissions. It is equally unsure how the four scenarios would affect rural communities in the future, and which might be the most desirable.

Faith-based communities, and particularly churches, have a significant voice within the rural context. There is great potential for these communities to develop and influence strategies for mitigating climate change. Here we will consider two initiatives that are partly or wholly aimed at reducing carbon emissions by churches and congregations.

Faith-based communities, and particularly churches, have a significant voice within the rural context

Eco-Congregation arose from a joint venture between ENCAMS and the Environmental Issues Network of Churches Together in Britain and Ireland, and was launched in September 2000 (Eco-congregation, 2009a). It aims to support churches in thinking about environmental issues inside a Christian framework. In March 2007 Eco-Congregation in England and Wales came under the management of A Rocha UK, and by July 2011 it had made a total of 206 awards to churches of many denominations, some of which are in rural locations.

Shrinking the Footprint was established by the Church of England in 2005, and initially gathered a large amount of data to establish a baseline of carbon emissions from the Church's building stock (Church of England, 2009). The national carbon footprint for cathedrals, churches, houses and offices was estimated at 330,000 tonnes of CO₂ of which churches and halls account for about 65% of emissions. In November 2009 the Church launched a seven year plan, the key points of which were: to reduce the Church's carbon footprint by 42% by 2020; to establish 4700 sustainable schools by 2016; and to

promote 'Eco-twinning' with churches in the developing world. In their report, the Church of England (2009) made no specific references to rural churches or communities, although they did include examples of environmental work from predominantly rural dioceses such as Exeter and Gloucester.

How rural communities can adapt to climate change

Not only do rural communities need to reduce carbon emissions, but also there will be an increasing need to adapt to climate change, both to changed climate and weather patterns, and to changes in lifestyle brought about by low availability of fossil fuels.

I am worried that we won't actually get off fossil fuels when we need to

If the UK is to move off fossil fuels then MacKay (2009) suggests that we need to make very large changes. Transport will need to be completely changed, with much better public transport, and electrification of all terrestrial transport systems. We will also require a major change of most building heating systems, with many buildings switching to ground source and air source heat pumps. MacKay (2009) foresees that green power needs to be increased by 10 to 20 times.

However, he is concerned that the British public has yet to take the issue seriously, and concludes (p250), 'Given the general tendency of the public to say "no" to wind farms, "no" to nuclear power, "no" to tidal barrages – "no" to anything other than fossil fuel power systems – I am worried that we won't actually get off fossil fuels when we need to.'

One idea for increasing the efficiency of power and heat generation is to abandon the present large power stations in favour of local stations. It is argued that the transport of energy (e.g. electricity) to rural locations is inefficient due to the greater distances involved. Many have suggested that so-called Combined Heat and Power (CHP) stations situated locally will lead to greater efficiency. However, Mackay (2009 p145) considers that the energetics and economics actually favour large power stations. He believes that in most locations heat pumps will out-perform CHP, but does concede that in areas with

ample supplies of wood CHP may be an option. So CHP may be workable in some rural areas.

In recent years the biggest community-based initiative that aims to assist with adaptation to the twin challenges of climate change and Peak Oil is the Transition Network (originally Transition Towns). Hopkins (2008) describes the development of the movement from its beginnings in Kinsale, Ireland, to the establishment of the first Transition Town at Totnes in Devon, to the creation of a national and even international movement. Transition initiatives assume four factors: that lower energy availability will happen soon, and that we should plan for it; that settlements lack the resilience at the moment to survive the disruption caused once we reach Peak Oil; that collective and immediate action is required; and that communities already have the resources available to change (Hopkins, 2008 p134). A key component of the Transition concept is the energy descent plan, which seeks to decrease community dependency on fossil fuels. To achieve this all areas of community activity need to be considered, including local food production, energy efficiency of housing, energy production and transport. It is emphasized that a future with less fossil fuel could be preferable to the present situation provided that enough advanced thinking and action has taken place. The Transition Network is also keen to promote local community resilience. Communities of all sizes have set up Transition groups, including a number of rural villages (Transition Network, 2011). Very frequently, individual Christians are members of Transition groups, although the movement as a whole is secular. The present authors are involved in Haddenham in Transition, a group focussing on the Buckinghamshire village of Haddenham. Not all of this type of activity comes under the Transition banner and many 'Low Carbon Communities' have now been established. These have a more specific focus on reducing carbon emissions and increased energy efficiency.

In many rural villages the church has a major community role, and

A future with less fossil fuel could be preferable to the present situation provided that enough advanced thinking and action has taken place.

there are many opportunities for interactions with secular society and mutual benefit. The church can have a key part in enabling and supporting change. We will now consider some examples of this type of activity from rural communities.

Examples of praxis: what some rural communities are already doing

There are a growing number of examples of good practice in responding to the challenge of climate change. Our four examples cover energy use, use of church buildings and land, recycling and the development of community projects. In general the most effective are those that have an immediate impact of reducing carbon emissions and also stimulate community activity, thus reducing travel and individual use of energy. Where the project is church-based there is a vital need to make the link between practice and faith; that is to see environmental activity as part of the worship and mission of the church.

Community energy generation: Westmill Co-op was set up in 2005 by Adam Twine, a local organic farmer, to build a wind farm on a disused airfield in west Oxfordshire (Hodson and Hodson, 2008 p145). Westmill made local investors a priority and has 2,374 members. Five wind turbines were built and the farm started commercial energy generation in 2008, producing enough energy to power 2,500 homes locally. Westmill is part of the Energy4All group of co-operatives and has been recognized in the UK Renewable Energy Strategy 2009. Energy4All is promoted as the best source of advice to other community groups seeking to develop local sustainable energy schemes.

