

Pallot Memorial Lecture

Holding Humanity to Account for the Future State of the Planet

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Introduction

It is a great honour and privilege to give the 4th June Pallot Memorial Lecture. Professor Pallot was a friend and colleague at Victoria University of Wellington for much of the 1990s.¹ We had offices on the same floor of the Murphy Building in Kelburn; we published two books (together with our colleagues John Martin and Pat Walsh); and we co-taught a number of courses in the fields of public policy and public management. June was a remarkable individual, with a sharp, formidable intellect, broad inter-disciplinary interests, huge energy and great warmth. Her contribution to public life in New Zealand and, in particular, to her specialist field of public sector accounting, was significant and enduring.

One of my most vivid recollections was attending an evening lecture she gave in the late 1980s on aspects of her doctoral research. Her presentation focused on the meaning and implications of the concepts of ‘true’ and ‘fair’, which of course are fundamental principles in the field of accounting. It was, I must admit, the first time I began to comprehend not only the significant ethical and philosophical foundations of accountancy as a discipline, but also the relevance of accounting to my own field of public policy, including many of the enduring issues that face policy makers across the globe. This includes everything from the nature of the good society through to the measurement of organizational and national performance, the valuing of assets, including community assets, the valuing of environmental services and natural capital, and the protection of our common heritage. It is these latter issues upon which I wish to focus this evening – above all, the challenge of protecting the interests of future generations, including the maintenance of biodiversity and the key bio-physical systems upon which human flourishing currently depends.

Let me summarize the substance of my argument. Human beings have certain, important ethical responsibilities to future generations – that is, all those who succeed the generations living today. Unfortunately, humanity is currently failing to fulfill these responsibilities adequately. Most notably, we are giving insufficient attention to the harmful, long-term environmental consequences of our actions. This is most evident when we consider our stewardship of our common property resources or what some call global public goods. Amongst the most important of these are the Earth’s atmosphere and oceans. On current policy settings we seem destined over the next few decades to degrade most of our global fish stocks. This will have dire consequences for huge numbers of people around the world who depend on fish as a core part of their diet. Even more serious, recent projections indicate that we are likely to increase greenhouse gas concentrations in the atmosphere to levels not witnessed for tens of millions of years. There is a significant risk that this will generate large-scale, irreversible damage to critical bio-physical systems.

¹ I would like to thank Frieder Lempp for his assistance with the preparation of this lecture, and Judy Brown, Ralph Chapman, Rachael Milicich, Markus Milne, David Rea, Andy Reisinger, Dennis Rose and Cath Wallace for their helpful comments on an earlier version of the paper.

Why is the global community, including most of the advanced industrialized democracies like New Zealand, failing to take adequate measures to mitigate human-induced climate change and why are we failing to manage our common property resources in a sustainable manner? Why is there so much political inertia in the face of such grave risks? Part of the answer, I suggest, lies in certain features of the democratic process and the wider framework or context within which liberal democracy operates. To quote Dennis Thompson (2005, p.246), the Harvard political philosopher, democracies are ‘systematically biased in favour of the present’. More specifically, the democratic process is failing future generations because of four politically significant asymmetries – *the voting asymmetry*, *the cost-benefit asymmetry*, *the interest group asymmetry* and *the accounting asymmetry*. In the course of this lecture I will explain the nature and implications of these asymmetries and consider how to counter their negative effects. Above all, we must find new and more effective ways of holding humanity to account for the future state of the planet. Such solutions, however, must be compatible with, if not nourish, the fundamental values of liberal democracy – liberty, political equality and respect for human dignity.

One important caveat before proceeding: the issues I will traverse in this lecture are broad, complex and controversial. I simply cannot do justice to all the relevant considerations in the limited time available, so please excuse my brevity and my incomplete treatment of some critical issues.

The nature of our responsibilities to future generations

Turning first to humanity’s obligations: there are various well-established moral, philosophical and religious grounds for asserting that human beings have responsibilities to future generations. One of these is the theologically-grounded claim that human beings have a divinely mandated duty to care for the created order and to be good stewards of our collective inheritance (Berry, 2007; Northcott, 2007; Spencer and White, 2007; White, 1967). From this perspective, the creation is viewed as an amazing and precious gift – one to be nurtured and treasured, not damaged, plundered and defiled. Related to this approach are the concepts of guardianship and trusteeship, and the claim that each generation of human beings has a responsibility to serve as guardians or trustees on behalf of the young and those yet to be born. A fundamental presupposition here is that human beings do not own this planet (let alone the cosmos) but rather hold it in trust for future generations, with all the connotations usually associated with a fiduciary duty – that is, good faith, a high standard of care, prudent oversight and wise management. In policy terms, this implies the adoption of a low social discount rate, and certainly a very low (or zero) pure time preference rate, as recommended by Nicholas Stern (2007). In other words, there is no ethical basis for judging the welfare of future generations differently from those living today.

