Sustainable Development: Promoting Progress or Perpetuating Poverty?
edited by Julian Morris
published by Profile Books, London, August 2002

Chapter 1

Reconceptualising Sustainable Development

Julian Morris

In early February this year, two colleagues and I were driven from Delhi to Agra to see the Taj Mahal. As we crossed the border of Uttar Pradesh we saw long lines of trucks simply waiting in line, doing nothing. Their drivers were hanging around smoking bidis. We were shocked. Then it struck me: sustainable transport. The truck drivers must have been given an edict that they should drive less, perhaps to conserve fuel or to reduce nasty emissions to the environment. I asked the driver. “No sir, not sustainable,” he said, laughing at the ridiculous Englishman. “The truck drivers must wait to pay a toll to cross the border.” “But we’re still in India” I protested, “You means they have *internal* tariffs here?” “Yes, sir.”

The term ‘sustainable development’ has been around for about 30 years but has only recently been popularised. It derives originally from the biological concept of ‘sustainable yield’ – that is to say, the rate at which species such as cod and elephants may be harvested without depleting the population. Starting in the late 1980s, environmentalists and government officials began applying the terms ‘sustainability’ and ‘sustainable development’ when discussing environmental policy. Thus, numerous measures aimed at conservation and pollution prevention have been justified on the grounds that they are necessary to promote sustainable development. More recently, and in light of the AIDS crisis in Africa, the interpretation of sustainable development has been broadened to include issues such as healthcare and education, the lack of which are seen as constraints on economic development.

The most common definition of the term derives from a report prepared for the World Commission on Environment and Development, which stated in 1987:

> "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[1]

So defined, sustainable development is, like motherhood and apple pie, not a concept to which many would object. It would take a perverse outlook indeed to support the idea that people’s needs should *not* be met both now and in the future. But, unobjectionable as it is in principle, the concept is sufficiently broad to allow various different interpretations. Indeed, a voluminous literature has sprung up debating its interpretation in periodicals with fancy names such as the *Journal of Sustainable Development* and the *International Journal of Sustainable Development*, which is not to be confused with the *International Journal of Sustainable Development and World Ecology*, or *Sustainable Development International*.

Most of this literature has focussed on identifying specific outcomes, such as controlling the climate or saving periwinkles, and then setting about developing policies intended to achieve those outcomes. Usually these policies require stronger systems of global governance (periwinkles are important).

An alternative interpretation focuses less on specific outcomes and more on increasing the chances of superior outcomes. It is the purpose of this chapter, first, to critique the conventional outcome-oriented vision of sustainable development and then to offer an alternative vision.

Unintended Consequence of Outcome-Oriented Sustainable Development Policies

Some environmental groups have claimed that rich countries are burning too many hydrocarbons (coal, oil, gas) and that this harms poor countries. In order to redress the balance, these groups demand a reduction in the consumption of hydrocarbons by rich countries. While such a policy would almost certainly reduce the differential in income and wealth between people in rich and people in poor countries, it would do so in the main by destroying wealth and reducing income of those in rich countries. The reason for this is twofold. First, energy is a basic factor of production, so increasing the cost of energy by mandating a shift to lower-carbon forms will reduce output. Second, hydrocarbons are used by consumers in all manner of applications, both directly, for example in cars and gas stoves, and indirectly, when they turn on their lights. So, reducing the availability of hydrocarbons will create energy poverty.

Although some middle-income countries might benefit from a shift in the location of industrial production, for the most part people in poor countries would suffer – those in the poorest countries, especially, because they have little industrial capacity. The reason is that reducing income in rich countries will reduce demand for all products, including agriculture, textiles, and apparel, which are the main products currently exported from poor to rich countries.

The likely adverse effect on the world's poorest people of constraining consumption of hydrocarbons by the rich is one instance of a more general phenomenon: the unintended effects of outcome-oriented policies that are justified on the grounds that they promote 'sustainable development'.

