9

Equity across Peoples and Nations

Tackling climate change, overcoming poverty, and promoting growth and development all require collaboration among peoples and nations. They require action over the short, medium, and long term. Sustaining the collaboration and commitment will in turn require some understanding and belief that all, or at least most, countries and groups are playing their part and that their strategies, actions, and outcomes are designed and carried through in a manner and spirit that are equitable. I argued in chapter 8 that equity was indeed a key element in generating both the ambition in overall and national action and the mutual trust and confidence that are crucial to international understanding and agreement.

Questioning of the equity in proposed arrangements has long been an obstacle in coming to international agreement and sometimes to individual countries intensifying their own action. It is therefore important in our theoretical and practical examination of obstacles to agreement to examine carefully the issues around equity. But first and foremost we should examine equity because it is the right thing to do. As we saw in part I, and as I have emphasized throughout, climate change is inequitable both in its origins—generally poor people have emitted and do emit less greenhouse gases—and in its impacts, as poor people suffer earlier and more severely from the impacts of climate change.

We begin in section 9.1 by examining the intratemporal ethical issues to which climate change gives rise, revisiting many of the common arguments between rich and poor countries. These have concerned responsibility for past emissions and who should do what and when about future emissions. Section 9.2 recaps some data on historical and

current emissions across key countries and groups of countries. Section 9.3 discusses where and when emissions reductions should take place according to different criteria, including notions of dividing up the carbon space. I shall argue that most of these notions do not stand up to close ethical or economic scrutiny, although I shall also argue that to dismiss ad hoc or formulaic approaches to equity is absolutely not to deny its importance: equity is indeed of fundamental importance in this context. Clarity on these issues is an important step in building equity into action. Section 9.4 examines ways forward, including further discussion of the concept of equitable access to sustainable development, and arguments around the future of growth.

9.1 The distributional ethics and the nature and scale of the necessary transformation

Many academic economists in rich countries jump quickly to the assumption that ethics and equity in the context of climate change concern primarily intergenerational issues, particularly discounting. On the other hand, when those in developing countries focus on equity in the context of public discussion and in international negotiations, the most prominent questions concern who reduces emissions by how much and when, and who contributes what in terms of finance and technology. The background to much of this discussion is that the rich countries got rich on high-carbon growth and are responsible for around half of the CO_2 emissions since the mid-eighteenth century.[1]

Many in the developing world argue that it is inequitable that they should make substantial cuts in emissions, and possibly slow their growth, when the difficult starting point is largely the responsibility of rich countries, and when those countries have the wealth and scientific expertise and technologies to pioneer new approaches. They argue: "Should not the rich countries first make drastic cuts themselves and bear the bulk of the extra costs the developing countries will have to incur to cut emissions?" Much of this language is embodied in the framework of the UNFCCC with its emphasis on "common but differentiated responsibilities."[2] Rich countries were responsible for meeting the "full incremental costs" incurred by developing countries in implementing those measures.[3]

It should be remembered that in the early 1990s, when the UNFCCC was negotiated, developed countries' share of world output was almost three-quarters[4] and their annual emissions were about half of the global total.[5] At the time the population in developed countries was around 1 billion in a world total of around 5 billion. The strong economic growth in developing countries over the past two decades has transformed that position: developing countries are now responsible for close to half of world output[6] and close to two-thirds of global annual emissions.[7] As developing countries, with currently around 6 billion people, grow more rapidly and fight to overcome poverty, they are likely to be responsible for the big majority of future emissions. However, their emissions per capita are still on average only about one-third to one-half of those of rich countries.[8]

Given the responsibility for past emissions, given that poor people are hit earliest and hardest by climate change, and given that all must be deeply involved if emissions reductions on the necessary scale are to be achieved, we should examine various ethical positions to see how they might help structure the policy debate and the framework of international understanding. The challenge is not simply to make interesting observations about ethics. Understanding by participants of what is or is not equitable will have, and has had, a profound effect on the negotiations and has shaped the potential for agreement and disagreement. Thus a clear discussion of the ethics and an understanding of the consequences of different positions is of great practical importance, both to the international discussions and to the perception of the right way to act by particular countries.

It is important in the context of this ethical discussion to understand the role of assumptions about the necessary scale and nature of the response in terms of emissions reductions, the kind of changes that are likely to be involved across the economy, technical progress and how it emerges, and the scale of the necessary investments and costs. A failure to understand the scale and nature of the response, and the process of dynamic learning which must be at its heart, has distorted the ethical discussion. In particular, a narrow formulation of the basic production processes, which models a transition to lower-carbon activities as simply switching to technologies with higher input-output coefficients and costs, leads to a framing of the discussion in terms of a permanent sacrifice of

living standards to protect the environment. It thus pushes the ethical questions toward "Who bears the incremental cost?" and can lead to a presentation of the issues as being largely about "burden-sharing."

"Burden-sharing" is a language and a framing of the issues much loved by international bureaucrats. But we know in economics that confining equity discussions only to the division of a pie can badly miss fundamental issues. Sadly it is often ministries of foreign affairs in particular that seem locked into such language, tending to conceive of the negotiations as a zero-sum game in which they must defend their interests. A more appropriate conceptualization of the challenge is to find ways of handling climate change that provide, and are understood to provide, very widespread benefits across peoples and over time. Given the nature of the problem and the potential attractiveness of alternative low-carbon paths for growth, development, and poverty reduction, we can do just that. The ethical issues must still be center stage, but they look very different and much less vexing if we carry that understanding of the nature of the problem into the analysis: on the one hand, this is about externality, market failure, and inefficiency on a massive scale, and on the other, the response is about discovery and co-benefits in terms of a more inclusive, secure, safe, clean, and biodiverse way of consuming and producing. There will be initiatives to be launched, investments to be made, and costs to be borne, and who does what and when matters greatly. But to focus relentlessly and narrowly on the notion of burden-sharing risks distorting and undermining both understanding and agreement.