Utilitarian, Kantian and Rawlsian ethics also provide grounds for protecting the interests of future generations. From at least one utilitarian perspective, the welfare of future generations is of equal value to the welfare of present generations. Decision-makers, therefore, have to consider how their actions will affect the welfare, not only of present,

but also future generations if they want to maximise total human welfare. Actions resulting in a significant welfare loss for future generations are only justified if they result in a net gain in total welfare.

From a Kantian perspective, moral duties arise from the existence of the categorical imperative. One of the maxims that can be derived from this principle is that the powerful should protect the powerless from harm. Applied to the case of inter-generational justice, the maxim entails that future generations, who obviously have no power due to their non-existence, must be protected from any harm inflicted on them by those living today. Consequently, the present generation has the moral duty to refrain from actions causing harm to future generations.

From a Rawlsian perspective, if those devising a just social order in the ‘original position’ under the ‘veil of ignorance’ are risk averse and concerned to maximize the welfare of the least advantaged, they will wish to ensure that there are reasonable and just conditions for living throughout the history of humanity. Hence, regardless of the generation or time period into which an individual is born, the least advantaged person will still be able to thrive. This implies a strong commitment to protect the interests of the future inhabitants of the planet.

In short, many different ethical traditions endorse the proposition that the present generation has ethical duties to future generations. Unsurprisingly, therefore, such notions have been embodied in at least five international treaties and three major declarations, as well as numerous national and sub-national legal instruments – constitutions, laws and regulations. For instance, many legal instruments ‘recognize the interests of future generations in a clean and healthy environment’ and ‘place specific duties on present generations to protect the environment for future generations’ (Science and Environmental Health Network, 2008, p.3). For instance, the United Nations Framework Convention on Climate Change (UNFCCC) states that the parties must ‘protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities’.

Often the relevant instruments recognize that the interests of present and future generations may conflict and thus must be balanced. Hence, the Rio Declaration on Environment and Development in 1992 declares that ‘The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations’. Likewise, the Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes provides that: ‘Water resources shall be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs’. Such wording reflects the definition of ‘sustainable development’ in the Report of the World Commission on Environment and Development (1987), widely known as the Brundtland Report – that is, ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.

But what are the needs and interests of future generations, what are the requirements of inter-generational equity, and how should we achieve inter-temporal objectives? First, we can be reasonably confident that human beings in the future will share many, if not most, of the same basic needs, desires, hopes and aspirations as those living today. This implies an obligation to leave the planet in a state where such needs can be met. Equally, we should be concerned to ensure that future generations can flourish, pursue a wide range of options, and enjoy opportunities (or an opportunity set) of at least *equal quality* to those of today. This suggests a need to protect *genuine wealth per capita* over time – and I am talking here of a broad notion of wealth which includes natural capital, human capital and social capital, as well as manufactured (or built) capital.

To realize such goals, arguably a relatively *strong* sustainability approach is needed – one that endeavours to maintain the *aggregate* stock of natural capital, protect the biodiversity of the planet and sustain crucial ecosystem services.² More specifically, we need to protect the stock of natural capital for which there are no current technically feasible substitutes – or what some have called ‘critical natural capital’ (Hubacek and Mauerhofer, 2008). Put differently, our use of non-renewable resources should ‘not exceed the rate at which sustainable renewable substitutes are developed’ (see Molisa and Wittneben, 2008; also see Meadows, 1998). Moreover, if future generations are to enjoy freedoms and opportunities similar to those living today, we also need to protect our democratic institutions and other vital social capital.

Second, and related to this, there is a widely accepted moral principle that we should avoid harming other human beings, and also the social institutions and environment upon which human well-being depends (see Broome, 2008). Arguably, the harm principle applies over both time and space, and thus places a significant limit on what is morally acceptable, even if the damage arising from our action is not experienced for decades or even centuries.

Third, there is an even stronger obligation, in my view, to avoid inflicting *irreversible* harm. And by irreversible I mean something that is irreparable or unalterable over thousands of years; I am not talking about geological timeframes involving millions or hundreds of millions of years. We thus have no right to alter fundamentally the state of this planet’s climate, all the more so if the changes we induce generate a less stable and less hospitable climate. Inter-temporal tyranny is not justified.

Finally, a good case can be made that non-human species have intrinsic value and that we have obligations to protect the interests that reside in nature, independent of the interests that human beings have in the protection of the environment. Accordingly, a narrow presentist, anthropocentric moral framework is not justified.

² I acknowledge that there are significant issues here concerning: the extent to which different types of capital – manufactured, human, natural and social – are substitutable; the relationship between capital stocks and opportunities (or opportunity sets); and the extent to which it is justified to change the mix of different forms of capital to be passed on to future generations.

Against this, it might be argued that future technological innovations of various kinds will overcome many current ecological constraints and that increased manufactured and human capital will compensate for the loss of natural resources. Plainly, we should not underestimate the benefits of technological advances, but nor should we take undue risks, especially when the potential negative consequences are so extensive and enduring.

