Minerals sustainability, emerging economies, the developing world, and the 'truth' behind the rhetoric

Michael G. Petterson

British Geological Survey, Keyworth, Nottingham, NG12 5GG, UK; mgp@bgs.ac.uk

Received 29 June 2007

The sustainable development paradigm was given birth in 1987 by the Brundtland report of the World Commission on the Environment and Development, which first coined the definition that sustainable development meant 'meeting the needs of the present without compromising the needs of future generations'. Who could disagree with such a high-aspirational, religious-like sentiment? But who could apply such a sentiment in real-world practical terms? Surely, non-renewable mineral resource development follows the laws of cause and effect: in simple terms extraction and usage of resources today will inevitably mean a reduction of resources tomorrow (and yet, paradoxically, it is living resources such as fish, etc. that struggle to be 'sustainable'. Sustainable development is a widely discussed but in reality little understood conceptual platform or paradigm that offers an intellectual and practical basis for mineral development with a heart and socio-environmental conscience. However, to demonstrate real-world benefits, it must be seen to be clearly applied, with tangible benefits, to real problems, real situations, and real people.

There is concern that the term 'sustainable development' is being hijacked and used as a politically convenient 'sound bite' by a wide range of interest groups with disparate but self-centred agendas. Over-usage of any term across a broad range of subjects and at a relatively shallow intellectual level runs the risk of killing the creative essence of the concept itself. The sustainable development 'label' has become over-used and possibly tired and somewhat dated. Fresh thinking and new exciting applications are needed to re-energize this area. We, as responsible world citizens and geoscientists, must ensure that our specific application of the sustainable development paradigm works in a manner that leads to better practices, particularly with respect to mineral and energy resources. As part of the world geoscientific community we have a responsibility to encourage a custodianship ethos towards mineral and energy resources that: maximizes resource usage and recycling; minimizes waste production; is kind to the physical environment; ensures that local communities and economies receive widespread and long-lasting benefits; and deals with our responsibilities towards mineral production within our sphere of influence without unnecessarily exporting problems elsewhere.

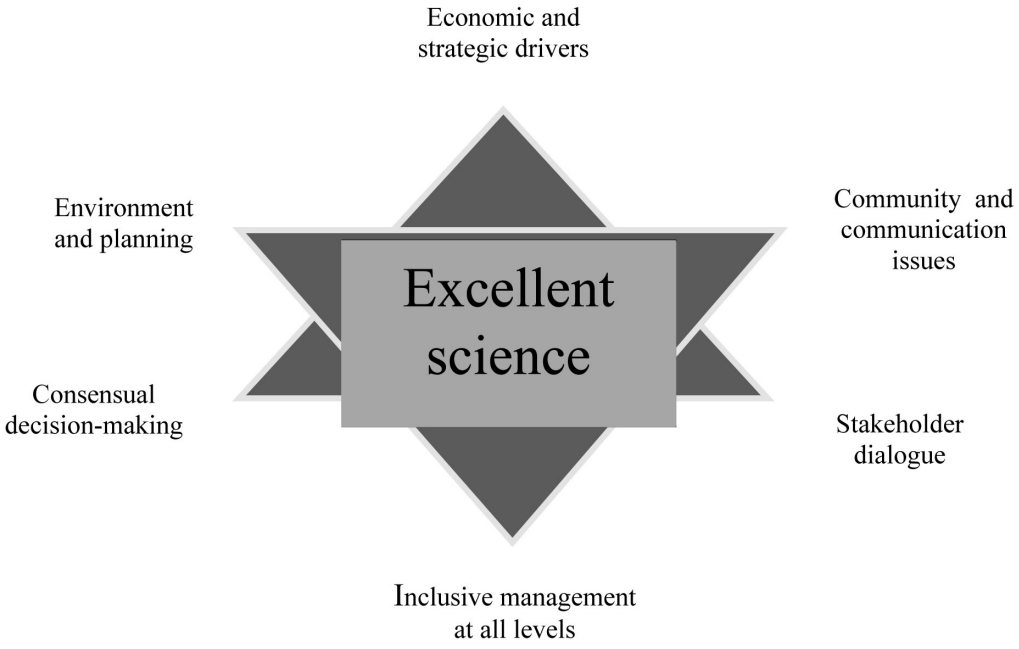
One of the most practical beneficial applications of sustainable mineral development involves reinterpreting our legacy of geoscientific information and knowledge and setting alongside a range of other contextual data-sets (national parks, city development areas, etc.) to assist with medium- and longer-term land and mineral use in a strategically planned and prioritized manner. In this way decisions can be made, backed by clear and transparent information and argument. We must also learn from past unwise mining practices and their related negative environmental, economic, and social impacts. We must encourage and lobby for mining extraction best-practice for the future. One key advance is in modelling the life-cycle of minerals, mineral-bearing land, and mining community-impacts from a grass-roots exploration stage to a post-mine stage. Real engagement with (including active listening!) a range of communities affected by natural resource development is fundamental. Developing customized local, national, and international minerals and planning policies for the benefit of all mineral stake-holders is an aspirational outcome of our cumulative study and engagement. These approaches must acknowledge that the world has an ever-growing need for minerals, which underpins a wide range of economic benefits and should aim to move mineral development forward in a consensual, strategic manner.

