

Equity and sustainability – Peoples, time and place

or who is Captain Subrim, when and where did he live, work and holiday and will the little Subrimas and Subrimos say thank you Granddad for your stand on sustainability or drat we would rather have had the cash

Stephan Jefferis

This 'Discussion Piece' reflects on some of issues that have concerned me over the last year and especially the last days of December 2004. The intention is not to provide fully worked arguments but ideas that can be referenced and developed by others.

The Boxing Day tsunami brings into focus the devastating power of natural forces and reminds us that sadly this is just the most recent of many massive natural disasters. As member of the SUBRIM consortium, I pause and contemplate the message it brings for equity and sustainability (I separate equity and sustainability as I am not sure we yet see them as coterminous).

We are all familiar with the Brundtland report and the oft quoted lines regarding sustainable development: 'development that meets the needs of the present without compromising the ability of future generations to meet their needs'. However, we are perhaps less familiar with the lines from the report: 'even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation'.

If sustainability requires a concern for equity and thus moral obligations within and between generations, how should we react to events such as the tsunami? Clearly immediate issues must be addressed by rapid deployment of aid but what about the longer term consequences and the prevention of future disasters? The time-scales between such major events may be long and they may affect diverse peoples in diverse places. It follows that, actions or inactions in one generation can affect much later generations and at remote locations.

The tsunami on Boxing Day was, we hope, a rare and extreme event. However, we can be sure that there will be future disasters. What should we do today about future major disasters? Actions we can take include:

- a) putting in place early warning systems;
- b) spending more now to ensure that structures for the future are more resilient and better protected;
- c) setting up trust funds so that resources are immediately available to future generations should these generations not have sufficient funds.

Clearly (a) early warning systems is a rational response and rapidly deployable – though making a system work may be complex especially as we now know that warnings could have been given that could have reduced the death toll had the key links been made. A more developed system will be complicated by the need for cross-national cooperation and management. Even with a system in place, warning times may be short and the costs of maintaining population awareness for rapid response will be considerable especially as memory fades and the terrible recent events merge into history. Furthermore, the cost of false alarms will be substantial.

As an example of the need for community preparedness one is forced to consider the people of Naples should there be a major eruption of Vesuvius.

Economists generally regard option (c) as impracticable. We cannot bind future generations and anyway they may be wealthier than we are (many economic models consider that man is capable of ever growing inventiveness and that this will lead to growing utility but this is not a given – especially if, as some predict, there are significant negative economic effects of global warming and other anthropogenic damage). Are there any examples of multigenerational funds disaster aid funds, beyond say the close daughter, granddaughter (son, grandson) empathetic distances? If economists doubt the practicality of option (c), one could ask why even consider it? The reason is that it provides an important baseline for the analysis of that class of environmental problems where we enjoy the benefits today but the harm will fall unequally on peoples at remote locations several generations from now. For example, the use of fossil fuels produces global warming, the major impacts of which may be felt two or more generations from now by those living in the third world, who will not only be more numerous than those who enjoyed the benefits but also will live in more fragile structures in areas which are more at risk. Option (c) makes us think about peoples, time and place.

Option (c) also demonstrates the power of compound interest. For example, on economic grounds a spend of more than £1.2 million pounds today would not be justified to prevent a £1 billion disaster a hundred years from now (using the USA Office of Management and Budget mandated discount rate for goods of 7%). Of course the corollary of this is that if we can achieve so much for the future for so little outlay today why not just be unselfish and do it? The answer is that it may not be Pareto efficient. Future generations might benefit more from other applications of the funds today.

This raises the question of appropriate use of resources – a key issue for sustainability. In my view, sustainability is not just about natural resources, we must apply the Brundtland tests to all the capitals we pass on and attempt to maintain some balance. These are Hawken et al (1999):

- human capital, in the form of labour and intelligence, culture, and organization;
- financial capital, consisting of cash, investments, and monetary instruments;
- manufactured capital, including infrastructure, machines, tools, and factories;
- natural capital, made up of resources, living systems, and ecosystem services.

