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GOD, SCIENCE AND GLOBAL WARMING

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delivered by

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Introduction

First let me say what an honour and privilege it is to be invited to give this second Convocation Address at Bowen University. It is an especial pleasure because my colleague and friend Professor Olatunde Aro is a member of your faculty. He and his family spent a year in my department at Oxford University in the 1970s and it is a real delight for me to visit him in his home country. It is my first time here in Nigeria. I have been looking forward to seeing your country, one of Africa's largest and most influential, with its great potential to lead within the African continent. And the new Bowen University campus in its turn will be a leading institution in Nigeria as your country develops and looks for solutions to the enormous problems that face our world.

I come to you today first as a scientist. The most important event in my early scientific life was the launching of the first Sputnik satellite by the Russians in 1957 - almost exactly 50 years ago . I guess that predates many of you in this audience! Three years later, in 1960, the United States launched the first weather satellite. Along with others I began to think of what could be done to observe the Earth, the atmosphere, the oceans – in fact the whole of the Earth system — from space. We were presented with the

exciting opportunity of observing the whole *global* atmosphere continuously in time – something that we had not even dreamed of before.

And so it was first satellites and then computers that transformed the science of meteorology, the science of weather forecasting and the science of understanding the climate. And I was privileged to be part of that transformation. During the 1970s, I worked with NASA — the US space administration — building instruments to observe the Earth from space on four separate missions, followed by a mission to Venus in 1978.

Venus is a bit closer to the sun than we are, but its surface is a dull red heat. And why is it so hot? Because the atmosphere is almost pure carbon dioxide, the greenhouse effect on Venus is enormous – a very good example of global warming, the subject that I will address in the second part of my lecture.

So developed my life as a scientist. The second strand of my life has been as a Christian for over 50 years. What has been especially important to me has been to link together the scientific and Christian strands in my life. I believe that science and faith should be seen together. They are not in opposition; in fact, the idea that they are opposed is a relatively recent idea. By thinking more carefully and deeply about them both, I hope I will persuade you that science and faith support each other in ways that are mutually enriching.

Our Fantastic Universe

Let us begin our exploration by looking at the whole universe. Another great triumph of science over the last 50 years has been the way in which the physics of the very small (for instance, the tiny particles that make

up the nuclei of atoms), and the physics of the very big (for instance, the far-off galaxies in outer space) have come together to provide a scientific description of the universe as we know it. The evidence points strongly to a universe that began about 14 billion years ago in what is known as the "Big Bang" when all matter and energy, concentrated in an extremely small volume of unbelievable high density and temperature, began to expand. It has continued expanding ever since.

Let me quickly mention three things about the universe: its size, its energy and its precision. Imagine the Sun as a golf ball somewhere in the middle of this hall; the Earth would then be a grain of sand roughly where I am. The nearest star would be over a hundred kilometers away – somewhere close to Lagos. Space is that empty. With the naked eye and a really clear sky, it is possible to count about 3,000 stars. But in the Milky Way — the galaxy of which our Sun is a member — there are one hundred billion stars. In the universe as a whole, there are about a billion galaxies. Multiply these numbers together we find the total number of stars in the universe. From the farthest ones, the light takes over 10 billion years to reach us. The universe is mind-bogglingly enormous in both space and time.

The energy in the universe is no less stunning. We are familiar with volcanoes, earthquakes or thunderstorms, but these are minuscule compared with what happens in the rest of the universe. The biggest event of all was the Big Bang at the universe's beginning. As matter expanded from the Big Bang, regions of high density condensed into stars. Stars shine from the nuclear energy released as hydrogen is turned into helium, matter being lost and energy

gained. Then nuclear reactions inside stars form other elements: carbon, nitrogen, oxygen, and all the way up the Periodic Table to iron.

Big stars, as they become old, explode as supernovae; in these explosions heavier elements are formed, for instance platinum, lead, gold and uranium. Then from the debris from these explosions, new stars are formed. Our Sun is such a second-generation star. From the rich material around our Sun — containing all the 92 naturally-occurring elements — the planets were formed, including our Earth. What energy we find in the universe!