We have seen in this book (particularly in chapters 2 and 3) that there is a way, different from burden-sharing, of understanding the transition which is both more accurate and more positive. It focuses first on the dynamic nature of the low-carbon transformation and its coincidence with a wider set of structural transformations occurring in the global economy, and second on the co-benefits of new and cleaner technologies over and above the benefits associated with reduced emissions. The first includes the learning and discovery that characterize industrial revolutions. In the coming two decades the context of the structural transformations in the world economy, including a continuing strong shift in the balance of activities toward developing countries, rapid urbanization, the large-scale building of energy systems, and intense pressures on land and resources, is of particular importance.[9] The co-benefits include things

such as cleaner air and water, more energy security, and more vibrant and productive ecosystems.

Understanding the transition in this way shows strongly that much of what is necessary on the low-carbon front is also very good for growth, development, and poverty reduction. Or to put it another way, if the great structural transformations are managed well, then much of what is necessary for the low-carbon transition can be achieved. And it also shows clearly that this is not a zero-sum game. The processes of transition will go much better with collaboration and if all are involved, to the benefit of all.

Such an understanding could radically reduce the risk of "free-riding," a notion much beloved both by game theorists (of the more simple kind) and by those who seek an excuse to do very little. As discussed in chapters 7 and 8, relative to the gloomy, free-riding view of the world, it is remarkable how many countries are willing to act without detailed international agreement; because they see the dangers, they believe it is responsible behavior to contribute to a response, and they see the attractions of an alternative path. The willingness to act is strengthened if there is an understanding of the measures that others are taking—better knowledge of what others are doing and discussing is a key factor in individual and mutual action.

We have examined in chapter 1 the emissions reductions which are necessary to achieve a 50–50 chance of holding to a 2°C increase relative to the nineteenth century. Global emissions have to be cut from around 50 billion tonnes CO_2e per annum in 2010 to below 35 billion in 2030,[10] and well below 20 billion in 2050—a factor of 2.5 between 2010 and 2050. That means, assuming population moves from around 7 billion now to 8 billion in 2030 to 9 billion in 2050, that global emissions per capita should diminish from around 7 tonnes CO_2e per annum in 2010, to around 4 tonnes in 2030, to around 2 tonnes in 2050. Thus if there are not many people below 2 tonnes in 2050, there cannot be many above—the average is the average.

Emissions per unit of output will have to fall by a factor of about 3 $\times$ 2.5 (roughly 7 to 8), if global output grows by a factor of 3 in the next 40 years (assuming an average global growth rate of 2.8% per annum). That surely implies change on the scale of an energy-industrial revolution, as was argued in chapter 2. The scale of change is such that no

major sector can be left out; and neither can any major country or group. It should be seen as a revolution involving radical change in how energy is used, and in the patterns of both production and consumption.

Energy-related activities are associated with around two-thirds of global emissions, and agriculture and deforestation with the bulk of the remainder. Within energy, it is possible that action on energy efficiency could cover close to half of what is necessary.[11] Many of the necessary technologies are emerging, and we see rapid progress in materials, building and construction, transport, and power generation. The interaction with rapid progress in biotechnology, material science, and information technology has provided great new potential in both energy and resource efficiency and alternative sources of power. There is likely to be much more to come, particularly with stronger investment in R&D. The story of a response on the necessary scale does not depend on some wonderful new technology coming out of nowhere (although, if past waves of technological change are a guide, the dynamic and innovative nature of the new industrial revolution implies that there will be great learning and that many unforeseen opportunities will indeed appear). Costs, and the direction and scale of investments, will depend on the path followed and the lessons it generates. There may be major advantages to the pioneers. Thus it is very difficult to assign an "extra cost" to specific emissions reductions in place A at time *t*.

These analytical difficulties and their sources, arising as they do from the potential of technological and organizational discovery, complicate any attempt to make specific calculations of how the costs of a given emissions reductions program will fall on different countries and groups. Such calculations are, for that reason, a shaky foundation for policy. They do not remove the relevance of economic and ethical arguments to policy analysis and international agreement: such agreements or understandings should indeed concern how rich countries should act in their own economies and what they should provide to developing countries in the reshaping of their economies. They do, however, influence how that discussion should be framed. The analytics should be focused on how poverty reduction and the necessary energy-industrial revolution can be fostered in an equitable way.

This is yet another example where the appropriate form of ethical and equity concepts and questions depends very sensitively on the basic

positive (as opposed to normative) economic structures that are used to understand the issues: in this case how we model the way the new low-carbon economic systems develop. It is crucial to keep the idea of a dynamic and radical transition and how it can be fostered at the center of the discussion, because that is the change demanded by a serious analysis of climate risks and the opportunities involved in a response of appropriate magnitude.

Casting the equity concepts on the back of one particular economic model of production may be profoundly misleading. Past UNFCCC discussions of these issues appear to have been tightly bound to a model where alternative production technologies, in particular a switch to low-carbon, are assumed to require a particular extra cost automatically. But to force the argument into that framework is to implicitly embrace a static model of production that is in conceptual and practical conflict with the type of change, investment, and learning processes at the heart of the policy challenge.

9.2 The basic cross-country data

As a background to the examination of equity across countries and peoples, it is necessary to have some data in front of us on relative recent and historical emissions. These are illustrated in figures 9.1 and 9.2 and tables 9.1 and 9.2, with figures for the main countries (largest emitter nations) for total emissions in CO_2e and emissions per capita for 2010. Figure 9.3 illustrates CO_2 emissions from 1990 to 2010, and figure 9.4 does so on a per capita basis over the same time period.[12]

China has firmly overtaken the US as the world's largest emitter (figure 9.1 and table 9.1) (we should recall that its population is around four times as large), and its emissions are rising. In 2014, China's emissions were probably more than 12 billion tonnes of CO_2e (table 9.1 shows the figure was around 10 billion tonnes for 2010).[13] The top 8 countries in emissions are China, US, EU (27), Russia, India, Brazil, Japan, and Indonesia. They are together responsible for close to 70% of total global emissions. They are all large countries in terms of population, output per head, and/or level of deforestation.