The failure of humanity to protect the interests of future generations

Unfortunately, there is mounting, if not overwhelming, evidence that humanity is failing to act in accordance with the principles I have just enunciated. Take, for instance, the findings of the Millennium Ecosystem Assessment prepared under the auspices of the United Nations by over 1,300 leading scientists and completed in 2005. This provides a state-of-the-art appraisal of the condition and trends in the world's ecosystems and the services they provide. The Millennium Assessment supplies a daunting array of evidence of how humanity is damaging the planet. To illustrate: approximately 60% of the ecosystem services examined were found to be 'degraded' or being 'used unsustainably', including fresh water, capture fisheries, and air and water purification (2005, p.1). Similarly, there was evidence of an increasing 'likelihood of nonlinear changes in ecosystems (including accelerating, abrupt and potentially irreversible changes) that have important consequences for human well-being'. These include 'abrupt alterations in water quality, the creation of "dead zones" in coastal waters, the collapse of fisheries, and shifts in regional climates' (p.1.). Genetic diversity is declining, as is the number of species on the planet. It is estimated, for instance, that since around 1800 'humans have increased the species extinction rate by as much as 1,000 times over background rates typical over the planet's history' (p.4). Currently, an estimated 10-30% of mammal, bird, and amphibian species are threatened with extinction (p.4). And the growing human population, projected to reach 9 billion by mid century, will increase pressures on ecosystems still further. We thus stand on the threshold of another great spasm of extinction – but caused by humanity, not natural forces.

Yet do we, as fellow creatures of nature and partners in the biosphere, have the right to put at risk billions of years of evolutionary development, with all its astonishing and intricate beauty, richness, complexity and wonder? The Apostle Paul in the New Testament writes of the whole creation 'groaning in travail and pain' (Romans 8:22). Surely humanity's responsibility lies not in exacerbating this travail, but in healing, restoration and renewal. Arguably, we should be seeking to cut the rate of *natural* extinction, not putting the fate of millions of species in doubt (see Southgate, 2008).

With respect to climate change, the findings of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), published in 2007, are equally concerning. According to the IPCC, there is 'unequivocal' evidence that the climate system is warming (IPCC, 2007, p.1), with the global mean surface temperature having increased around 0.8°C over the past century. Further, the IPCC concluded that most of the observed warming since the mid-20th century is 'very likely' due to the observed increase in anthropogenic greenhouse gas concentrations (p.5). The words 'very likely' mean that there is at least a 90% probability that human beings are the cause of the

problem. Thus far, carbon dioxide concentrations have risen from around 280 parts per million in pre-industrial times to about 390 parts per million, far exceeding the natural range over the last 650,000 years (p.4). Without effective measures to reduce global greenhouse gas emissions over the next few decades, concentrations of heat-trapping gases in the atmosphere will continue to increase at a rapid rate, with carbon dioxide concentrations likely to exceed 550 parts per million – double pre-industrial levels – well before the end of this century. On this scenario, the global mean surface temperature can be expected to rise by about 3°C above pre-industrial levels, with significantly greater increases across most land surfaces. This will cause major changes to the planet’s climate system, including what the IPCC calls a heightened risk of ‘large-scale singularities’ (p.20), such as the rapid loss of the Greenland and West Antarctic ice sheets, thereby generating a multi-meter rise in the sea level over the next few centuries. Other key risks include the acidification of the oceans, the loss of most coral reefs, and the destruction of much of our remaining tropical rainforests. (For a very recent scientific analysis see Richardson, et al. 2009.)

Leading scientists and senior policy makers around the world have been aware of most of these risks since at least the late 1980s. Yet governmental action to address climate change, and in particular to curb the growth of greenhouse gas emissions, has been remarkably sluggish and ineffective. To be sure, the global community negotiated a major treaty in 1992 – the United Nations Framework Convention on Climate Change – and subsequently, in 1997, an important protocol under the Convention – the Kyoto Protocol. But the noble sentiments expressed in these international agreements have not been matched by robust domestic policy responses.

At the international level, greenhouse gas emissions increased by 3% between 1990 and 1995, 6% between 1995 and 2000, and 15% between 2000 and 2005. Put differently, global annual emissions in carbon dioxide equivalents increased from 24 billion tonnes in 1970, to 33 billion tonnes in 1990 (the reference year for the Kyoto Protocol) and 41 billion tonnes in 2005. A major reason for this rise in global emissions was rapid economic growth in East Asia, especially China. But despite the Kyoto Protocol, gross emissions in developed countries have also increased significantly since 1990 – by close to 30% in Australia and Canada, and about 17% in the USA. Of the major industrialized economies, only the European Union and Russia have reduced their emissions since 1990. Their relative success lies partly in the collapse of the Soviet Union and the economic dislocation that followed in its wake.

New Zealand’s climate change policy performance

But what of New Zealand’s performance? After all, we are a small, stable democracy. The country prides itself on being ‘clean’ and ‘green’. It also has relatively simple, centralized political institutions. A country with such attributes might be expected to cope tolerably well with the challenges posed by climate change – both in terms of mitigation and adaptation. But this has not been the case (see Harbrow, 2007).