What about precision? We are familiar with the very exact movements of stars and planets in the sky. But the Big Bang doesn't sound like anything very exact. However, science demonstrates its extreme precision. The Big Bang force was driving the universe's expansion with gravity trying to pull it back. These forces had to balance to one part in 10 to the power of 60. That's a one with 60 zeros after it. And if you think that is a big number, just listen for an even bigger one. Considering the entropy of the universe – or the way the universe is ordered – raises the question, "What sort of order was needed at the beginning of the Big Bang?" According to Sir Roger Penrose, a distinguished Oxford mathematics professor who has studied this entropy problem, it had to be set with a precision of one part in 10 to the power of 10 to the power of 123. Now if all the trees on Earth were turned into paper and all that paper filled with zeros, there would be nothing like enough zeros to describe that number. If a zero were placed on every atom in the universe, there still would be nothing like enough zeros to describe that number. What fantastic fine-tuning!

A universe designed with humans in mind?

Size, energy, precision — all beyond our wildest imagination. And as we have seen the whole universe provides the workshop where all the chemical elements are made. So, for humans to exist, the whole universe is needed with its enormous size and great age. This realization begs the question that many scientists have asked, "Was the universe designed with humans in mind?"

And despite the complexity I have talked about, it's often said that the most complex object in the universe is the human brain. Amazingly our brains have the capacity to understand something of the universe's design and structure. We find the universe to be ordered according to scientific laws that we can discover – the law of gravity, Newton's laws of motion, the laws of Quantum Mechanics, and so on. Where do they come from? They are not invented by human brains - they are discovered. They, too, were part of God's creation. They are God's laws, and the science that humans explore is God's science.

Albert Einstein once said the most incomprehensible thing about the universe is that it is comprehensible. We are able to understand some of the scientific laws and the remarkable mathematical basis of the universe's structure. This comes from a unique characteristic we possess; we've been made in God's image (Genesis 1:26) which brings with it capacities of understanding and creativity. Paul, in the Epistle to the Romans (chapter 1 v 20) says that creation leads us to knowledge of God and his "invisible qualities, eternal power and divine nature have been clearly seen, being understood from what has been made" - so

that we are without excuse. If that was true in Paul's day, how much more true is it in our day today with our much greater knowledge of the creation?

So what sort of God are we talking about? Did God just set up the laws, light the blue touch-paper, set it off, and retreat to a safe distance without any further engagement? Such a god is commonly known as a deist god. Many scientists are willing to accept intelligence behind the universe. Einstein described himself as a deeply religious nonbeliever who believed in a deist God. Even Richard Dawkins in his recent best seller *The God Delusion* acknowledges a god in that sense, although he doesn't want to use the word *God*. In fact he states that science has displaced God. In arguing that way, people like Richard Dawkins are going completely outside the boundaries of science and misusing it. Science answers *How?* questions, not *Why?* questions. Science neither proves nor disproves the existence of God. The view that science tells the *whole* story is not only biased, it's completely wrong.

Intelligent Design – Science is *God's Science*

I would like here to say something about *intelligent design*, - a phrase we often hear amongst those who try to relate science and faith. It is the scientists I have just been talking about who passionately affirm that science is disconnected from God, that have stimulated the *Intelligent Design (ID) movement*. Its proponents argue that there are areas of science, especially those concerned with the evolution of living systems, where the amount of complexity is such that explanation on the basis of scientific law is impossible. They call them *areas of irreducible complexity* and argue therefore that they must have been intelligently designed by a

supernatural agent. Some things therefore belong to science, and some belong to the supernatural.

This approach has big problems. The first and most obvious is that as scientific knowledge grows so does scientific understanding. Things that seem impossible to understand today may eventually come within the ambit of scientific description. If some things are labeled today as due to direct divine action and sometime later a scientific description emerges, the supposed supernatural action is no longer required. This *God of the gaps* is bound to diminish as science advances.