The greatest danger in any application of sustainability is complacency and cynicism. This leads to outcomes

such as: paying lip-service, using sustainability as a 'gloss' to make companies look good and improve their image, and developing so-called sustainability policies that are, in reality, vacuous. Sustainability relies on a dynamic balance between economics, society, environment, and politics. To a large degree economics takes care of itself as shareholders and profit drive this. Environmental concerns are, in the main, seriously attended to in most of the mining industry and this fight has largely been won (with some continuing notable exceptions). Politics is always a 'wild card' as it moves at the mercy of political winds and vested interests: it must be taken into account and managed but can rarely be directly controlled. The society challenge has not always been seriously addressed, is a particularly complex issue difficult and time-consuming to solve, and can be inappropriately acted upon. It is in the area of social engagement where I believe non-industry geoscientists, in particular working at universities, geological surveys and other public institutions, can make real contributions as they are seen by the general public to have fewer vested economic interests, possess bona fide expertise, and act impartially. I therefore suggest it is a challenge to all of us to explain to society the need and benefits of mineral resources and the imperative of wise custodianship of these resources. The only real test of mineral sustainability is the lasting transfer of mineral-generated wealth from the mine to the people in one form or another – more sophisticated and widely accepted modelling is needed in this area to demonstrate clearly benefits and disbenefits.

Global sustainability has become even more complicated with the advent of the new economic tigers personified at the moment, such as China, India, Brazil, and the like. The current climate change debate clearly crystallizes the conundrums: how can a high-consuming Western world who has had it good for so long preach to an aspiring Eastern and Southern world with any real credibility? It just cannot and it is deluded if it thinks it can. China is fuelling exceptionally high raw material demand and is a key driver for the commodity supercycle in which we find ourselves at the moment. There will be no turning back. In China and India hundreds of millions of people will attain a lifestyle that will be ever-more demanding of mineral and energy resources, and history teaches once such a lifestyle is attained, people are very reluctant to drop living standards. Geoscientists have a heavy burden of responsibility to engage with the global community and develop ever more sophisticated and customized raw material custodianship methodologies through the sustainability paradigm or something better that springs from this.

We also have a responsibility to focus on the poorest world. Europe produces a large mineral footprint and largely relies on commodities extracted from a global market. It has a responsibility to the poorest and by definition most vulnerable part of the world in particular. It is in this world where we often find examples of least-



sustainable mineral development practices and the presence of the 'resource curse' that distorts local markets, fuels wars, and creates misery. Perhaps the real test of sustainability is here: mineral development in this part of the world more than anywhere else should tangibly improve quality of life in the longer term. If it does not it has failed the sustainability test and heads should hang in shame.

The core challenge is: can sustainable development offer a real way forward or be used merely as public relations gloss with little genuine inner-meaning? For this test to be truly successful motivation must be added to intellectual analysis, systems development, and the ever-growing arrays of high-quality data our modern digital world can produce. If the motivation for mineral development is profit and profit alone, then there is little chance of new sustainability approaches succeeding.

The figure on p. 180 summarizes the key tenets of real sustainability for the geoscientist: excellent science at the heart of a dynamic process involving inclusive management and engagement, stakeholder identification, decision-making, community, economics, and environment.