There has, of course, been much ambitious rhetoric and the regular setting of emissions reduction targets, including the former government's goal of carbon neutrality, which the current government quickly abandoned. But to date not even our least ambitious targets have been met. For instance, New Zealand's first climate change policy, announced in August 1990, included a commitment to reduce net carbon dioxide emissions by 20% from 1990 levels by 2005. The target date was later revised to 2000, and this remained the policy until 1994 when the target was modified to reflect our obligations, as an Annex 1 country, under the Climate Change Convention. The new target was less demanding: a reduction in net emissions to 1990 levels by 2000 – not a cut of 20%. Later, under Kyoto, New Zealand committed to reducing net annual emissions to 1990 levels during the period 2008-12 or purchase carbon credits on the international market to meet any shortfall. Note that the new 'responsibility' target embraced the six Kyoto gases, not just carbon dioxide. But notice, too, that it was less ambitious than the earlier targets. Instead of reducing net emissions to 1990 levels by 2000 (let alone 20% below these levels), the new target date allowed New Zealanders another decade to curb their emissions. Further, New Zealand's target was more generous than the average agreed for Annex 1 countries, namely a 5.2% cut on 1990 levels.

It remains to be seen whether our domestic emissions will fall within our responsibility target for the first commitment period under the Kyoto Protocol. While *gross* emissions have increased by over 20% compared to 1990 levels, *net* emissions – allowing for removals by our forest sinks – are currently close to 1990 levels (so we may just reach our Kyoto responsibility target).

But even if New Zealand is not obliged to purchase Kyoto-compliant emission units on the international market, our record in tackling climate change has been lamentable and our current ambitions are little better. For instance, the recently announced conditional target for 2020 is for a reduction of 10-20% below 1990 levels. Note that this is roughly the same goal that was set in 1990 – 19 years ago – for achievement by 2000, two decades earlier than the new target. Moreover, unlike the government's latest target, the one set in 1990 was not conditional on what other countries do – it was unconditional. And, it was a *domestic* target, not a *responsibility* target; in other words, there was no scope for fulfilling it through purchasing emission units overseas.

To compound problems, the best available scientific evidence (see IPCC, 2007) suggests that developed countries will need to cut their emissions, on average, by 25-40% by 2020 (from 1990 levels) to have even a 50:50 chance of avoiding a global temperature increase of more than 2.0-2.4°C (i.e. above pre-industrial levels). The 2°C maximum or 'guardrail' has been recommended by many experts because exceeding it significantly increases the risks of abrupt and irreversible changes (e.g. the loss of much of the Greenland ice sheet). While the 2°C cap has been widely endorsed, including by the G20, many of the poorest and most vulnerable nations prefer even more stringent approaches.

New Zealand officially supports the 2°C cap, but the government's current domestic emissions reduction target for 2050 – namely, a cut of 50% from 1990 levels – is not consistent with this objective. The scientific evidence suggests that *global* carbon dioxide

emissions must be reduced by 50-85% compared to 2000 levels by 2050 to stay within or close to the 2°C cap (IPCC, 2007, p.21). Taking equity considerations into account, but also allowing for our distinctive emissions profile, a country with high per capita emissions like New Zealand will need to curb its emissions by much more than 50% by 2050. And looking further ahead, global emissions will need to fall practically to zero by next century. Carbon neutrality, in short, will be essential in due course, whether we like it or not. It is solely a matter of time.

Let me put the matter even more starkly. Instead of time-specific reduction targets, it can also be helpful to think in terms of a cumulative global carbon budget. From this standpoint, to have a roughly 50:50 chance of avoiding warming of more than 2°C, total emissions must not exceed 1,440 Gt CO₂ between 2000 and 2050 (Meinshausen, et al. 2009). At current emission levels – approaching 50 Gt CO₂ per annum – humanity will use up the available carbon budget by 2039. To reduce the risk of exceeding warming of 2°C to 25%, total emissions must be capped at 1,000 Gt CO₂ – an amount that will be exceeded by 2027 at current emission rates. Suppose the available ‘atmospheric space’ were allocated henceforth according to the principle of an equal per capita right to emit (that is, regardless of where in the world people live). New Zealand’s per capita greenhouse gas emissions exceed three times the global average, while our CO₂ emissions are nearly twice the global average. Taking all greenhouse gas emissions into account, New Zealand’s entitlement will be exhausted in six years – in 2015 – if we want a 75% chance of staying within the 2°C cap, and in about 10 years for a 50% chance. After that, we will be obliged to keep our net emissions to zero until 2050 or buy emission allowances from other countries. Bear in mind, too, that if we backdated the principle of equal per capita emission rights to 1900 or 1950, New Zealand would already have used up its entitlement. But who amongst our political leaders is talking publicly about such matters, let alone taking such data seriously? Further, how do we account for the lack of progress in implementing policies to reduce emissions – not just in New Zealand, but in most developed countries?