The second problem with the ID approach is even more fundamental. It's based on a misconception of the nature of scientific law. Scientific laws are not invented by scientists; they are an expression of the creator God's orderly activity. The *whole* of creation is God's intelligent design - both the parts where we've discovered some of the laws describing their control (remember they are God's laws!) and the parts where as yet we have no description in terms of scientific law. The arguments of the ID movement are based on a misunderstanding of the nature of science and lead to a God who is far too small. I believe it is vital that Christians — especially Christians who are scientists — take the high ground and insist that the creator God is the Originator and the Sustainer of the whole of creation and that our scientific descriptions all provide evidence of his intelligent design.

In speaking in this way, I could perhaps be accused of oversimplifying the views of the ID community; there are in fact many detailed points to be discussed. Most of the examples of ID that are put forward are from

biology – I am not a biologist so cannot comment on them in detail. Francis Collins, a distinguished biologist and head of the Genome project, has addressed some of them in his excellent book *The Language of God* published in 2006.

Some Christians, when speaking about science give the impression that they are presenting people with a dilemma: either you believe in science or you believe in God. I believe that is a completely false dilemma because what science is doing is describing God's creation and the way he has created it. What I therefore most want to emphasize is the basic point that is absolutely fundamental - that our science is God's science and belongs to him. It's something I've believed from my early years as a scientist. I've been exploring the relationship between science and faith and the connections between them for most of my life. It is most rewarding exploration.

A Personal God

Let me now return to the deist God I introduced earlier and ask, *Is there more to the Creator than a deist God?* I still remember the scientist who years ago was my supervisor during my doctorate program in Oxford. He used to say, *I can believe in a God who made it all and who made the laws of nature. But, a God who is interested in me, I can't believe in that. I'm just too small.* But this is too simple a cop out. We may appear minuscule in terms of the size of the whole universe but God is enormously big - bigger than we can ever imagine. There is no reason to argue that he can't be interested in me. By definition God is big enough to be interested in every one of us.

Is there any evidence in science that might point towards a personal God? Steven Hawking is the cosmologist with Motor Neurone Disease who wrote the bestseller *A Brief History of Time*, which sold 10 million copies in hardback – with my books if I sell one tenth of one percent of that, I think I'm doing very well! It's a remarkable book, known as the "most unread bestseller in the world" because it's not an easy read. He talks in that book about the mind of God. He would say, I think, that he is not a religious believer but that he could believe in remote deist God. But his book plays with the idea of the *mind of God* – although he fails to explain what he means by God's mind. He is not the only cosmologist who, perhaps inadvertently, attributes personal qualities to God?

Earlier I outlined evidence that might suggest that the universe has been designed with conscious beings like ourselves in mind. We possess the capability to understand and appreciate something of the universe's grand design, its order, precision, its mathematical basis, and perhaps most surprising of all, its reliability and consistency. And all this is possible because we have minds, with consciousness and self-awareness.

But what do we mean by our consciousness or self-awareness? Scientists ask these questions – in fact, understanding the science of the mind is perhaps the greatest challenge faced by modern science. But, as yet, science cannot even come up with a good definition of what it means to be conscious. For instance, suppose, in a closed room we are told there is either a computer or a person with which or whom we can communicate through a keyboard. How do we decide which it is? No adequate test has yet been formulated. And yet we are

all certain that we are conscious, self-aware and have freedom of action.

Since we possess these qualities of personality — consciousness, self-awareness and freedom of action — we can argue that they must also be characteristics of the creator God. We are after all made in his image. God, the maker of the universe, is not merely a mathematician or a machine –such a God would be completely inadequate and uninteresting. But a God with personality, to whom we might relate, really grips our attention – although it's an idea that Richard Dawkins in his book *The God Delusion* dismisses out of hand, providing no argument, scientific or otherwise, for his dismissal.