The story in terms of emissions per capita is very different (figure 9.2 and table 9.2, and figure 9.4). In 2010, the United States, Canada, and

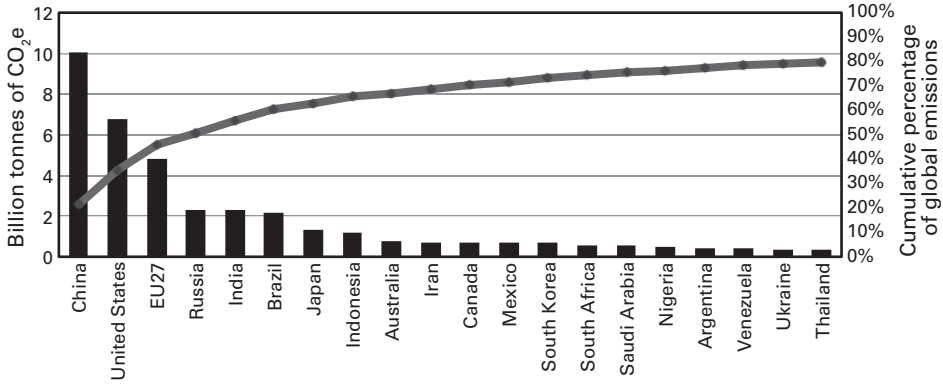


Figure 9.1
Top 20 emitters in 2010: total GHG emissions and cumulative percentage of global emissions. Source: Climate Analysis Indicators Tool (2013).

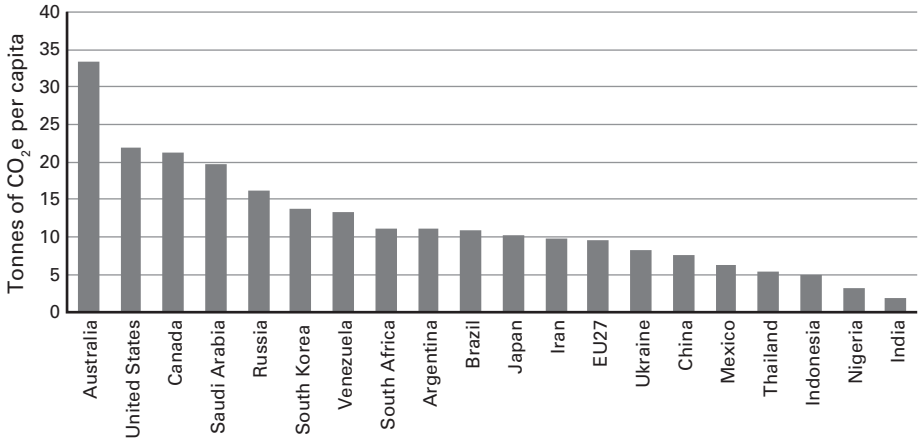


Figure 9.2
Top 20 emitters in 2010: ranked by GHG emissions per capita (including those from land use change and forestry). Source: Climate Analysis Indicators Tool (2013) for emissions, and World Bank (2013b) for populations.

Table 9.1
Data for the 8 largest emitters in 2010: total and percentage GHG emissions

Country	Billions of tonnes of CO_2e[a]	Share of global total (%)
China	10.08	21.37%
United States	6.77	14.36%
EU27	4.82	10.22%
Russia	2.32	4.91%
India	2.30	4.88%
Brazil	2.14	4.53%
Japan	1.30	2.75%
Indonesia	1.17	2.48%

Source: Climate Analysis Indicators Tool (2013).
[a] Including land use, land use change, and forestry.

Table 9.2
Data for the 8 largest emitters in 2010: GHG emissions per capita

Country	Tonnes of CO_2e[a]
Australia	33.38
United States	21.90
Canada	21.29
Saudi Arabia	19.75
Russia	16.27
South Korea	13.75
Venezuela	13.43
South Africa	11.20

Source: Climate Analysis Indicators Tool (2013) for emissions, and World Bank (2013b) for populations.
[a] Including land use, land use change, and forestry.

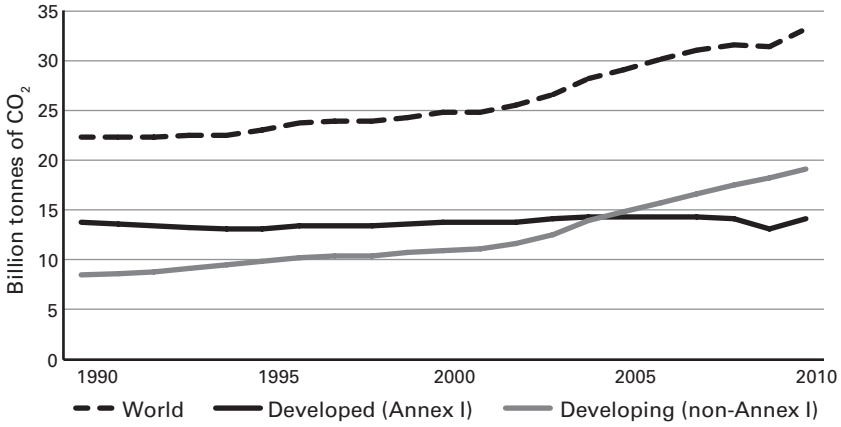


Figure 9.3
Total CO_2 emissions, 1990–2010: developed and developing countries. Source: Climate Analysis Indicators Tool (2013).