My acceptance of the need for balancing of capitals implies that I adopt the tenets of weak sustainability and accept that natural capital, at least to some extent, can be substituted by the other forms of capital.

The above discussion identifies some of the bounds that must be considered for option (b). Large outlays on infrastructure assets which are likely to benefit only future generations and which are of minimal recoverable value may mean that the balance of the four capitals we pass on becomes skewed (i.e. we pay for it all today, get no benefit, future generations may benefit if it is still relevant but will recover nothing if they scrap it). The classic example of a major expenditure with little recoverable asset value (recoverable by future generations if they scrap the asset) is nuclear waste disposal. There is little recoverable value in a deep hole, concrete, grout and clay.

However, a repository should provide protection for many generations to come should these generations need it but the present generation will have paid for it. Similarly a tsunami proof structure would bring little benefit today if the next tsunami were a hundred years hence. Also it may have little value to future generations if alternative risk mitigation procedures have been adopted. Is the role of SUBRIM to produce cities which are prepared against natural disasters and where this preparedness has value now as well as in the future, i.e. cities that balance the benefits for peoples today and those of future generations?

This question is also germane to contaminated land remediation. Recently I set out to investigate whether the steps involved in a Life Cycle Assessment could be applied to sustainability assessment (Jefferis, 2005). I found that whilst the rigour of an LCA analysis and the steps that it involves can inform sustainability analyses it is clear that LCA is neither a necessary nor a sufficient test for sustainability. Note: as the paper is yet to be published I welcome comments on it.

In 2001, I wrote a keynote paper for a conference in Rio in 2002 in which I addressed the issue 'Can we identify sustainable remediation techniques for contaminated land?' (recognising that I was in Rio ten years on from the 1992 summit). Please note that this paper does not include an acknowledgment to SUBRIM as it predated SUBRIM by some considerable time. In Section 3.1 of the paper, I considered some risk-benefit tests for contaminated land remediation. I subsequently developed a fuller set of criteria (see early SUBRIM emails) and these were carried over into one of the SUBRIM work packages. I mention the authorship of these ideas because I want to make it clear that they were tests of risk to receptors not of sustainability. If LCA is neither a necessary nor sufficient test for sustainability, it follows that the tests based on summed risks are also neither necessary nor sufficient. The summed risk approach helps to identify who are the winners and the losers and to develop the conceptual model for a site but not the sustainability of a remediation process. Furthermore, times have moved on, if impacts are to be assessed, LCA can give a more rigorous picture and one that can be more readily assimilated into current sustainability analyses – although this requires a different framework than that required for risk based tests. LCA techniques are sufficiently widely available and codified that they can be applied to the remediation of contaminated land should their rigour be required and the issues presented by contaminated land remediation be of sufficient significance in the broader industrial ecology of land development. NB if LCA is applied great care will be needed in defining the goal & scope, the system boundaries, the functional unit and the timeframe – some remediations may be permanent, others such as containment or stabilisation may require maintenance or replacement.

If LCA and risk summations are neither necessary nor sufficient tests, we still need procedures for evaluating the sustainability activities with impacts over long time-scales and to achieve equity between peoples – that is to address the issues of peoples, time and place. For example, the benefits of clean-up will include increased land value and the value attributable to the use of the land over succeeding years. The costs will include the immediate costs of the works and also the liabilities that remain, for example, if the contamination was not or could not be completely destroyed and it was placed in a landfill. Costs then may fall on those who own or manage the landfill in perhaps a hundred or a thousand years (the time to failure of the containment) or on those who live adjacent to it.

What if the contamination is left in place so that the liability it produces remains in the same physical place as the asset (the land)? If the remediation lasts for 40 years (a reasonable time based on today's experience and predictive models) then the net present value of £1 to be spent in 40 years time to upgrade the remediation at a discount rate of 7%, is 7p and the land value could be discounted accordingly. However, we know that the actual discount required by potential purchasers of the land may be much higher because of perceived worries of premature failure, a more litigious future, increasing remediation costs etc. Also what if the required remediation in 40 years were so radical that any development on the site had to be demolished?