Consider the effect of the Basel Convention, an international agreement intended to prevent the illegal dumping of hazardous waste in poor countries. As Alan Oxley points out:

> "… restrictions on the export of used lead to India has undermined the formal lead recycling industry in that country with perverse environmental consequences. The formal recycling industry, which operates under strict environmental and health and safety regulations, requires high throughput of lead. Because of the relatively low levels of lead use locally, the industry requires imported lead in order to operate at a profit. The restriction on exports of used lead to India has led to the closure of a number of formal-sector lead recycling facilities, which became unprofitable. As a result, more of the locally-produced waste lead is now being recycled in the informal sector. These are unregulated backyard operations, which typically cause contamination of water and air, with adverse health consequences."[2]

Likewise, the ban on trade in elephant ivory, enacted under the Convention on International Trade in Endangered Species, probably does more harm than good by undermining incentives to conserve elephants locally. In Southern Africa, governments have, to a greater or lesser extent, decentralised management of wildlife. In many places in Botswana, Namibia, South Africa, Tanzania and Zimbabwe, local people receive a proportion of the income from hunting, eco-tourism and other economic activities associated with the wildlife with which they share their land. As a result, local people have become stakeholders in the wildlife management system and instead of seeing elephants and other wildlife as a threat they realise that by conserving them they are able to benefit. The ban on international trade in elephant ivory reduced the value of elephants to these people and thereby reduced their incentives to conserve them.

The UN Commission on Sustainable Development is outcome-oriented. One need only search for a few minutes on its website to find a hundred outcomes that it seems to favour – most of which seem, mysteriously, to involve global governance by … the UN.[3] In 2000, the UN issued *The Millennium Declaration*, which included a commitment to halve by the year 2015 the proportion of the world's population whose income is less than $1 per day.[4] Now, of course, such an outcome may seem laudable; reducing poverty and its accompanying misery *is* a good thing.

But several objections to this proposition could be raised. First, one could object that the outcome is far too modest. How can we accept that in 2015 there will still be 400 million people living on only a dollar a day? Second, one could object that the simply reducing the number of poor people is not enough. What happens to the people who were poor is important. Merely ensuring that they have $1.10 per day for a few years by sending them food packages or other forms of emergency aid is hardly much use in the long-run. Increases in wealth must be sustained if they are to be considered sustainable. This points to a general problem of starting with a desired outcome and then attempting to formulate an appropriate policy to achieve that outcome: all sorts of mischief becomes acceptable because the ends justify the means.

Good Intentions Are Not Enough

Good intentions are laudable but if good intentions were enough to alleviate poverty, malnutrition and disease, these dreadful problems would no longer plague us. Indeed the facts that more than 10 million people each year die of preventable or curable diseases and that 800 million people survive on less than $1 per day, are testament to the failure of good intentions – and the many billions of dollars spent in their pursuit.[5]

In July 1944, officials representing 44 of the world's nation states gathered in Bretton Woods, New Hampshire, for the United Nations Monetary and Financial Conference. At this conference, under the chairmanship of John Maynard Keynes, officials agreed to use money taken from taxpayers in the wealthier countries there represented to subsidise loans to the governments of the war-ravaged countries of Europe. To facilitate this operation, the International Bank for Reconstruction and Development (IBRD) and the International Monetary Fund (IMF) were set up with a mandate to make loans to governments. In 1949, following Harry S. Truman's Point Four Program, the IBRD and IMF began lending to the governments of 'developing' countries. Since then, hundreds of billions of dollars have been spent on 'aid', yet a balanced assessment indicates that, although there may have been a few benefits, on average it has caused harm. Graham Hancock, former East Africa correspondent for *The Economist*, noted over a decade ago:

> 'Garnered and justified in the name of the destitute and the vulnerable, aid's main function in the past half century has been to create and then entrench a powerful new class of rich and privileged people. In that notorious club of parasites and hangers-on made up of the United Nations, the World Bank, and the bilateral agencies, it is aid – and nothing else – that has permitted hundreds of thousands of "jobs for the boys" and that has permitted record breaking standards to be set in self-serving behaviour, arrogance, paternalism, moral cowardice, and mendacity. At the same time, in the developing countries, aid has perpetuated the rule of the incompetent and venal men whose leadership would otherwise be utterly non-viable; it has allowed governments characterised by historic ignorance, avarice, and irresponsibility to thrive; last but not least, it has condoned – and in some cases facilitated – the most consistent and grievous abuses of human rights that have occurred anywhere in the world since the dark ages.
>
> 'In these closing years of the twentieth century the time has come for the lords of poverty to depart.'[6]

Since then, there have been few signs that 'aid' is being put to better use.