The reasons for inadequate action to mitigate climate change

There are many obvious explanations. These include ignorance, denial and skepticism of the science of climate change by influential sector leaders; the lack of widely experienced negative impacts; a mismatch between those who consume and those who produce energy-intensive goods; bureaucratic infighting and procrastination; the fiendish complexity of the policy issues; the sheer magnitude of the challenge; the absence of any consensus amongst key stakeholders on the best way forward; and a lack of political resolve and far-sighted leadership (see Boston, 2006; Harbrow, 2007). Many uncertainties, too, plague this policy area and have been fully exploited by vested interests. Such uncertainties include assessments of the magnitude and timing of the impacts of climate change, and the costs and benefits of the various policy options and timeframes for action. But compounding all these difficulties are several interconnected and mutually reinforcing behavioural and structural problems of an even more fundamental and deep-seated nature. Let me explain further.

The human condition

First, human beings have certain deeply rooted behavioural characteristics that militate against effective action to address climate change, including a strong dose of self-interest and acquisitiveness, a relatively high private discount rate or myopia, the undervaluing of long-term risks, and a dogged resistance to certain types of change – or what some social scientists refer to as a cognitive bias for the status quo, which is attributed to loss aversion and the endowment effect. Theologians blame some of these traits on humanity's fallen or disordered state. Pope Benedict XVI (2005) put it thus:

the external deserts in the world are growing, because the internal deserts have become so vast. Therefore the Earth's treasures no longer serve to build God's garden for all to live in, but they have been made to serve the powers of exploitation and destruction (see also Benedict, 2009).

Albert Einstein phrased it somewhat differently: 'two things are infinite', he said, 'the universe and human stupidity; and I'm not sure about the universe'. The producers of the recent film 'The Age of Stupid' probably have a similar view.

But however we describe or account for the disordered, imperfect state of humanity, if we are to solve the climate crisis and related ecological problems, we must – as Michael Sandel (2009) has argued in his recent Reith Lectures – nurture a new environmental ethic and emphasize the moral dimension of what is at stake. Relevant imperatives would include sustainability, inter-generational as well as intra-generational equity, a reverence for nature, and the precautionary principle. Humanity's baser instincts must yield to nobler purposes, such as the common good and our vocation to be guardians of the created order.

The collective action problem

Second, climate change represents a formidable collective action problem. Any effective solution requires coordinated, enforceable action by all the major economies; otherwise free-riding will prevail (see Helm, 2008). But securing international agreement on the necessary measures faces multiple stumbling blocks: national self-interest; weak international institutions; corrupted domestic political processes; and the profound ethical challenge of deciding how the costs of mitigation and adaptation should be shared across the international community. Burden sharing, of course, is never easy, but the complexities of climate change make it intensely difficult to determine what is fair. And yet the stakes are high: if national self-interest repeatedly triumphs over the common good, the mitigation effort will be constrained by the pace of the slowest, most recalcitrant and uncooperative nations. Under this scenario, the tragedy of the commons will become both far-reaching and irreversible.

Asymmetries and their impact

Third, there are at least four well-recognized, politically salient and interrelated asymmetries which exercise a profound influence on policy making in liberal democracies: *the voting asymmetry, the cost-benefit asymmetry, the interest group asymmetry and the accounting asymmetry*. Collectively, these asymmetries generate what might be called a demand-side government failure (see Charles Wolf, 1987). I want to spend the remainder of this lecture exploring these asymmetries and their possible solutions.

The *voting asymmetry* is very simple: in democracies, the young and future generations, not to mention other species, have no vote. Yet their well-being is directly affected by the policy decisions of the present generation. If the majority of current voters disregard the environment, there is nothing that future generations can do about it. As the Brundtland Report put it: 'We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions' (WCED, 1987, p.8). In short, future generations are powerless; they cannot hold us to account; they are utterly dependent on our goodwill and sense of responsibility. The same, of course, applies to non-human creatures. And while there is no voting asymmetry in non-democratic systems, authoritarian regimes tend to have even fewer reasons than democracies to take long-term issues seriously.

The second asymmetry, the *cost-benefit asymmetry*, refers to the fact that the costs and benefits of mitigating climate change are significantly different with respect to the key dimensions of *time, certainty, visibility and tangibility* (Boston, 2006). Let me explain. Policies to mitigate climate change impose immediate costs on the economy; these costs, moreover, are relatively certain and visible, and they are tangible – in the sense that they are real and measurable. By contrast, the benefits of mitigation policies are long-term – for instance, reduced adaptation costs over many centuries and better conditions for prosperity. Admittedly, there may be some shorter-term co-benefits, such as better health outcomes, but future generations will be the main beneficiaries. Further, the benefits are much less certain and visible than the costs, and for the present generation, they are largely intangible (i.e. we enjoy few material benefits from adopting such policies). Where one generation incurs the costs while later generations enjoy the benefits, the goods can be said to be 'back-loaded' and are likely to be under-produced and under-consumed (Gardiner, 2009, p.147-8). In effect, we end up with 'intergenerational buck-passing' (ibid., p.148).