Forming a personal relationship with the One who created such a wonderful universe is the most wonderful and exciting possibility open to us as humans and is something worth pursuing more than anything else in the world. In fact, our scientific exploration — our asking the question "Why?" — has led us to ask whether the creator God might be known by us. As William Temple, Archbishop of Canterbury wrote over 60 years ago, *Natural theology* (the study of what you can learn about God from creation) *ends with a hunger for that Divine Revelation which it began by excluding from its purview.*

A schoolboy began an essay on science and religion with the sentence: *The difference between science and religion is that science is material and religion is immaterial.* That (with its ambiguity of meaning) may seem to express a simple and easy divide but I believe it is a misconception of both science and religion. The

material and the spiritual are not unrelated. Our involvement with the material world and our scientific study of it are not outside God's Big Picture but intimately woven into it. The world desperately needs a personal God. Many Christians need a personal God. How personal is your God? Is he nearer to you than hands and feet? Is he somebody you really know? Because if you don't, the possibilities of knowing a personal God are enormous and beyond all our imaginations.

Two Books – book of God's works and book of God's Word

Let me take you back three or four hundred years to the birth of modern science as we know it. A group of pioneering scientists that included Isaac Newton, Robert Boyle, Christopher Wren, John Ray and many others met together regularly in Oxford or London to exchange information about their latest experiments as they excitingly investigated the working of nature in all its aspects. Many of them were Christians and believed their pursuit of science was for the glory of God. They spoke about God's revelation in the form of *two books*: the book of God's works as found in his creation and investigated by science, and the book of God's Word as found in the Bible. That God has revealed himself in these two ways is a powerful idea.

In fact however, the idea is much older. In particular it is embedded in Psalm 19 that I encourage you to read. It begins by declaring *The heavens declare the glory of God.* Its first six verses speak of God's Works in creation, the next three about God's Word in scripture. The final verses enthuse about the value of God's Word and encourage us to apply the Word to our actions, words

journey are limited. The spacecraft crew is engaged for much of the time in managing the resources as carefully as possible. A local biosphere is created in the spacecraft where plants are grown for food and everything is recycled. Careful accounts are kept of all resources, with especial emphasis on non-replaceable components. That the resources be sustainable at least for the duration of the voyage, both there and back, is clearly essential.

Planet Earth is enormously larger than the spaceship I have just been describing. The crew of Spaceship Earth at six billion and rising is also enormously larger. The principle of Sustainability should be applied to Spaceship Earth as rigorously as it has to be applied to the much smaller vehicle on its interplanetary journey. In a publication in 1966, Professor Kenneth Boulding, a distinguished American economist, employed the image of Spaceship Earth. He contrasted an 'open' or 'cowboy' economy (as he called an unconstrained economy) with a 'spaceship' economy in which sustainability is paramount.

There have been many definitions of Sustainability. The simplest I know is *not cheating on our children*; to that may be added, *not cheating on our neighbours* and *not cheating on the rest of creation.* In other words, not passing on to future generations an Earth that is degraded compared to the one we inherited, sharing common resources as necessary with our neighbours in the rest of the world and caring properly for the non-human creation. We are all guilty of cheating in these three respects.

The science of global warming

One of the most important and urgent problems of sustainability is that of global warming and climate change. Let me start by summarising the basic science. By absorbing infra-red or 'heat' radiation from the earth's surface, 'greenhouse gases' present in the atmosphere, such as water vapour and carbon dioxide, act as blankets over the earth's surface, keeping it warmer than it would otherwise be. The existence of this natural 'greenhouse effect' has been known for nearly two hundred years; it is essential to the provision of our current climate to which ecosystems and we humans have adapted.

Since the beginning of the industrial revolution around 1750, one of these greenhouse gases, carbon dioxide has increased by over 35% and is now at a higher concentration in the atmosphere than for many hundreds of thousands of years. Chemical analysis demonstrates that this increase is due largely to the burning of fossil fuels - coal, oil and gas. If no action is taken to curb these emissions, the carbon dioxide concentration will rise during the 21st century to two or three times its preindustrial level.

The climate record over past centuries shows a lot of natural variability arising from external factors (such as changes in the sun's energy or the influence of volcanoes) or from internal variations within the climate system. However, the rise in global average temperature (and its rate of rise) during the 20th century is well outside this range of known natural variability. The years 1998 and 2005 were the warmest years in the

global instrumental record that goes back to 1860. A more striking statistic is that each of the first 8 months of 1998 was the warmest on record for that month. There is strong evidence that most of the warming over the last 50 years is due to the increase of greenhouse gases, especially carbon dioxide.