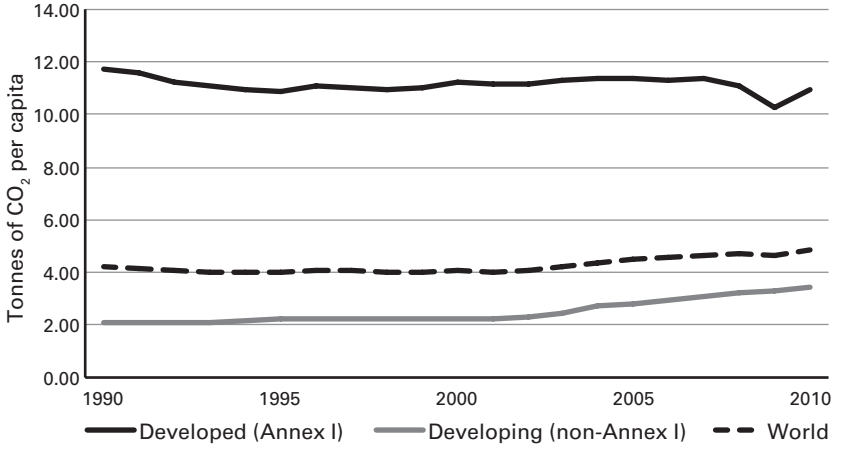


Figure 9.4
CO_2 emissions per capita, 1990–2010: developed and developing countries. Source: Climate Analysis Indicators Tool (2013) for emissions, and World Bank (2013b) for populations.

Australia were above 20 tonnes CO_2e per capita per annum, China around 8, India around 2, and many African countries between 1 and 2 tonnes.[14] Given the history of high emissions from the rich countries (and thus the use of "carbon space" in the past) and the finite carbon space that remains, it is understandable that the debate around equity, expressed in terms of who takes what of the space that remains—either in terms of actual emissions or in terms of rights to emit—is so intense. It can be seen in figure 9.3 that annual developing-country emissions overtook developed-country emissions in 2005, and in figure 9.4 that there was an acceleration in emissions per capita in developing countries from around 2000 as growth picked up and some passed through an energy-intensive phase of development. Emissions per capita in developing countries will have approximately doubled in the quarter-century 1990–2015, while those in developed countries will have fallen a little. Nevertheless in the middle of this decade some are still on average around three times as high in developed countries. There is of course great variation in emissions per capita within groups, as table 9.2 shows. China's emissions per capita are already likely around EU levels (see chapter 7).

Various calculations are available on the "remaining carbon space" on the basis of analysis of the kind described in chapter 1.[15] They point to figures in the region of 1,000–1,500 billion tonnes CO_2 for a 50–50 chance of holding temperature increases to 2°C—this is equivalent to about 40 times the current world annual emissions.[16] We have also argued that emissions per capita on average for the world must be around 2 tonnes CO_2e in 2050 for paths consistent with a 50–50 chance of 2°C, and that since there are unlikely to be very many people well below 2 tonnes, there cannot be many well above. But if actual emissions per capita must be clustering around 2 tonnes in 2050, we must not misunderstand this as an equity statement. It follows from the science of emissions and warming, from population forecasts, and from the basic arithmetic of averages—there are no ethical criteria in this calculation.

We must also be clear that there is a great deal to do after 2050. To meet a 2°C target, emissions would have to go on decreasing to zero or negative levels in global terms by the end of the century. However, strong action in the coming three or four decades will likely open up all sorts of discoveries and possibilities for the decades that follow.

It is clear that the world will have to take some tough decisions if it is to give itself a reasonable chance of holding to 2°C. On a path fairly central among those achieving 2°C, in 2030 the overall world budget for emissions would have to be below 35 billion tonnes CO_2e. As discussed in chapter 7, an early peaking and decline of China's emissions would be effectively essential for global efforts to address climate change: even if we assume, conservatively, that China's emissions will increase by only a further 3 billion tonnes in annual flows between now and 2030 (this would require a significant slowing in China's emissions growth), that would take China to around 15 billion tonnes in 2030 when the population may be around 1.4 billion (and thus to per capita emissions of 10 or 11 tonnes). If the US's total were then 6 or 7 billion tonnes and the EU totaled 3 or 4 billion, then in 2030 China, the US, and the EU might together total around 25 billion tonnes—that is a rough estimate of emissions from these three based on their announcements in October and November 2014. With an overall global budget of around 35 billion tonnes per annum around that time, that would leave perhaps 10 billion tonnes for the other nearly 6 billion of the 8 billion people in the world in 2030 (assuming the China/US/EU population totals a little above 2 billion people in 2030). That would require these 6 billion others to average little more than 1.5 tonnes per capita 15 years from now—a scenario very unlikely to be feasible.

The precision of these forecasts is not critical, but the implications are clear: combined China/US/EU emissions will have to be far lower than 25 billion tonnes CO_2e in 2030, our best guess based on current targets of these three, if a reasonable chance of 2°C is to be realistic. One can see in these figures the potential intensity of the debate on who does what and where, and how investment and technology are financed.

It is surely clear that (1) there is a great risk that the possibility of giving the world a 50–50 chance of 2°C will be lost, (2) all must be involved in strong reductions of emissions if we are to have any chance of achieving that target, (3) even if rich country emissions were zero in both 2030 and 2050, the per capita emissions of developing countries would have to be around 4–5 tonnes by 2030 and 2.5 tonnes by 2050; and recall that China is currently heading for 10–11 tonnes per capita in 2030. We can play with the numbers, but the message is clear: it is crucial that all countries, both developed and developing, recognize the broad arithmetic of the scale of necessary reductions, if an outcome is

to be achieved that is both effective in reducing emissions as required and equitable in its allocations and actions. Paris 2015 may not get us to total global commitments in the region of 35–40 billion tonnes of CO_2e, but plans for a strong raising of ambition should be embodied within it.