Note that the *cost-benefit asymmetry* is causally related to the *voting asymmetry*. It is, after all, one of the primary reasons why policy makers are reluctant to adopt effective mitigation strategies. Thus, the disjunction between the timing of the costs and benefits of action to combat global warming lies at the heart of the political economy of climate change.

Closely related to the *cost-benefit asymmetry* is the *interest group asymmetry*: the costs of mitigation are concentrated and fall mainly on powerful vested interests, most notably the

fossil fuel industry – and in New Zealand, the agricultural sector.³ By contrast, the potential beneficiaries of mitigation policies, including those who enjoy the co-benefits of such policies, are dispersed across the economy, other countries and over time. There is a well established literature on these kinds of interest group asymmetries. As Theodore Lowi (1979) and others have pointed out, where well-organized and concentrated interests are ranged against less well-organized and dispersed interests, there is a significant power imbalance. The policy implications of this are very simple: the concentrated interests will thwart and delay any governmental measures that are contrary to their perceived short-term interests. We have witnessed this so often in New Zealand and elsewhere. Over the past two decades both Labour and National-led governments endorsed a carbon tax. Yet all efforts to introduce one failed, as did the attempt to adopt a very modest tax on methane emissions – inaccurately dubbed the ‘fart tax’ by its opponents. And it took the previous Labour-led government almost nine years to enact an Emissions Trading Scheme, only to have it reviewed almost immediately by a new government.

The failure of governments to act more decisively and effectively in New Zealand is at least partly the result of vigorous lobbying by powerful interest groups, such as the Greenhouse Policy Coalition and Federated Farmers, together with the failure of much of the business community to think strategically and long-term. Notwithstanding the fact that this country has a science-led, agriculturally-based economy which depends for its success on a clean environment and the ecosystem services which this provides, the previous President of Federated Farmers, Charlie Pedersen, lambasted environmentalists as ‘arrogant, fear-mongering religious zealots waging war against the human race’ (quoted in Upton, 2009). The current President, Don Nicolson, said similar things in August 2009, arguing that New Zealand should have no emissions reduction target or policies to reduce emissions. Even more remarkable, having challenged the scientific evidence surrounding human-induced climate change, he audaciously proposed that the government should seek to boost overall spending on research and development from one percent of GDP to three percent by 2029. But why spend more on science if you have so little confidence in the findings?

Finally, but by no means of least importance, there is a significant *accounting asymmetry* – or, rather, asymmetries. There is no requirement for firms to include their impacts on the environment in their financial statements or for governments to include net changes in natural capital in the national accounts. Nor is natural capital integrated into mainstream economic analyses for policy purposes. In short, unlike financial capital, natural capital is not generally valued and accounted for.

The former British Prime Minister, Tony Blair, summed up the problem of climate change as follow:

³ Of course, in most cases the costs of mitigation will be passed on to consumers (via higher prices). But this in turn poses a further political problem. To the extent that the costs are visible, consumers will not unreasonably seek assurances that these costs are justified by the likely long-term benefits, and providing such assurances is not straightforward.

...the challenge is complicated politically by two factors. First, its likely effect will not be felt to its full extent until after the time for the political decisions that need to be taken, has passed. In other words, there is a mismatch in timing between the environmental and electoral impact. Secondly, no one nation alone can resolve it. It has no definable boundaries. Short of international action commonly agreed and commonly followed through, it is hard even for a large country to make a difference on its own. But there is no doubt that the time to act is now.

When one considers the four asymmetries and the related behavioural and coordination problems, it is not surprising that Professor Ross Garnaut (2008, p.xviii) concluded last year in his major report to the Australian government that ‘Climate change is a diabolical policy problem. It is harder than any other issue of high importance ...’.

Possible solutions

So, are there any solutions? Can the four asymmetries be overcome? Or are we confronting a so-called ‘wicked problem’? These are problems which are inherently difficult, if not impossible, to solve because of their sheer complexity, the range of interdependencies, and the fact that every proposed solution merely creates other serious problems. But even if we are dealing with a wicked problem, and thus have no prospect of a complete solution, there may still be scope for improving the situation. Moreover, there is no shortage of good ideas for correcting, or at least ameliorating the impact of, these asymmetries, many of which deserve close scrutiny (see Beckman, 2008; Hubacek and Mauerhofer, 2007). Briefly, the proposed solutions can be divided into six categories – global, constitutional, institutional, accounting, financial/economic, and other.