Over the 21st century the global average temperature is projected to rise by between 2 and 6 °C (3.5 to 11 °F) from its preindustrial level; the range represents different assumptions about greenhouse gas emissions and the sensitivity of the climate. For *global average* temperature, a rise of this amount is large. Its difference between the middle of an ice age and the warm periods in between is only about 5 or 6 °C. So, associated with likely warming in the 21st century will be a rate of change of climate equivalent to say, half an ice age in less than 100 years – a larger rate of change than for at least 10,000 years. Adapting to this will be difficult for both humans and many ecosystems.

The impacts of global warming

Talking in terms of changes of global average temperature, however, tells us rather little about the impacts on human communities. There will be some positive impacts, for instance a longer growing season at high latitudes. But most impacts will be adverse. One obvious impact will be due to the rise in sea level of about half a metre (20 inches) to a metre per century that is mainly occurring because ocean water expands as it is heated. This rise will continue for many centuries – to warm the deep oceans as well as the surface waters takes a long time. This will cause large problems for human communities living in low lying regions. Many areas, for instance in Bangladesh (where

about 10 million live within the one metre contour), southern China, islands in the Indian and Pacific oceans and similar places elsewhere in the world will be impossible to protect and many millions will be displaced.

There will also be impacts from extreme events. The extremely unusual heat wave in central Europe during the summer of 2003 led to the deaths of over 20,000 people. Careful analysis leads to the projection that such summers are likely to be average by the middle of the 21st century and cool by the year 2100.

Water is becoming an increasingly important resource. A warmer world will lead to more evaporation of water from the surface, more water vapour in the atmosphere and more precipitation on average. Of greater importance is the fact that the increased condensation of water vapour in cloud formation leads to greater release of latent heat of condensation. Since this latent heat provides the largest source of energy driving the atmosphere's circulation, the hydrological cycle will become more intense. This means a tendency to more intense rainfall events and also less rainfall in some semi-arid areas. Since, on average, floods and droughts are the most damaging of the world's disasters, their greater frequency and intensity is bad news for most human communities and especially for those regions such as south east Asia and sub-Saharan Africa where such events already occur only too frequently. It is these sorts of events that provide some credence to the comparison of climate with weapons of mass destruction.

Sea level rise, changes in water availability and extreme events will lead to increasing pressure from

environmental refugees. A careful estimate by Norman Myers at Oxford has suggested that, due to climate change, there could be more than 150 million extra refugees by 2050.

In addition to the main impacts summarised above are changes about which there is less certainty, but if they occurred would be highly damaging and probably irreversible. For instance, large changes are being observed in polar regions. If the temperature rises more than about 3 °C (~5 °F) in the area of Greenland, it is estimated that melt down of the ice cap would begin. Complete melt down is likely to take 1000 years or more but it would add 7 metres (23 feet) to the sea level.

Can we believe the evidence?

How sure are we about the scientific story I have just presented? It is largely based on the assessments by the world scientific community carried out through the work of the Intergovernmental Panel on Climate Change (IPCC). I had the privilege of being chairman or co-chairman of the Panel's scientific assessment from its beginning in 1988 to 2002. The Panel's purpose was to provide an accurate assessment of the science of climate change – a very complex area of science. Hundreds of scientists — including most of the world's leading climate scientists came together from different backgrounds, personal agendas and preconceived ideas about what the science should be like. Yet when we really got down together and agreed under the discipline of science to be absolutely honest, the honesty won through. No assessments on any other scientific topic have been so thoroughly researched and reviewed. We were able to generate assessments about the nature

and scale of climate change that have proved invaluable in giving to the world reliable information to the world. In June of 2005, the Academies of Science of the world's eleven most important countries (the G8 plus India, China and Brazil) issued a statement endorsing the IPCC's conclusions.

Unfortunately, there are strong vested interests that have spent tens of millions of dollars on spreading misinformation about the climate change issue. They first denied the scientific evidence and more recently have argued that its impacts will not be large, that we can 'wait and see' and in any case we can always 'fix' the problem if it turns out to be substantial. The scientific evidence cannot support such arguments.