9.3 Where and when should reductions take place? Carbon space and rigid formulae

What sort of principles can we bring to bear in examining targets for countries or for people? A popular assertion is that it is equitable to have per annum "allocations," "quotas," or "permits to emit" which are equal for everyone, for example for 2050 around 2 tonnes CO_2e per person, or for 2030 around 4.5 tonnes per person (representing a CO_2e world budget of 35 billion tonnes per annum divided by an 8 billion world population) and similarly for intervening periods from now. Sometimes such arguments are augmented by looking at past emissions or at allocations for a period of several years or a few decades rather than a single year. Such arguments are examined in this section. I will conclude that the arguments for "equal per capita allocations" do not stand up to close ethical and economic examination and that this route does not look promising as a way to analyze the equity issues. But let me be clear that a number of key ethical and conceptual concerns about the arguments point to the conclusion that "equal per capita" allocations are not equitable enough, relative to some plausible ethical criteria.

Past international discussions have got locked into particular formulations of "common but differentiated responsibilities," of "full incremental costs," and of divisions into particular groups of developed and developing countries (see chapter 7). I will argue that it is time to break away from the narrow formulations and examine equity issues on economic and ethical bases which fit better to the outcomes and processes the problem demands, i.e., fostering the dynamics of the transition. Lest I be misunderstood, this is not an attempt to avoid or play down the equity issues. On the contrary, it is to take them very seriously indeed and integrate them into approaches that are founded in ethical principles and that take account of the scale and dynamics of the challenge.

There is at times some evidence that the arguments are moving in this direction. At the UNFCCC COP in Cancún in December 2010, on the

basis of language suggested by India the equity issues were summarized in terms of "equitable access to sustainable development." Giving meaning to this language offers an important way forward, and I shall return to the issue below. Further, at Cancún the 2°C target was adopted, and the idea of a Green Climate Fund endorsed. At the COP in Durban a year later, the gap between the total of current intentions across countries and the emissions necessary for a reasonable chance of 2°C was recognized, and the idea of an eventual common legal basis, applying to all countries, for emissions targets was accepted (see chapter 7). But the tensions over perceived equity issues remain intense.

Let us continue our discussion of equity by focusing on the common suggestion of an allocation of equal-per-capita quotas each year. While I shall be fairly negative about the logical basis for this proposition, its analysis helps illuminate some key questions. If such allocations were made and permits or quotas could be marketed, then low emitters, mostly poor countries, would be selling permits and rich countries would be buying. At \$30 a tonne of CO_2e (say) in 2030, the total value of a world asset totaling 35 billion tonnes CO_2e in 2030 (the world budget) would be more than one trillion dollars. World GDP then might be \$100–150 trillion. Thus it would be a total world asset that, while large, might be of the order of 1% of world GDP. If Africa had, on a population basis, 20–25% of the allocation, then the value of the allocation at \$200–250 billion might represent of the order of 20% of its GDP and would likely be a large multiple of foreign aid. And the carbon price might be, indeed should be,[17] far higher than \$30 per tonne CO_2e in 2030.

We must take care, however, in understanding how carbon markets might work. The price for marginal trades should be equal across countries and high enough to limit demand to the carbon budgets, if efficiency and effectiveness are to be achieved. But not all trades need take place at the marginal price.

The logic behind the assertion that allocations should be equal appears to be the claim that "there should be equal rights for each person to the atmospheric commons," where the size of the commons in each year is represented by the carbon budget. This is a story articulated by many, with varying degrees of rigor in the arguments offered.[18] The proposition clearly has some instinctive attraction.

The argument, at least in its simple form, has serious problems scientifically, ethically, and economically. Scientifically, equality on a flow basis makes little sense: it is the time path of concentrations that is of primary importance in determining warming and climate change. But if we switch to stocks, we find that equality which focuses on stocks or the sum of flows over a period of time raises very difficult questions of when the clock should start for the summation. Is it now, so that everyone has an equal share of the total remaining carbon budget (see section 1.4)? What is the relevant population, given that it has changed over recent history, and will change, differently in different places? Should there be accounting for past emissions? Is there a responsibility starting from when the problem was scientifically identified and embraced by the body politic? When was that—Fourier in the 1820s, the launch of the IPCC in 1988, the creation of the UNFCCC in 1992? Criteria based on equal per capita allocations clearly have deep conceptual and practical problems. Nevertheless, if we go down the route specified by this argument, it would be hard to argue in favor of a starting date later than 1992. The emissions by rich countries in the two decades since then have consumed a great deal of carbon space,[19] and, from most ethical perspectives, these past actions of emitting should have a bearing on moral responsibilities.

Ethically, the assertion of a right to the atmospheric commons is not an easy one to explain or justify. There are some who might argue that there is a right to development, a right to energy, or a right to shelter associated with basic human needs. These rights do have a reasoned basis,[20] and some are embodied in constitutions (as in South Africa). But these neither separately nor together imply a right to emit. There are no fixed coefficients between development, shelter, or energy on the one hand and emissions on the other. Indeed policy on climate change is in large measure about altering those coefficients.[21] Further emissions cause real damage to, and can kill many from, future generations. Is there a right to endanger life? As the late Prime Minister Meles Zenawi of Ethiopia put it (on Africa Day in Durban at the UNFCCC gathering in December 2011), "It is not equity or justice to foul the planet because others have fouled it in the past."[22]

If we change the language from rights to tradable quotas, then the issues look somewhat different: economically, the issues concern the

distribution of a new asset, perhaps of total value of the order of $1 trillion per annum in 2030. There is nothing in the economics of public policy that points to each person in the world being entitled to an equal share, say $125 for each person if there are 8 billion people in 2030. Most distributional frameworks in theory and in practice would point to poorer people getting more. There are some, implausibly in my view, who argue that allocation of quotas should be in relation to production (with some standard coefficient relating emissions to production). They invoke the idea that everyone should be at liberty to produce what they can and policy should focus on encouraging greater carbon efficiency in the sense of reducing emissions per unit of output. The efficiency aspects of the argument of this last sentence are not mistaken; what *is* illogical is to say that it implies that those who are richer, in the sense that they produce more, have a proportionally greater right to damage others through their emissions, in being entitled to quotas related to production; the argument about efficiency is silent on equity.