Institutions for Sustainable Development

The reason transfers of financial resources from the governments of rich countries to the governments of poor countries have been largely unsuccessful in stimulating economic development is that lack of resources is not the primary problem in poor countries. Take the case of Nigeria, which happens to contain one of the largest oil deposits on the planet. The oil wealth in Nigeria has been controlled by government officials – until recently it was in the hands of the murderous kleptocrat General Sanai Abache – who used it to line their pockets and keep the politically important elite happy, rather than to promote development.

There is little point to pouring money into a country whose government has no intention to encourage economic development. Indeed, as Mengistu showed in Ethopia, Mobutu in Zaire, Pol Pot in Cambodia, and Idi Amin in Uganda, dictators will happily accept 'aid' if it helps to prop up their regime. In such cases, government-to-government transfers are not merely counterproductive, they are murderous.

The more fundamental problem is that 'aid' is based on a largely false premise, namely that poverty itself is a barrier to development. In general this is simply not true. Economic development in Western Europe did not require massive redistribution from the rich to the poor. Rather, it required a change in the structure of Europe's institutions; a move away from the Feudal system of the early middle ages to a trading economy.[7] Whilst Sub-Saharan Africa now appears to be facing a genuine crisis, in the form of disease that is destroying the economically productive sector of society, it is probably unique in the world (if not world history) in requiring external assistance to escape from such a quagmire. And even then, such assistance is unlikely to lead to significant growth; rather, it might prevent total economic collapse. If countries are to develop sustainably, institutional reform, not aid, is the solution.

But what do we mean by 'institutional' reform? Institutions are the framework within which people act and interact – they are the rules, customs, norms, and laws that bind us to one another and act as boundaries to our behaviour. Institutions reduce the number of decisions that we need to take; they remove the responsibility to calculate the effect of each of our actions on the rest of humanity and replace it with a responsibility to abide by simple rules. In a system in which rules emerge spontaneously and rules are selected by evolutionary processes, good rules will tend to crowd out bad rules. That is to say, over time, rules that result in better outcomes will be preferred to rules that result in worse outcomes.

Some rules are, of course, essentially arbitrary -- which side of the road to drive on, for example. Clearly a rule is required here, or the consequences would be fatal. But whether one follows the English rule, which is based on the fact that (right-handed) jousters would pass on the left, or the French rule, which is based on the fact that it is not English, is of no great consequence.

Other rules are not so arbitrary. For example, the rule that contracts should, generally, be upheld in a court of law has a very distinct consequence. It grants people greater certainty in their transactions with one another and thereby encourages such transactions to take place. If the rule were that contracts were not legally binding, the effect on commerce would be devastating.

In *The Other Path*, Hernando de Soto documented the plight of his fellow countrymen in Peru, most of whom were and are denied the formality of such law.[8] They must, instead, rely upon informal mechanisms to enforce contracts, property rights and other relationships.

Whilst such informal mechanisms – customs and norms, for example – work well for groups that are relatively homogenous and where there is little trade with outsiders, they impose significant constraints on the ability for groups to improve their lot. Societies that have adopted formal institutions – such as property rights, markets, contract law, tort law, trademarks, patents, copyright, and so on – have tended to do much better economically and socially than societies that have relied primarily on informal institutions.

