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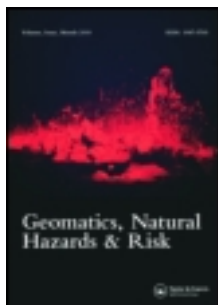
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**Development with a difference:
neo-disaster risk management for
sustainable development**

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Opinion

Development with a difference: neo-disaster risk management for sustainable development

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Sustainable development (SD) or sustainability is the imperative of the 21st century. Protecting our planet, lifting people out of poverty and advancing economic growth are interconnected aspects of the same principle – sustainability. Global change research and global environmental policy summits have repeatedly asserted that the current developmental paradigm that puts considerable pressure on natural resources, resulting in environmental degradation, change climate and widening of the gap between the poor and rich further, is simply not sustainable.

While developed countries will continue efforts to sustain their living standards and maintain economic growth, developing countries are on a fast track to become ‘developed’. Is there a paradox in the development trajectories that the two groups have been following in that they are inherently unsustainable? It depends. Either we contradict the principles and practices of SD or now we have a unique opportunity to embrace an altogether new course of action to realize the dreams of our generation and those who will follow us, traversing the less travelled pathway of sustainability. This is what we dub as development with a difference, a big difference!

While many idealize SD, we propose actually to practice it. While skeptics question the validity of the multiple risk-based scenarios developed in scientific assessments such as Intergovernmental Panel on Climate Change (IPCC), Millennium Declaration and United Nations mediated global sustainability summits, we could pursue a new way of building resilience to avoid undesired outcomes in the future through reducing current risks posed by human actions that are changing significantly Earth and its environment. We could define risk more inclusively to cover both ‘rapid onset–high impact’ events such as floods and heat waves, and ‘slow onset–high impact’ events such as climate change and poverty, acknowledging that most of the present-day sustainability challenges belong to the latter category at this stage.

The need for a set of sustainable development goals (SDGs) as highlighted in the Rio+20 outcome, the ‘future we want’, is urgent to pursue through focused and coherent action to address sustainability challenges. A recent article (Griggs et al. 2013) proposed six such SDGs – thriving lives and livelihoods, sustainable food

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security, sustainable water security, universal clean energy, healthy and productive ecosystems and governance for sustainable societies – with possible areas under each goal that could become the targets. In our view, a further breakdown of these targets, in a cause–effect sequence, could result in more country-specific and action-oriented programmes, aligned to national development policies and priorities. These programmes must be the conduit to address current sustainability risks that always carry the potential to be realized as disasters in the absence of planned interventions. Such an approach, which is based on sustainability rather than sectorial criteria that are practiced at present, should make global efforts more inter-disciplinary and multi-stakeholder, focused both in outlook and action (Glaser 2012).

We will use disaster risk management (DRM) as an example to show the difference between the traditional approaches used in the past/present and the new model we propose to support SD globally. In the new model we integrate the usual four components of DRM – prevention, preparedness, response and recovery – to meet the needs of SD.

For example, in most developing countries, conventional disaster management is limited to event-based reactive engagements, while proactive disaster management calls for stronger *preparedness* and *response* measures. The ‘neo-DRM’ will build on these principles by strengthening the *prevention* and *recovery* components of DRM, including the cost-effective and win-win measures. This could involve a host of country-specific activities such as community-based resilience building towards disasters, efficiency improvements in energy and water use, fisheries and land use through training and capacity enhancement, process-based approaches to mitigation and risk sharing, technology-assisted early warning systems, better public transport, improved hydro-met services, smart policies and innovative implementation through public–private partnerships for multiple pilots and scaled-up projects. This may also include integrated SD policies for development planning and protection of coastal cities, flood plains, estuaries, forests and national biodiversity. In the absence of anticipatory action, these risks will get harsher as the population grows, the world warms and global environmental changes accelerate. Any and all proactive measures to ameliorate the adverse impacts of these events will help greatly in managing their potential risks towards a more sustainable future.