If one attempts a formulaic approach to allocations, in a standard context in welfare or public economics with a Bergson-Samuelson social welfare function, it might look something like the following. We could fix the starting date T_0 for "knowledge of problem" and total available resources for transfer payments as X (this can also be a choice variable). We could then fix the remaining pot of emissions as Y (although in some modeling approaches this might also be a choice variable), constraining the sum over i and t of y_{it}, emissions of country i at time t. Then we could set up criteria for evaluating how y_{it} and x_{it} (the compensation or transfer payment to country i at time t) should be determined as a function of X, T_0, and Y. In most simple models with concave social welfare functions (diminishing social marginal utility of income), we could not avoid the formal conclusion that allocation of the resources available for transfer payments should be largely to the poorest (for example, up to the point of equal social marginal utility of income). The allocation of a tradable emissions quota is essentially a transfer in this type of model.[23]

The argument of the last two paragraphs emphasizes the importance of avoiding seeing justice and rights only in terms of the one dimension of emissions (Simon Caney has termed such a perspective "isolationism").[24] Certainly most applications of the economics of public policy

(see above) would regard income and wealth as relevant to the allocation of emissions quotas. But while "isolationism" makes little sense—because we can recognize immediately some factors beyond emissions that are relevant to distributional allocation of quotas—we do encounter difficult problems when we go beyond it. Should rich countries be credited with their development of technologies? Should the British be credited with the Indian railways built under colonialism? If so, then what about the debts incurred and crimes committed by the British in the colonial period?

9.4 The danger of impasse and a way forward: equitable access to sustainable development

There have been various attempts[25] to create one-dimensional[26] "formulae for equity" along the lines just discussed, relating to past and current emissions. Generally they share key elements of the above formal structure and thus tend to point to "allocations of rights or permits" which are similar to equal per capita rights to the remaining carbon space, or still stronger in terms of allocations to poor countries.

One might try to invoke an argument that those places where emissions reductions can be made very cheaply should have a downward adjustment in allocation to avoid creating an "excessive rent" associated with the happenstance of their location or past. This reflects the reservations that arose when Russia received high allocations under Kyoto because energy usage in the former Soviet Union was so inefficient and allocations were in part historically based. The problem was referred to as "hot air": Russia faced no or negative cost in complying with emissions targets created in this way and had a lot of permits to sell. Interestingly there has been a disinclination to buy such permits on the grounds that they do not represent "real reductions"—i.e., one would be buying "hot air." This suggests that under Kyoto the emphasis was on finding efficient ways of reducing overall emissions by the necessary amounts, and getting international agreement via grandfathering existing allocations. Grandfathering embodies the notion of entrenched rights associated perhaps with costs of change or avoiding retrospective taxation. There appears to have been a disinclination to see the allocation of permits as, or to allow them to become, a large-scale method of income

distribution, particularly by those, often the richer countries, who saw themselves as potential losers.

I have argued elsewhere that global agreements on climate change should be "effective, efficient, and equitable" both as a matter of principle but also pragmatically if they are to be built and sustained.[27] The discussions around Kyoto and on "hot air" point to an apparent desire, at least by some countries, to have allocations and trading mechanisms focused on effectiveness (meeting the desired overall reduction targets) and efficiency (keeping the costs down). It seems that in those discussions, implicitly or explicitly, there was a mutual understanding, rightly or wrongly, that the subject of equity should be handled through some other mechanisms (or perhaps the rich countries thought it should have a very limited role). In a, somewhat weak, way this could be seen in notions of "common but differentiated responsibilities" and the split between Annex I countries with "binding" quotas and non-Annex I countries which were not obliged to take on quotas.

How should we evaluate this perspective or implicit understanding that equity should be separated from allocations of rights and tackled elsewhere? Standard second-best welfare economics says that if income distribution mechanics are constrained (for example by disincentive effects of income taxation or income-contingent transfers), then policies focused primarily on other issues, such as efficiency, should have their distributional impacts included in any assessment.[28] And this is revealed in practice to be important in public discussions of, say, energy or water pricing. In this public economics approach, if a new instrument emerges, such as the allocation of quotas, then its potential for improving income distribution should be regarded as an advantage.

That argument is technically correct and of substance. But in the case of cross-country transfers we already have mechanisms, used insufficiently in my view, to make transfers. The problem is that those in rich countries choose to make, via those mechanisms, only modest transfers as overseas development assistance. Sometimes issues such as corruption, ineffectiveness, or aid dependence are raised. Yet it seems reasonable to conclude that larger transfers are not made mainly because the people and political systems of rich countries do not want to make them. In other words, there is an underlying feeling that "I do not feel the obligation to give very much to poor countries" and "my sense of community

responsibility for inequality does not extend strongly to the rest of the world." If this is the case, as I think it is, we cannot expect agreement by those in rich countries to make large transfers, perhaps considerably larger than current or planned overseas aid, through another route. We can try the arguments about paying for past pollution, but the evidence of international discussion suggests they are unlikely to have strong traction. I write as someone who has tried, with very limited success, both the distributional and compensation arguments publicly and privately in international discussion. And I have observed the largely unsuccessful efforts of others.