Energy, buildings and community: St Mary's, Haddenham in Buckinghamshire is chiefly known for its successful Fresh Expression, *Caféplus+*, a monthly breakfast café in the village hall (Gaze, 2006 pp80-81). In 2008 members of St Mary's attended an A Rocha seminar at Spring Harvest and became convinced that it was their Christian responsibility to seek a sustainable alternative for the church oil-fired

boiler. A grant-funded energy audit recommended a wood pellet boiler and solar PV on the south aisle roof. Both these options proved impossible to implement and after two and a half years of serious exploration, the church has not been able to find a suitable renewable option. The current plan is to computerise the heating system to maximize efficiency of the conventional boiler. The process has shown how difficult it can be to use renewable energy in a medieval church. It has led members to consider what it means to be church at a time of climate change.

In the wider community, the newly formed Haddenham in Transition group has undertaken practical initiatives including using a thermal-imaging camera to assess house insulation (see back cover). One farm is growing biomass crops and all three primary schools are implementing eco-school. The interesting factor with these initiatives has been the level of interaction between various groups and institutions, and the focus on community. It is important to build on what is already within the community and for the church to become as involved as possible with the wider village initiatives. In Haddenham, a myriad of small initiatives are likely to take the community toward a sustainable future (see front cover).

The interesting factor with these initiatives has been the level of interaction between various groups and institutions, and the focus on community

Churchyard allotments: St Barnabas, Queen Camel, in Somerset, won a Church Times Green Award in 2007 for their Churchyard allotment scheme. The church recognized the need for allotments in their village and decided to develop an area of reserve churchyard that had never been used for burials (Eco-congregation, 2009b). The community benefits have been great. People have enjoyed working the land and those with allotments now help with the general maintenance of the churchyard. The village primary school use the area to learn about how things grow and there are plans for a wildlife area. The allotments are used for worship by St Barnabas at Harvest and Rogationtide. There is also a prayer garden.

Community and recycling: 'Take a Pew,' in Herefordshire aims to keep church buildings open and develop them for community use (Holden, 2009). It is run by Hereford Diocese in partnership with EnviroAbility who support projects that facilitate community and help the environment. Pews are often removed from churches to enable community use. In this scheme, the surplus pews are offered to parishioners to buy as smaller made-to-measure furniture. At the workshop, carpenters work with people with learning disabilities to help them increase their confidence and skills. Because the project is locally based and has community outcomes, it reduces energy use through transport and domestic heating. The recycling of pews reduces carbon use for creating new furniture. Overall it embodies an ethical view that creates a lower energy lifestyle because the environment is valued alongside people.

Discussion: the value of a faith-based approach to community action and change

We have described the difficult problem of climate change and the possible ways forward. Though the situation is very serious, our theological reflection gives Christological hope. When translated into ethical responses, we can engage theology in practical responses. UK rural communities will be unable to maintain their current energy use without endangering the poor and the biodiversity of the planet. Energy reduction is possible but will involve major changes. Initiatives such as Transition and local energy projects assume a greater commitment to local communities and this will be especially important in rural areas as transport becomes more expensive.

UK rural communities will be unable to maintain their current energy use without endangering the poor and the biodiversity of the planet

Faith communities in rural areas have a strong role to play for a number of reasons. First, they are often well integrated in wider communities and may have natural community leaders with the resources to motivate change. Secondly, they understand a values approach to living and are willing to make sacrifices for the good of others. Finally they have the spiritual resources to pray for their communities and inspire hope at a time of uncertainty. The Sustainable Development Commission (2005) emphasized the faith dimension to responding to climate change, largely drawing on urban examples. Rural communities chiefly look to the church to provide spiritual resources and this gives strong potential for a specifically Christian response. One of the greatest immediate needs is to motivate Christians to integrate an environmental understanding into their faith world-view. This is one of the reasons Eco-congregation has been an effective initiative. When faith and environmental understanding are brought together, Christians have the resources to develop environmental projects as mission initiatives.

CHAPTER FIVE

**Conclusion and recommendations:
faith in the countryside, a sustainable approach**

There is much potential for a faith-based response to the current environmental crisis and this has significant potential for rural communities in their response to climate change. The context of the response will depend on the national policies for rural areas for agriculture, energy, transport and housing. The effectiveness of the churches role will depend on how deeply a local Christian community is embedded into its wider community, and whether an environmental understanding has been integrated into their theology. Churches will also need to be mission focused to support rural communities through significant transition.

Two recommendations for discussion, reflection and action

We are moving toward a future where the problem of climate change will call for major changes in the way we live. In the light of the findings outlined in this paper, our recommendation for government is to frame their policies in the context of an overall agenda for the re-localisation of communities. This would encourage local food production and energy generation alongside measures to reinvigorate communities culturally and commercially. One potential means of achieving this would be to encourage and fund partnerships between local authorities and voluntary bodies, such as Transition groups.

Our recommendation for the church is to be a key player in local community regeneration in rural areas. This may mean: entering into partnerships for community development; giving church buildings over to multiple community use; seeking to make buildings and congregations become more sustainable; and strengthening lay and voluntary local church leadership. This will require significant expansion of environmental Christian education for both clergy and lay people to provide the motivation for change.

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