1. The *global* solutions include a new International Court for the Environment or a Court of Generations, a range of new international agreements and institutions, and new regional institutions like the European Union with powers to impose measures on sovereign states.
2. The *constitutional* solutions include inserting provisions into constitutional documents to protect the environment and future generations, strengthening the voting rights of the young, creating special parliamentary seats for organizations representing the environment and future generations, establishing second chambers with a mandate to represent long-term planetary interests, extending the term of parliament, and providing greater support for parties and advocacy groups speaking on behalf of diffuse, long-term interests.
3. The *institutional* solutions include the establishment of new governmental bodies charged with the role of being guardians of the interests of future generations, such as a Commissioner or Ombudsman for Future Generations, or bodies like the recently created Committee on Climate Change in Britain, established under the Climate Change Act 2008 (Boston, 2008).
4. The *accounting* solutions include: establishing genuine investment measures or ‘green’ GDP measures which reflect changes in the value of environmental goods

5. The *financial* or *economic* solutions include green taxes and subsidies, market-based mechanisms designed to internalize externalities, and new approaches to the ownership and management of natural resources – for instance, via an ‘eco-social’ property regime or a global trust fund.
6. The final category of solutions – ‘other’ – include educational campaigns to change voters’ time preferences and ecological understanding, and various regulatory mechanisms to promote sustainable development.

As will be evident, the various proposed solutions are intended to work in a number of different ways. These include: limiting national sovereignty; giving the judiciary the right to override legislation incompatible with the interests of future generations; reducing the powers of legislative majorities; strengthening the political voice of those who speak on behalf of nature and/or future generations; reducing the current presentist bias in policy making through new countervailing bodies; changing how nations and firms value their activities in the interests of transparency and more prudent decision-making, and developing a stronger link between socio-economic systems and ecological or biophysical systems. Cumulatively, the broad aim is to strengthen the incentives for wise stewardship of the Earth’s resources and enhance the capacity to hold decision makers, at all levels, accountable for the long-term consequences of their actions.

There is not the time here to explore each of the suggested solutions, but let me offer two general observations and then a few comments on several specific proposals.

First, there are no simple, one-off solutions to the four asymmetries or the global collective action problem, and we would be foolish to place too much confidence in any single policy instrument, whether at the global, regional or national levels. What is needed is a concerted effort on many separate fronts, using a combination of measures. In determining an appropriate strategy, we need to be mindful that some of the suggested solutions have already been tried in various jurisdictions – so there is at least some opportunity for policy learning and evidence-based decision-making.

Second, it is plain that some of the proposed solutions would be difficult and costly to implement, some are currently not politically feasible, and some would have significant deleterious effects. For instance, consider the impact of the various proposals on the democratic process: some would weaken democracy; some would merely change the political context within which the democratic process operates; while yet others would shift power to supra-national bodies – some of which would be moderately democratic,

others not at all. In my view, we should not embrace solutions which limit or undermine democracy; rather, we should seek measures that strengthen and improve our democratic institutions. There is no point, as Ludvig Beckman (2008, p.614) argues, ‘protecting the unborn from the consequences of our short-sightedness’ only to weaken ‘the power of future people to protect themselves’ or ‘rule themselves effectively’. The quality of democracy in the future should not be compromised. Against this, it should be borne in mind that catastrophic environmental degradation is likely to weaken, if not overwhelm, democratic institutions (see Dyer, 2008).

Institutional solutions

In terms of proposals to address the four asymmetries, one is the establishment (or strengthening) of independent advocacy or advisory bodies charged with representing the interests of future generations (e.g. via a specific focus on sustainability or environmental goals). For instance, Hungary established, via legislation, a Parliamentary Commissioner for Future Generations in 2007. The commissioner has many powers, ‘including the powers to review and propose legislation, to initiate administrative actions or judicial reviews of agency decisions, to order those illegally endangering the environment to stop their activities and restore the site they damaged, to evaluate proposed development projects...and to comment on and monitor international treaties’ (Science and Environment Health Network, 2008, p.17).

Likewise, as part of its far-reaching climate change legislation in 2008, the British government established a new, high-powered advisory Committee on Climate Change. This Committee is mandated to provide independent advice to the government on setting and meeting medium term carbon budgets and long-term emissions-reductions targets. It also reports to Parliament on the government’s progress in reducing emissions and achieving its carbon budgets, and conducts independent research and analysis (Boston, 2008). Other British institutions worth considering are the Carbon Trust and the Sustainable Development Commission. The Trust was established in 2001 as a government-owned company with the purpose of accelerating Britain’s move towards a low-carbon economy and develop commercially viable, low-carbon technologies. The Commission was established in 2000 and is now an executive non-departmental body that serves as an independent watchdog and adviser to the government on sustainability issues, scrutinizing governmental performance and monitoring progress.

New Zealand, of course, has had an independent Parliamentary Commissioner for the Environment (PCE) for more than 20 years (see Hawke, 1997). But the PCE is not well resourced and has modest powers. I do not pretend that increasing the resources of the Commissioner for the Environment would counter the imbalance in the power of current and future generations, but it would be a step in the right direction. There is also a case for establishing bodies like the Carbon Trust with specific pro-sustainability mandates.