Taking the proposed concept one step further, we propose to combine mitigation, adaptation and readiness as pre-disaster risk-reduction measures, and post-disaster measures such as relief, restoration and overall rehabilitation to achieve the desired sustainability objectives (Environment Canada 2011). In this approach (neo-DRM-SD), the overall risk (in the absence of any risk-reduction measures) will be progressively reduced to a level where any resulting disaster from the residual risk will be considered manageable (figure 1). Simple as it might sound to disaster risk managers, this approach demands in practice all the rigour of SD implementation. We believe if these principles and a new approach is adopted and practised over the long-term, a sustainable pathway could be found for all nations, especially for the less developed and developing countries, to be free of poverty, debilitating disasters and diseases, rapid loss of biodiversity and depleting capital, by asserting that the price of this freedom from disaster is eternal vigilance and proactive action (Cohen 2009). This is because, for example, a developing country on fast-track towards developed status generally will

- adopt sustainable technologies (Green technology) quickly and across the nation,

Disaster Risk Management for Sustainable Development

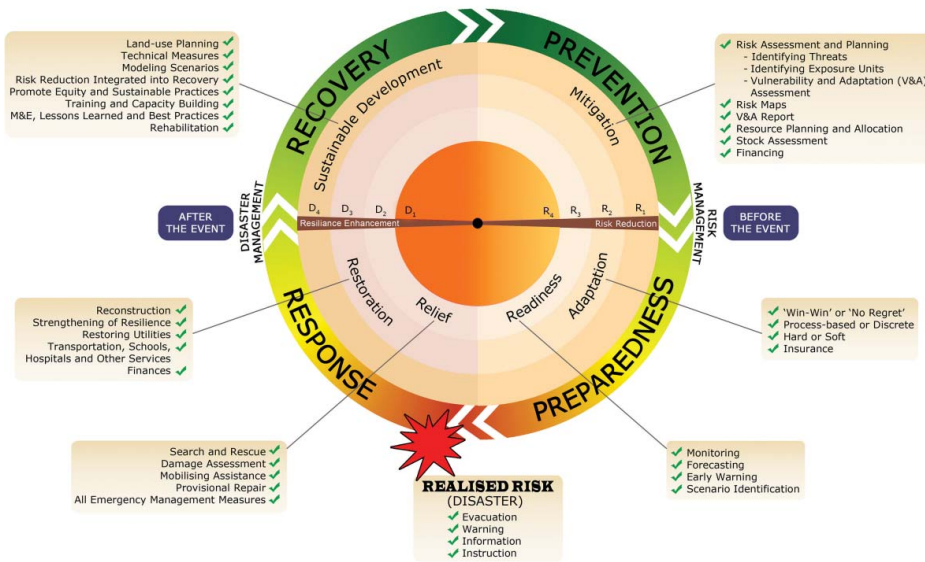


Figure 1. The neo-DRM-SD model: a cyclic and iterative process in which ‘risk reduction’ and ‘resilience enhancement’ are given equal importance. These are the pre- and post-disaster activities (shown as radii of the hemispheres). It is assumed that the radius of the right hemisphere represents the full risk and that on the left, the full disaster. The key to successful implementation of the model is the ability to progressively reduce risk through mitigation (R₁), adaptation (R₂) and readiness (R₃) measures carried out ‘before the event’ under *prevention* and *preparedness*. The residual risk is shown by R₄ which when realized as disaster (D₁) is presumably small and manageable. The post disaster activities relief (D₂), restoration (D₃) and sustainable development (D₄) will enhance resilience (reduced disaster) under *response* and *recovery* phases. The checklist items shown outside the circle in pockets are examples of activities that form a part of neo-DRM-SD. This model requires that we move from an ‘event-based’ to a SD-compatible ‘process-based’ approach for improved results.

- strive to *eradicate abject poverty*, while simultaneously accelerate activities to *alleviate relative poverty*, i.e. ‘hardship alleviation’,
- preserve the environmental resource base and life-supporting mechanisms (the natural capital) through risk assessment and rehabilitation of hotspots,
- ensure food, water, energy and human security through good governance, public–private partnership, strategic environmental assessment and setting SDGs and
- promote education for SD and sustainability science for sustained economic growth, social cohesion and overall well-being of people (Sachs 2008).

Attempting to achieve tangible results in the above critical fields of SD, it is realized that every sustainability challenge arising out of these objectives has an inherent risk level and likelihood of occurrence. For example, we are in an advanced stage of *risk* as far as global climate change is concerned, and we are bordering on *disaster* stage for impacts and vulnerabilities of natural resources and biological diversity due to these changes. It is this risk that needs to be characterized and managed urgently,

instead of waiting to settle all the arguments about uncertainties before taking action. If we consider poverty in this context, it may be a serious risk or disaster depending on where we look; examples abound globally.

Much like millennium development goals (MDGs), SDGs could also be daunting for less empowered countries and communities. A situation could arise in such cases where we have the right goals, but little means to achieve them. The proposed neo-DRM-SD will prompt us to intervene strategically at the risk level to keep on reducing the multiple risks posed by SD challenges to levels manageable by people and planet alike. Our approach will require that we start taking here-and-now steps through no regret measures, while simultaneously intensifying efforts on more involved mitigation challenges that require policy, finance and mindset changes. For developing countries, more than a mind-set change will be required; empowerment and the creation of an enabling environment are critical. Here the specifics of the 'means of implementation' – finance, technology, capacity building, trade and networking – adopted in the Rio+20 outcomes, become vital.