Property Rights[9]

It is the institution of private property that, more than any other, has enabled people to escape from the mire of poverty. Property rights are capital; they give people incentives to invest in their land and they give people an asset against which to borrow, so that they might become entrepreneurs. As in Peru, the 700 million rural poor in India are not oppressed by multinational companies. Most of them have never even heard of multinational companies and those that have probably dream of working for them. No, the 700 million rural poor in India are oppressed by tenure rules which make it difficult for them to rent, buy or sell property formally. Land transactions typically involve paying large bribes to local officials, who have a vested interest in maintaining the status quo.

Property rights are created in order to resolve competing claims over resources. Thus, if 10 men all graze their cattle on the same piece of land and there are no rules governing how much each man can graze, then each man has a strong incentive to graze as much of the available land as possible. Under such a system – known as ‘open access’ – the cattle will quickly denude the land and, in the absence of free land on which to move the cattle, will die.

Historically, open access has been a rarity, occurring only when land is so plentiful that ownership is not necessary, or when people are prevented from owning property. In most cases, before the tragedy occurs, the users of the land would see the advantage of either dividing it up into individual plots or creating rules for using it that reduce the likelihood of denudation. In either case, the land has been privatised – made the exclusive property of one or more people. If the land is split into plots it becomes ‘several’ or ‘individual’ property; if the owners agree to common rules it is called ‘common’ property.[10]

Privatisation is expected to occur when the costs of exclusion (that is, the costs of limiting access to a piece of previously open land, for example by fencing and policing) are equal to or less than the external costs (which, in this case, means the costs associated with the denudation of the land).[11] But the costs of exclusion will depend upon the exclusion technologies available. Wherever there are externalities present (such as the threat of encroachment by cattle belonging to other ranchers), users would have an incentive to produce new and cheaper exclusion technologies. So, over time, we would expect more and more land to become privately owned and the sum of external costs to decline precipitously.

Land that is owned privately (whether individually or in common) will in general be better managed than land that is unowned or owned by the state. This is because the owner(s) know that they will reap the benefits from any investments made in the land, so they have stronger incentives to make those investments. Going back to our cattle-rancher example: those who graze more cattle than their land can support will soon cease to be cattle ranchers. That creates a strong incentive to discover the ‘carrying capacity’ of the land – and to increase it through new technologies. Entrepreneurial peasants constantly introduce new crops and production methods, creating an environment of diverse agriculture.[12]

Technological innovation not only enables peasants to improve their lot, it also benefits those with whom they trade by lowering the cost of purchasing food and other goods and reducing the risk of famine. But such innovations will be stifled if those who might innovate new technologies are not allowed to benefit from the investments they make through the ownership of property. The individual's *incentive* to *invest* in his land and *innovate* new methods of production will be greater when he can *own* and *exchange property*. Thus, Michael Stahl concludes:

> 'At the farm level, the presence or absence of clearly defined property rights makes the difference between active interest in investing in soil conservation measures or apparent indifference to environmental degradation'[13]

Individual property rights also encourage pollution prevention. In the English common law for example, if the owner of property A emits a substance that causes damage to property B, then the owner of A must compensate the owner of B for the harm caused.[14] Thus, even at the height of the industrial revolution a smelting works in an industrial area was enjoined for causing damage to shrubs and trees on a nearby property.[15] There remains an ancient maxim, *sic utere tuo ut in alienum non laedas*, roughly translated as "so use your own as not to harm another." Widely applied in the courts of law this rule would protect not only the property of the owner but also neighbouring properties and even the environment – and society – as a whole. However, the maxim has not received sufficiently general application, mostly because states have stepped in and asserted that the polluting activities should continue because they are in the general interests of mankind.

Property also begets wealth. Once a person owns property, he or she can use it as collateral against a loan. Because such collateral gives the lender security, they will be willing to offer loans at lower rates. So property reduces the cost of becoming an entrepreneur.

Of course, some of these entrepreneurs will fail and they may have their property repossessed by the lender. But at least they will have had the opportunity to try to escape from poverty and, of course, most will be no worse than if they never had the property in the first place. In any case, many will succeed in their endeavours. Some may become wealthy; most will simply be less poor.