We seem to have arrived at an impasse. Equity, at least if it is formulated in the rather mechanical and narrow ways we have discussed, via quotas and rights, is on a collision course with practical politics. Equity arguments and historical responsibility together point to allocations of emissions rights that would give large transfers to poor countries; yet rich countries are most unlikely to accept the arguments for so doing, or at least they will refuse to make the transfers, whether or not they acknowledge the validity of the arguments. The result, if we insist on acceptance and implementation of these rights and transfers before action by poor countries is agreed or implemented, will be the most inequitable of all—unmanaged climate change. However frustrating and unjust it may seem, there seems little sense in insisting on one narrow, and conceptually problematic, formulation of equity, i.e., via quotas, if such insistence is likely to lead to this outcome. Demonstrating that the equity case is very powerful (beyond an emissions per capita approach) does help show how deeply unattractive is the intransigence of rich countries—but a rigid and formulaic view blocks progress. While the poor countries have much the better of the argument on equity, the rigidity or intransigence of two groups (poor countries insisting on only one way of formulating equity, and rich countries calling it unacceptable) is holding hostage the future of the children of both groups and risks severe damage or destruction. And it is poor people who are at the most risk.

But there is a way forward. It is not to drop the equity criteria but to embed them in the twin ideas of rich countries embarking on a dynamic and attractive transition to the low-carbon economy in their own economies, and supporting that transition in the developing world as a policy

chosen by those countries themselves as a driver of growth and poverty reduction that is capable of becoming sustained. In other words, it is to give life to the idea of "equitable access to sustainable development" proposed by India and adopted in the UNFCCC agreement in Cancún in December 2010.

To do this we must start by being clear about six things: (1) the scale of the necessary emissions reductions; (2) that the transition to low-carbon requires radical change; (3) that it will have many attractive features beyond reducing climate risk; (4) that the next two decades, when the low-carbon transition must be strong, coincide with a strong structural transformation in the world and national economies in terms of changing balance of output, rapid urbanization, and so on, and that good management of the investments for the structural transformation (including avoiding waste, pollution, and congestion) will also provide a very powerful contribution to emissions reductions; (5) that the low-carbon transition is a sustainable growth story with great potential for overcoming poverty in the next few decades; and (6) that substantial investment resources and new technologies are required. As an attempt at high-carbon growth will self-destruct in the deeply hostile physical environment it is likely to create, there is little point in "equitable access to a train wreck." And neither should we try to make the transition to sustainable development by expecting poor countries to make the necessary investments without strong support in resources and technology.

"Equitable access to sustainable development" should start with what is necessary for a transition to a low-carbon economy, because that is central to sustainable development. An analysis of policies would focus on a dynamic public economics of change as described in chapter 3. This could start by analysis of some basic market failures: those relating to (1) emissions of GHGs; (2) R&D and the publicness of knowledge and discovery; (3) networks (electricity grids, broadband, public transport, recycling, and so on); (4) weakness in long-run capital markets in handling risks; (5) information on available goods and services concerning options, for example energy efficiency opportunities; and (6) co-benefits (reduced air pollution, energy security, biodiversity, safety, and so on). And it should be set in the context of the powerful structural transformations that are taking place in the world and national economies. If these are managed well, the low-carbon transition will be much easier.[29]

The "equitable" in "equitable access to sustainable development" would concentrate on the nature and type of support. It would be directly influenced by attitudes to discounting, risk, and inequality: the lower the pure-time discounting, the greater the risk aversion; and the greater the aversion to inequality, the more powerful are the ethical arguments for strong support by rich countries in resources and technology for the transition in poor countries. Research to provide evidence, structure, and life to the idea of "equitable access to sustainable development" should be of the highest priority. It will require the professional skills of economists, economic historians, political scientists, philosophers, scientists, engineers, and many others, and, critically, the involvement of business people, investors, and politicians. But as we research and think, we must also act. And we can describe the likely basic elements now—see below.

Let me note one perspective which sometimes appears here in order to put it to one side as unconvincing. There are some who might interpret the concept as requiring "zero growth," particularly in rich countries.[30] There are three aspects of this proposition that I find problematic or unconvincing: quantification, focus, and politics. Quantitatively, if all countries stopped growth now, our global emissions at 50 billion tonnes CO_2e per annum are, as we have seen, far too high to be consistent with avoiding dangerous climate change. It follows that the focus of attention should be breaking the link between production and consumption on the one hand and emissions on the other, and a zero-growth proposition could divert attention. Politically, if we try to turn this into a battle about growth rather than the nature of growth, or express it as an artificial race between growth and climate responsibility, the most likely outcome is that climate responsibility will lose. That would be the most inequitable of all outcomes.

Countries and people in the developing world will examine their own circumstances and opportunities and thus potential transition paths. And there is much the rich world can do to support analysis of what is possible, provide resources and finance, and develop and share technologies. In the process of examining both ethical underpinnings and opportunities for better growth and for poverty reduction, we will begin to define the meaning(s) of "equitable access to sustainable development."[31]

From the analysis that I have already offered here, the idea of equitable access to sustainable development should contain the following.

For all countries

- A shared recognition of the magnitude of the risks from climate change; the 2°C goal; the scale of reductions necessary to achieve that goal; and the need for global emissions to be in the region of 2 tonnes CO_2e per capita by 2050, for zero energy emissions in the second half of the century, and for zero emissions from electricity by midcentury.
- Accelerating the shift away from fossil fuel power generation, especially polluting coal-fired power generation.
- Removing fossil fuel subsidies.
- Halting the deforestation of natural forests, and investing strongly to restore lost or degraded forests and degraded agricultural land.
- A recognition that the next two decades are vital in determining whether the 2°C goal is within reach.
- A shared commitment to simultaneously promote economic development, overcome poverty, and manage climate change responsibly, and a recognition that these three goals can be achieved but that they require strong and wise investment over the next two decades so that the structural transformation in the world economy (particularly concerning urbanization, land use, and energy systems) is managed well, in a sense which includes promoting poverty reduction, efficiency, security, less congestion, less pollution, and a stronger environment and biodiversity. If it is managed well, we can achieve strong growth, radically reduced poverty, sustainable development, and a better environment and will move substantially toward a path that can achieve our climate goals.
- Designing, fostering, and expanding national and international financial institutions and development banks on the basis of these objectives.
- Working, with other countries, to create new technologies and ways of working and living that can promote both poverty reduction in all its dimensions and sustainability.
- Working to create an ambitious, credible, and equitable international climate agreement.