Accounting solutions

Turning to the possible solutions to the current accounting asymmetries: there is a good case, in my view, for enhancing the quality and range of our non-financial measures of performance, both at the national and organizational level. This will help ensure that environmental impacts and other relevant considerations are more fully taken into account, and enable the interaction of the economy and the environment to be better understood. Providing additional information to citizens and stakeholders will also make it easier to hold policy makers and organizations to account for any environmental (and other) damage they cause. Further, a broader set of performance measures and indicators will help reframe how we measure 'success' or 'progress' and thus influence perceptions and behaviour.

There is already a substantial academic literature on how to improve our systems of environmental accounting and considerable analytical work has been undertaken through the auspices of the United Nations, the OECD, the IMF, the World Bank and other major institutions (see Bebbington, Brown and Frame, 2007; Boyd, 2007; Buhrs, 2009; Molissa and Wittneben, 2008; Nordhaus, 2006; Stiglitz Commission, 2009; United Nations, 2003). At the national level, a plethora of new, revised and complementary metrics have been proposed. These include measures of *genuine investment* – which incorporate changes in manufactured (or built) capital, human capital, natural capital, social capital, and the knowledge base – (see Arrow, et al., 2004), measures of net changes in natural capital and the quality of ecosystems, and various indices of economic growth that take into account the environmental consequences of that growth – such as a *green* GDP measure (and other departures from standard GDP measures). Locally, Statistics New Zealand (2009), in collaboration with other departments, has produced a sustainable development framework, and the various indicators employed within this are now part of New Zealand's official statistics. Thus far, however, such measures appear to have had little impact on the public consciousness or governmental decision making.

Interestingly, China undertook some pioneering analytical work several years ago, and published (in September 2006) a set of green GDP accounts for 2004 – compiled by the Chinese National Bureau of Statistics and the State Environment Protection Administration (see Chinese Government, 2006). The official report estimated that the damage due to environmental pollution was about US\$66 billion (NZ\$100 billion), representing about 3% of GDP. Although this was less than some independent estimates, the results were sufficiently concerning that the report for 2005 was apparently suppressed and government support for the green GDP methodology was withdrawn.

The original intention of the Chinese authorities was to assess the costs arising from the depletion of five types of natural resources – land, minerals, forest, water and fishery resources – and two types of environment costs – pollution (i.e. water, air, solid wastes and accidents) and ecological damage. But because of data limitations, the 2004 report covered only environmental pollution costs – and even then, only 10 of 20 identified pollution types. For instance, it did not include groundwater pollution or soil contamination. It was estimated that if all the discharged pollutants from point source had

been properly treated or disposed of during 2004, the cost would have been in the region of 7% of GDP.

Obviously, attempting to estimate and value natural resource depletion (or enhancement) and environmental damage (or restoration) poses large conceptual and methodological issues (see Arrow, et al. 2004). These include defining what is to be counted and determining how best to monetize environmental degradation (e.g. the damage caused by greenhouse gas emissions, the loss of species or objects of natural beauty, etc.). Measuring changes in the health or quality of ecosystems and the services they provide is, of course, equally challenging. Yet, if we do not seek to estimate such costs and benefits, there is a risk that they will be hidden or invisible. Environmental assets will thus be under-valued, and it will remain hard to quantify how current consumption is likely to affect future well-being. Worse, economic policy making will continue to be guided by particular metrics, such as GDP, which have significant limitations as indicators of economic performance or social progress.

There are of course many ways of altering our current national accounting systems to incorporate environmental considerations, each with its advantages and disadvantages, and each with its advocates and detractors. For instance, the relative merits of composite and complementary measures remains contested. Perhaps this is an area where New Zealand can demonstrate some leadership. After all, this country has been a pioneer in the field of public sector accounting, the field to which the late Professor Pallot contributed so much. In my view, the accounting profession has a particular responsibility to engage in the debate over how to improve our accounting systems, at both the national and organizational levels, so that they better reflect critical ecological considerations and values. It is heartening that some within the profession are already contributing to this debate; may this work prosper.

Conclusion

To conclude: Edmund Burke commented over two centuries ago in his *Reflections on the Revolution in France* (1790) that: ‘Society is indeed a contract ... a partnership ... between ... those who are living, those who are dead, and those who are to be born’ (quoted in Curtin, 1962, p.59). There is overwhelming evidence that humanity today is not keeping its side of the inter-generational bargain. Rather than bequeathing a flourishing and fruitful environment to those who will follow us, we are running up a huge environmental debt – a debt that will impair the quality of life on Earth and afflict billions of people for generations to come.

I have highlighted some of the causes of this unacceptable state of affairs, most notably four asymmetries that distort our democratic processes – to the grave disservice of the future inhabitants of this extraordinary planet. I have also outlined some possible ways of alleviating these asymmetries. I do not pretend that there are any simple solutions. But of this I am certain: we must change our ways and we must take our environmental and inter-temporal responsibilities more seriously. This will require new mechanisms for holding current decision-makers to account. Part of the solution lies in better and more

holistic ways of valuing our actions and their impacts. Amongst other things, we need accounting frameworks that more truly and fairly reflect humanity's ecological impacts. The accounting profession clearly has much work to do – exciting and important work, but also morally pressing.

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