Intellectual Property Rights[16]

Another institution that encourages innovation is intellectual property. In 1474, the Venetian Republic enacted a law that entitled inventors to a temporary exclusive right to profit from their inventions. Later such laws were adopted widely throughout Europe and North America. In some cases the laws have been abused, but for the most part they have been very beneficial to humanity.

Strong, readily enforceable intellectual property is particularly important for those products and processes that require large investments in research, development and marketing but for which the costs of copying are relatively low. Chemicals, pharmaceuticals, and biotechnology each rely heavily on patents. The music, film, book, art and software industries each rely heavily on copyright. Meanwhile, all manufacturers and sellers of brand goods (which is most manufacturers and most sellers) rely on trademarks and servicemarks to guarantee the identity (and hence brand-associated characteristics) of products.

There are of course drawbacks to IP, including temporarily higher prices of the protected goods, a reduction in the number of goods directly derived from those that are patented,[17] the legal and administrative costs involved in enforcement, and so on.[18] These drawbacks have led several commentators to conclude that patents and other forms of intellectual property are not desirable. However, the problem with focussing on these drawbacks is that in doing so one often forgets that the inventions and creative works might never have come about but for the existence of IP.

It is all very well to criticise the excessively broad application of patent to the internal combustion engine or aeroplane wing control (which was patented by Orville Wright) but if there was no patent protection how much longer would we have had to wait for the car and the aeroplane? Perhaps more importantly, without the stimulus of patent protection, would we have had all the wonderful synthetic chemicals and pharmaceuticals that make our lives and the lives of our loved ones so much better? Without copyright protection, would we have enjoyed the explosion of music, art, literature and film that we have experienced over the course of the past century? Without trademarks and servicemarks, how much more complicated would our lives be, constantly battered with confusingly similar marks?

In sum, were we to abandon or significantly diminish our system of intellectual property rights, we might gain in the very short term through lower cost products, but the cost in the medium to long term would be felt in terms of fewer products, as well as higher expenditures on trade secrecy and other means of protecting knowledge, which might well increase the cost of products.

Freedom of Contract

Another fundamental institution for sustainable development is freedom of contract. This includes both the freedom *to* contract – the freedom to make whatever agreements one desires, subject to fair and simple procedural rules – and the freedom *from* contract – the freedom not to be bound by the decisions of others. Freedom of contract is a fundamental part of the freedom to associate with others. It includes the freedom to transact – to buy and sell property – and as such it is an essential adjunct to the right to clearly defined and readily enforceable property rights.

The freedom to contract enables people to bind themselves to agreements and thereby creates greater legal certainty. This in turn encourages people to engage in trade and investment. Armed with enforceable property rights and contracts, the peasant becomes a merchant.

The freedom from contract prevents others from attempting to interfere with one's right to engage in exchange. Sadly, governments rarely respect the rights of parties to freedom from contract. Restrictions on trade abound in every country in the world. As I pointed out, in India they even have tariffs on the borders, where trucks can wait for days while their drivers pay a small fee (Uttar Pradesh charges 160 rupees – about three dollars). The delay comes from the drivers having to go backwards and forwards filling out ridiculous forms. And as they wait, their loads rot or are stolen. Such interventions are truly unsustainable: they waste capital (the trucks and goods lie idle), and they waste good food, which in turn reduces the value of perishable agricultural goods, and keeps farmers poor.

The Rule of Law

Property rights and contracts are nothing if they are not enforceable. And enforcement is only possible if there are courts wherein disputes over the rights and duties of parties may be resolved and a legal system that will enforce those judgements. There are two key issues of concern here: the first is the willingness of the state to permit competition in the provision of legal services; the second is the enforcement of whatever decision is made.

When the state exerts a monopoly on the provision of law, the costs of resolving disputes through the formal judicial system are typically large. The costs of such dispute resolution can, however, be dramatically reduced if people are able to resolve their disputes privately, for example through arbitration. However, for such arbitration to be enforceable, the courts must accept the rights of parties to settle disputes by arbitration. This is essentially a matter of freedom of contract: if parties contract to have their dispute settled by arbitration then the courts should only get involved if that contract is breached. Sadly, in most countries the courts have resisted this – presumably because they see it as a threat to their power.