International agreement required

Global emissions of carbon dioxide to the atmosphere from fossil fuel burning are currently approaching 7 billion tonnes of carbon per annum and rising rapidly. Unless strong measures are taken they will reach two or three times their present levels during the 21st century and climate change will continue unabated. To halt climate change during the 21st century, emissions must be reduced to a fraction of their present levels before the century's end.

It is essential that all countries join the international agreements being negotiated under the Framework Convention on Climate Change (FCCC). The FCCC states that it is developed countries who must take the first action – after all it is they who have received the most benefit from plentiful and cheap energy from fossil fuels. This is proving an enormous challenge. Nevertheless, many developed country governments are

beginning to plan for reductions in greenhouse gas emissions of 50% or 60% by 2050 - targets that recognize the need to allow some headroom for developing countries. Estimates of the cost to developed countries of making the changes required to achieve such targets show it to be small – for instance, as no more than the equivalent of a year's economic growth over the 50 year period.

What actions can be taken?

Three sorts of actions are required if such reductions are to be achieved. First, there is energy efficiency. Means are available to at least double the efficiency of energy use in buildings, transport and by industry, in most cases with significant savings in cost. Secondly, there are possibilities for sequestering carbon that would otherwise enter the atmosphere, for instance from large coal, oil or gas fired power stations. This can be done through the planting of forests or by pumping carbon dioxide underground, for instance in spent oil and gas wells. Thirdly and perhaps most importantly, a wide variety of non-fossil fuel sources of energy are available for development and exploitation, for instance, biomass (including waste), solar power (both photovoltaic and thermal), hydro, wind, wave, tidal and geothermal energy. The opportunities for innovation, development and investment in all these areas is large. Technology Transfer from developed to developing countries is also vital if energy growth in developing countries is going to proceed in a sustainable way.

When talking of commercial energy, our minds often turn to large power stations generating electricity in vast quantities that is then transmitted over large scale grid systems – such as exist in many developed

countries. But it does not have to be that way. Technology is now available to generate energy locally in small units making use for instance of solar photovoltaic energy or of various forms of bioenergy – burning or fermenting wood or other crops to generate electricity or generating biogas or biofuel from crops or from agricultural or domestic waste. Such energy provision on a village scale can provide an essential part of the foundation for economic growth and development in rural areas particularly in Africa and Asia.

Stewards of Creation

People often say to me that I am wasting my time talking about environmental sustainability. 'The world' they say 'will never agree to take the necessary action'. I reply that I am optimistic. I give three reasons. First, because I have seen the commitment and dedication of the world scientific community, secondly because I know that the necessary technology is available and thirdly because I believe that God is committed to His creation and that we have a God-given task of being good stewards of creation.

What does Christian stewardship of creation mean? In the early part of Genesis, we learn that humans, made in God's image, are given the mandate to exercise stewardship/management care over the earth and its creatures (Gen 1 v26,28 & 2 v15). We therefore have a responsibility first to God to look after creation - not as we please but as God requires – and secondly to the rest of creation as ones who stand in the place of God.

We are only too aware of the strong temptations we experience, both personally and nationally, to use the world's resources to gratify our own selfishness and

greed. Not a new problem, in fact a very old one. In the Genesis story of the garden, we are introduced to human sin with its tragic consequences (Genesis 3); humans disobeyed God and did not want him around any more. That broken relationship with God led to broken relationships elsewhere too. The disasters we find in the environment speak eloquently of the consequences of that broken relationship.

We, in the developed countries have already benefited over many generations from abundant fossil fuel energy. The demands on our stewardship take on a special poignancy as we realize that the adverse impacts of climate change will fall disproportionately on poorer nations and will tend to exacerbate the increasingly large divide between rich and poor. Our failure to be good stewards is a failure to love God and a failure to love our neighbours, especially those in Africa and Asia.