At the risk of overemphasis, we would like to state clearly that knowledge generation and capacity development are critically important for success in achieving SDGs. This is where global agreements and education- and research-based capacity development matter. For higher educational institutions (HEIs), this means that for every domain of SD, there is a crucial need for: fundamental (basic) research to find innovative solutions and knowledge transfer programmes (applied/action research) to improve current processes and practices. The former will generate new use-inspired and targeted knowledge that is required to address bigger sustainability challenges (i.e. HEIs functioning as 'knowledge base' institutions), while the latter will make prudent use of existing knowledge to address relatively lower level problems for which cost-effective solutions are at hand (i.e. HEIs acting as knowledge-based institutions). The emerging field of sustainability science, which includes both natural and social sciences, promotes 'sustainability research' and universities are engaging and contributing significantly in this transformation by offering academic expertise, excellence in research and associated infrastructure, but most importantly through training and development of next generation of scientists, engineers, technology experts and educated global citizens (Kates 2011).

However, the public still needs to be convinced that global environmental and policy summits and HEIs are serious about the issues beyond maintaining status quo. For example, many think that Rio+20 lacked ambition, urgency and decisive action, at a time when there is unequivocal evidence to show that the continued functioning of the Earth system as it has supported the well-being of human civilization for centuries is now at risk (Brito & Smith 2012). The public also knows that most HEIs have not mainstreamed sustainability into their mission, teaching, research, community engagement and institutional governance. Yet it is worth noting that in the Rio+20 outcome declaration, there are a host of great ideas and recommendations for 'making things happen', which if followed-up with commitment by all stakeholders at all levels, will enable us to achieve the 'sustainable future we want'. Given the Rio declaration that relate specifically to the role of higher education in promoting sustainability implementation, HEIs need to ask if there is a parallel between the Rio+20 process and the national sustainability commitments by the participants (United Nations 2012). It helps to pause and take stock, evaluate achievements, face new and emerging challenges and adjust course to stay focused on our sustainability journey. The development of neo-DRM-SD by the Centre for Global Sustainability

Studies (CGSS) at Universiti Sains Malaysia is an attempt to re-orienting its research priorities while pursuing knowledge-based engagement for community development and security of livelihoods.

Against this background, CGSS used the neo-DRM-SD methodology to assess community vulnerability and to implement cost-effective adaptation measures in Kuala Nerang, in Northern Malaysia, a community extremely vulnerable to floods. The vulnerability of the selected communities was assessed and ranked using a risk assessment methodology (RAM) based on neo-DRM-SD, following the United Nations International Strategy for Disaster Reduction and United Nations Environment Programme 'risk equations' that relate risk to system characteristics such as 'hazard, vulnerability, impact, adaptation and capacity'. Essentially in classical risk management, the focus is to 'reduce the cause' of the hazard through mitigation and to 'prevent potential damage' of the impact through adaptation. Neo-DRM-SD considers the impact of hazards on critical exposure units spanning environmental, social and economic spheres for which it is important to do vulnerability assessment and risk rating before trying to implement management measures. We completed this step factoring the magnitude (how big), intensity (how strong), probability (how often) of the impact, and capacity (how resilient) of the exposure units. This assessment and risk prioritization were essential to prevention and preparedness-based interventions before the event, and the response and recovery activities after the event.

This project with a budget of \$200,000 was undertaken as a part of Universiti Sains Malaysia (USM's) 'Delivering Excellence' initiative. Our project eventually received two Regional Centre of Expertise (RCE) 'Recognition and Honor Awards' in 2012 from United Nations University Global RCE Program for innovative community-based sustainability research.

The challenge now is to replicate this approach and its successful implementation in other communities by focusing on those sustainability issues that matter most to them. The neo-DRM-SD and RAM are equally applicable to any such challenge where the primary effort from USM would be to educate the communities to minimize the risk they face and to work in partnership with implementing agencies such as government and NGOs to apply sustainability principles and practices to effectively respond and recover from any disaster. CGSS@USM is looking at the possibility of establishing a South East Asian sustainability network to provide the necessary institutional framework for effective enhancement of resilience and stakeholder capacity to minimize the multiple risks to the vulnerable communities, especially the risks that they must live with daily. We invite the readers of this article to share their experience and knowledge openly on similar initiatives elsewhere, to determine the feasibility and effectiveness of this new approach to risk management and SD.

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