The second issue, enforcement of decisions, requires the existence of a credible system of sanctions. One of the reasons rich countries have been able to become rich is that the police and the administrators of criminal justice are generally trusted and are trustworthy. That is not to say that they are free from corruption; rather, that the level of corruption is small in comparison to the levels of corruption in many poor countries. In Indonesia, for example, it is common for criminals to use a combination of threats and bribes to ensure that they stay out of jail. Similar problems exist in many other countries. In Nigeria and South Africa, people have so little trust in the police that they employ private security agencies. In South Africa these seem on the whole to be rather reliable. In Nigeria they are no doubt better than the police – if you can afford them – but they also run scams, stealing from the very houses they are supposed to protect.

Decentralised Decision-Making and Sound Science

If government is to intervene in the actions of the citizens, there must be both a strong justification – the benefits must outweigh the costs – and there must be in place mechanisms to ensure that poor decisions can be changed.

Space does not permit a discussion of how in practice costs and benefits would be estimated. Needless to say, however, decisions must at the very least be informed by sound science – that is science which has undergone a rigorous process of peer review.[19]

To prevent mistakes being perpetuated, decisions must be reviewable. Given the difficulties associated with reviewing legislation, that probably means building in redundancy: legislation should perhaps have a sell by date of two or three years after which it must go through the same process of assessment to decide if it is still justified.

In addition, decisions to limit human activities should be taken at the most local level possible. But must be bound by the other principles that prevent abuses of local power. Those principles are mostly contained within the other principles already adumbrated, such as respect for property and freedom from contract.

Generally speaking, state bureaucracy should be avoided because bureaucracies have a tendency to expand and to create justifications for expansion. One way to deal with this would be to contract out all government services.[20]

Towards Good Governance for Sustainable Development

This combination of property rights, freedom of contract, the rule of law, decentralised decision-making and sound science provides the basis upon which sustainable development can take place. In short, they represent good governance. Sadly, as subsequent chapters in this book attest, few countries have come close to instituting such systems of good governance.

The challenge for those eager to see the world become a more sustainable place is clear: stop squealing about the importance of global governance and instead promote good governance.

References

Alchian, A. (1965): 'Some Economics of Property Rights', *Il Politico*, Vol.30, pp.816-29, reprinted in Alchian, A. (1977): *Economic Forces at Work*, Indianapolis: Liberty Press.

Anderson, T.L. and P.J. Hill (1975): 'The Evolution of Property Rights: A Study of the American West', *Journal of Law and Economics*, Vol.18, pp.163-75.

Ault, D.E. and G.L. Rutman (1979): 'The Development of Individual Rights to Property in Tribal Africa', *Journal of Law and Economics*, Vol.22, pp.163-82.

Barzel, Y. (1989) The Economic Analysis of Property Rights, Cambridge: Cambridge University Press.

Brookfield, H. and C. Padoch (1994): 'Appreciating Agro-diversity', *Environment*, Vol.36, No.5, June, pp.6-11, 37-45.

Besen, S.M. and Raskind, L.J. (1991). "An Introduction to the Law and Economics of Intellectual Property," *Journal of Economic Perspectives*, 3(1), Winter 1991, pp 3-27.

Cole, Julio H. (2000). "Patents and Copyrights: Do the Benefits Exceed the Costs?", *paper presented at the Mont Pélerin Society*, Santiago, Chile, November 12-17.

de Soto, H. (1989): *The Other Path: The Invisible Revolution in the Third World*, New York: Harper and Row.

Demsetz, H. (1967): 'Toward a Theory of Property Rights', *American Economic Review*, Vol.57, pp.347-59.

Hardin, G. (1968): 'The Tragedy of the Commons', *Science*, Vol.62, 13 December, pp.1,243-48.

Hancock, G. (1989): *The Lords of Poverty*, London: Macmillan; New York: Atlantic Monthly Press.