Some Christians tend to hide behind an earth that they think has no future. But Jesus has promised to return to earth – earth redeemed and transformed. In the meantime earth awaits, subject to frustration, that final redemption (Rom 8 v 20-22). Our task is to obey the clear injunction of Jesus to be responsible and just stewards until his return (Luke 12 v 41-48). Exercising this role provides an important part of our fulfilment as humans. In our modern world we often concentrate so much on economic goals – getting rich and powerful. Stewardship or long-term care for our planet and its resources brings to the fore moral and spiritual goals. Reaching out for such goals could lead to nations and peoples working together more effectively and closely than is possible with many of the other goals on offer.

New Attitudes

Not only do we need goals but also new attitudes and approaches in the drive towards sustainability – again at all levels of society, international, national and individual. For instance, sustainability will never be achieved without a great deal more sharing. Sharing is an important Christian principle. John the Baptist preached about sharing (Luke 3 v11), Jesus talked about sharing (Luke 12 v33), the early church were prepared to share everything (Acts 4 v32) and Paul advocated it (2 Cor 8 v13-15). The opposite of sharing - greed and covetousness - is condemned throughout scripture. At the individual level, a lot of sharing occurs. At the national or international level it occurs much less as is well illustrated by the most condemning of world statistics - that the average flow of wealth in the world is from the poor to the rich. An urgent challenge to those of us who are comparatively rich is to find ways of effectively sharing our wealth with people in the poorer parts of the world.

One of the biggest 'sharing' challenges faced by the international community is how emissions of carbon dioxide can be shared fairly between nations. Currently great disparity exists between emissions by rich nations compared with poorer ones. Expressed in tonnes of carbon per capita per annum, they vary from about 5.5 for the USA, 2.2 for Europe and less than 0.5 for Sub-Saharan Africa. Further the global average per capita, currently about 1 tonne per annum, must fall substantially during the 21st century. A proposal by the Global Commons Institute is that emissions should first be allocated to everybody in the world equally per capita, then transfer of allocations being allowed through

trading between nations. The logic and the basic equity of this proposal is in principle quite compelling – but is it achievable? A further aspect of sharing, increasingly recognized, for instance, by aid agencies, is for rich countries to share their skills with the developing world - for instance in science and technology. The worldwide Christian community could be foremost in developing partnerships across the rich/poor divide that realize genuine and practical sharing. As communities from different parts of the world work and share together in facing this challenge of climate change, great benefits will flow helping to create a more united world.

You may ask, 'but what can I as an individual do?' There are actions that all of us can take. For instance, we can make sure that in all aspects of our homes and our lives we are as energy efficient as possible. We can become better informed about the issues and support leaders in local or national government or industry who are advocating or organizing the necessary solutions, especially the use of renewable energies. To quote from Edmund Burke, a British parliamentarian of 200 years ago, *No one made a greater mistake than he who did nothing because he could do so little.*

Partnership with God

We may feel daunted as we face the seemingly impossible challenge posed by global warming. But an essential Christian message is that we do not have to carry the responsibility alone. I've spoken of partnerships within our world communities. But there is a much greater partnership to be grasped. I began my lecture by emphasizing that our God is a *personal* God who wants a relationship with us. This means that

our partner is no other than God Himself. The Genesis stories of the garden contain a beautiful description of this partnership when they speak of God *walking in the garden in the cool of the day* – God, no doubt, asking Adam and Eve how they were getting on with learning about and caring for the garden. Jesus talked about this partnership too. Just before he died he said to his disciples, *Without Me you can do nothing,* and went on to explain that he was not calling them servants but friends (John ch 15). Servants are given instructions without explanation; as friends we are brought into the confidence of our Lord. We are not given precise prescriptions for action but are called upon to humbly use the gifts we have been given in a genuine partnership.

God has called all of us to *stand* for his truth in the world. But so many in our modern world are drifting - not knowing where. There's an African proverb that says,

If you don't stand for something, you will fall for something. The reality of human induced climate change provides an unprecedented mission opportunity for Christians everywhere in the world – and to you in my audience today - to take a *stand* and to show real leadership – so demonstrating love for God as creator and redeemer and love for our neighbours wherever they may be – remembering the words of Jesus, *From everyone who has been given much, much will be demanded* (Luke 12 48).