If however, we provide more robust remediation and stretch the predictive models and offer 100 years as the life of the remediation, the discounted cost is now 0.1p – totally trivial. But is it actually worth spending the extra money today – perhaps yes for the developer as he can maximise immediate gain but what about issues of Pareto efficiency and equity across generations. Equally, how confident are we that 7% or any other discount rate, fixed or variable, is appropriate for a time-scale of 40 years, let alone 100 years? Can the economist, engineer, scientist give a joint and unequivocal answer? No! Are we or are we not being inappropriately conservative and placing an inequitable burden of remediation costs on the present generation?

I am endeavouring to develop Section 3.1 (and the related Section 9) of the Rio 2002 paper and I would welcome input on how to value costs and benefits across generations when these benefits and costs may not fall on the same people and in the same place. Land is an enduring asset and an analysis that considers just a single generation or act of redevelopment is clearly insufficient (see Figures 8 and 9 of the 2002 paper). Analyses that consider a longer time frame and a wider community may show that our remediation expenditure patterns are wrong both in time and place as regards the overall benefits and costs to the present and future generations.

I am also reminded of a further aspect of the issues of peoples, time and place. 'Dematerialisation' is becoming a mantra word for sustainability devotees. An example of 'dematerialisation' is the replacement of products by services. For example, as a result of the EU Directives such as those on End of Life Vehicles (ELV) and Waste Electrical and Electronic Equipment (WEEE) we may, in the future, hire services rather than buy products. A physical telephone answering machine may be replaced by a remote service – a bit of memory chip at some remote location (remote from the user). The service user pays the service provider but the user, the labour to maintain the service and the profit retained may be in different countries. This raises questions about equity. When all components of a product or service are provided in/from a single country/economic unit a government/authority can legislate to promote a more equitable distribution of wealth within that country/economic unit if they wish do so – and most taxation systems have a significant element of re-distribution. Is this possible for pan-national services?

Call centres in developing countries appear to promote international equity by transferring opportunities, jobs and money to developing countries but are there countervailing risks? For example, do they damage social cohesion? The work force in the developing country very likely will be working nights to service the developed

world's day-time needs – a practice which is recognised to have negative health impacts. Also where do the profits go? To the country where the service is used, where it is provided or some third country? Who can influence re-distribution to promote greater equity?

Is a more insidious example of service provision, the all-inclusive package holiday to a less developed country? Can local bars and restaurants survive if tourists are on 'all-inclusive' packages and the only reason to use indigenous facilities rather than those of the package holiday hotel is boredom with the menu? How much of the money paid in the tourists' home country for the all-inclusive package reaches the developing country? Does it bring benefits to the developing world? Could they be greater?

Will the city of the future function like an all-inclusive package holiday? Will accommodation, food, drink, IT services, transport etc. be provided to the city dweller at an all-inclusive rate, the profits disappearing to a distant tax haven and providing no benefit to the city economy? Outsiders will be prevented from penetrating the market by commercial barriers (they are not part of the all inclusive market) and by physical barriers, the community will be gated with security guards limiting entry to the favoured. Are these some of the countervailing risks of dematerialisation?

The message is that next time you consider benefit-cost analyses make sure you also seek out the underlying issues: on whom, when and where will the costs fall and to whom, when and where will the benefits accrue? Considering only the UK and the here and now may lead to decisions which in the long term prove quite wrong. Worry also about the appropriate tests for intra- and inter-generational efficiency. Is Pareto relevant? Is the world too brutal for Kaldor-Hicks?

References

Hawken, P, Lovins, A.B. and Lovins H.L. 1999. Natural capitalism, Earthscan, London.

Jefferis, 2002, Can we identify sustainable remediation techniques for contaminated land? 4th International Conference on Environmental Geotechnics, Rio, Balkema Publishers.

Jefferis, 2005 (to be published, post edits, September) Geotechnology in harmony with the global environment: dream or deliverable? 16th International conference on soil mechanics and geotechnical engineering, Osaka.

See web site or the last two papers

Apologies for the self-citation but thought the papers might be of interest.