Morris (1995) *The Political Economy of Land Degradation*, London: Institute of Economic Affairs.

Morris, J. Mowatt, R., Reekie, W. D., Tren, R. (2002) *Ideal Matter: Globalisation and the Intellectual Property Debate*, Brussels: Centre for the New Europe.

North and Thomas (1972): *The Rise of the Western World*, Cambridge: Cambridge University Press.

Ostrom, E. (1988): 'Institutional Arrangements and the Commons Dilemma', in V. Ostrom *et al.* (1988), pp.101-39.

________ (1990): *Managing the Commons*, Cambridge: Cambridge University Press.

Ostrom, V., D. Feeny and H. Picht (eds.) (1988): *Rethinking Institutional Analysis and Development*, San Francisco: ICS Press.

Schlager, E. and E. Ostrom (1992): 'Property-Rights Régimes and Natural Resources: A Conceptual Analysis', *Land Economics*, Vol.68, pp.249-62.

Stahl, M. (1993): 'Land Degradation in East Africa', *Ambio*, Vol.22, No.8, December, pp.505-8.

Wade, N. (1974): 'Sahelian Drought: No Victory for Western Aid', *Science*, Vol.185, 19 July, pp.234-37.

WCED (1987) *World Commission on Environment and Development: Our Common Future*, Oxford: Oxford University Press

[1] WCED (1987), p. 43.
[2] PAGE REF IN FINAL TEXT

[3] http://www.un.org/esa/sustdev/index.html -- Accessed 12 June 2002.
[4] UN General Assembly resolution 55/2, para. 19. New York: United Nations.
[5] The following description is taken from Morris (1995).
[6] Hancock (1989), pp.192-93.
[7] North and Thomas (1972)
[8] De Soto (1989)
[9] Portions of this section are taken from Morris (1995)
[10] The meaning of 'private' property should be clarified: in the sense in which it is used here, private property means property for which an identifiable person or group of people is (are) the principal 'residual claimant(s)', see Barzel (1989). Residual claimants have a right to any good produced by that property, and are liable for any externalities generated. Many fascinating alternative mechanisms for managing property, especially where individual rights are difficult to delineate, are discussed in Elinor Ostrom (1988, 1990) and Schlager and Ostrom (1992).
[11] Alchian (1965); Demsetz (1967); Anderson and Hill (1975); Ault and Rutman (1979).

[12] Brookfield and Padoch (1994).
[13] Stahl (1993).
[14] It is necessary only for the owner of B to show that this physical harm was most likely the result of the pollution emanating from A. However, it must be shown that the damage actually exists or is imminent; otherwise there is only the potentiality of an action, not an action as such: *Pemberton v Bright* [1960] 1 WLR 436.
[15] *St Helen's Smelting Co v Tipping* (1865) 11 All ER 1483.
[16] The following is drawn from Morris et al. (2002).
[17] "If later innovators cannot freely build on the work of others, or must pay to do so, they may be less likely to engage in inventive activity themselves" (Besen and Raskind, 2001)
[18] For example, the legal fees arising out of a battle between Kodak and Polaroid cost Kodak $100 million (Cole, 2000).
[19] It is important to distinguish here sound science from consensus science. Often interest groups on both sides of a particular argument will say that so many thousands of scientists have said X. Whilst such statements probably persuade a certain section of the public, they rarely reflect the very real disputes which exist in the scientific literature. Ensuring that these disputes are taken into consideration is not an easy task – but forcing 'consensus' is no solution. In addition, any cost-benefit analysis must consider the opportunity costs of diverting resources towards one action rather than another. So, for example, if one believes that the global climate will warm by two degrees Celsius by the year 2100 and that the cost of this will be 5 per cent of total world output, then before taking action to prevent this harm one should calculate what the cost of taking action will be. If it turns out that no action can be taken that reduces world output by less than 5 per cent, then it would be folly to take any action.
[20] Of course, strict rules would be necessary to prevent abuse of power, such as a requirement that all tenders be clearly specified and bids be considered strictly on the basis of conformity with hurdle-type criteria and cost.