For developed countries

- Clear, ambitious, and credible commitments (including necessary legislation and institutions) to achieve at least 80% reductions in emissions

by 2050 (relative to a 1990 base), with stronger reductions for higher-emitting countries. Building these commitments into plans for cities, energy and transport systems, and land use, and encouraging cities and businesses to do the same.

- Investing strongly in energy and other relevant public R&D, with at least a tripling from current levels in the very near future. Fostering innovation throughout energy and agriculture. Creating strong examples of methods of reduction across the economy; the power of the example is of great importance here. Working to share technologies and know-how. Making innovation in energy-efficient and low-carbon technologies a very high priority in public discussion, esteem, and policies.
- Committing to end now the building of new unabated coal-fired power generation capacity, and to accelerate the early retirement of existing unabated capacity.
- Working to bring down the cost of capital for long-term investment in developing countries, particularly for infrastructure, via overseas development assistance, via multilateral institutions, and via regulatory and other reforms that can promote long-term private capital. This would include, at a minimum, measures to realize the Copenhagen-Cancún promises of flows of $100 billion per annum to developing countries by 2020.
- Through both finance and technology, providing support for the adaptation that will inevitably be required.

For developing countries

- Limiting new construction of unabated coal-fired power generation and halting new building of same by 2025.
- Investing in cities, energy systems, and land use with those goals in mind, with priorities for compact cities, energy efficiency, and public transport.
- Recognizing, discovering, and investing in methods and technologies that exploit the great potential in combining development, adaptation, and mitigation.
- Ensuring that the great potential for inclusiveness and poverty reduction in the new technologies and methods is realized.

• Working to share ideas, examples, and technologies, particularly with other developing countries.

These perspectives and methods would create a spirit, an approach, institutions, and policies that would provide a clear sense of direction, and incentives that could transform the environment for investment. With clear, consistent, and strong signals, the investment, innovation, and discovery will flow from the entrepreneurial spirit and creativity of people round the world. Of course, the above elements are expressed in fairly general terms, but they are, in my view, the key foundations and framework. If they are accepted in principle, and their essence included in any international agreement, then "equitable access to sustainable development" would find its way in different forms in different places. And it would be a driving concept throughout.

9.5 Conclusions

In summary, the lessons we have learned from this chapter are:

• It is both morally and politically important that international climate cooperation occur, and be perceived to occur, on the basis of equity across peoples and nations. Differences across nations in past discussions of international equity have slowed the pace of international cooperation.

• A failure to understand the scale and nature of the desirable response to climate change, and the processes of growth and dynamic learning which must be at its heart, has distorted those discussions. The prevailing assumption has been that the basic processes of decarbonizing necessarily involve a shift to (permanently) higher-cost substitutes. This has led to a misleading framing of international climate cooperation as being entirely about "burden-sharing" and a "zero-sum" and static game.

• With a better understanding of the potential attractiveness of alternative, low-carbon paths for more durable and better-quality growth, development, and poverty reduction, the cooperative challenge can be recast to focus on how to reduce emissions in ways that provide very widespread benefits to people over time. When recast in this way, the ethical issues are less vexing and the responses more constructive.

• A promising way forward is to base cooperative action around the notion of "equitable access to sustainable development," imbuing it with the following interpretation: rich countries undertake a dynamic and attractive transition to the low-carbon economy in their own economies, taking the lead in terms of emissions quantity reductions, innovation, and providing strong examples, and of support for similar transitions in developing countries through collaboration in the areas of finance, technology, and capacity-building.

More broadly, this part of the book has highlighted recent developments around the world. It has examined the progress in and state of the international negotiations and sketched possible ways forward for international climate cooperation. The survey of actions in chapter 7 demonstrated that there is already an enormous amount of climate action going on, and that there are many positive examples from which to draw inspiration and lessons. But it also showed that much more is needed, and that the international negotiations have not driven the type and scale of structural change that are urgently required. Learning lessons from what has not worked will be just as critical as following the examples of what has.

Drawing on such lessons, in chapters 8 and 9 I articulated broad institutional elements and ethical principles that could frame an international response to climate change based on a clear characterization of the task at hand. We require a radical transition to a low-carbon economy that will involve learning, discovery, innovation, and co-benefits. Much, though not all, of the low-carbon transition will be net beneficial within a country in terms of social and economic returns on investment, quite aside from the consequential reductions in climate risk. It can take place hand in hand with the wise management of the great structural changes taking place in the world economy, including in the international division of labor, in urbanization, in energy systems, and in land use. Strong, clear, and coordinated policies and investments, along with collaborative international efforts to develop and diffuse technologies, expand and improve finance, and share experience, can give reality to the idea of "equitable access to sustainable development."

Why Are We Waiting?

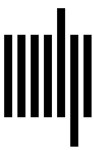
The Logic, Urgency, and Promise of Tackling Climate Change

By: Nicholas Stern

Citation:

Why Are We Waiting?: The Logic, Urgency, and Promise of Tackling Climate Change
By: Nicholas Stern
DOI: 10.7551/mitpress/10408.001.0001
ISBN (electronic): 9780262329200
Publisher: The MIT Press
Published: 2016

The open access edition of this book was made possible by generous funding and support from the author



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This book was set in Sabon 10/14pt by Toppan Best-set Premedia Limited. Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Stern, N. H. (Nicholas Herbert)
Why are we waiting? : the logic, urgency, and promise of tackling climate change / Nicholas Stern.
pages cm. — (The Lionel Robbins lectures)
Includes bibliographical references and index.
ISBN 978-0-262-02918-6 (hardcover : alk. paper)
1. Climatic changes—Economic aspects. 2. Climatic changes—Government policy. 3. Environmental policy—Economic aspects. I. Title.
QC903.S833 2015
363.738′74—dc23

2014039907

10 9 8 7 6 5 4 3 2 1