

Governing Uncertainty: Environmental Regulation in the Age of Nanotechnology

Edited by Christopher J. Bosso
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This useful edited book is a collection of scholarly chapters providing insights into how nanotechnology should be regarded, given the way it is currently being marketed as a technological resource to save our future. The senior staff from various universities in America who provided the chapters in this book (almost all deans and professors) between them have an impressive track-record in political science, the environment, regulation and organisational theory. Each chapter comes with its own references, making them easy to find for following up, and each is well paced and leads logically from one to the next.

A brief but interesting introduction sets the book in a climate of unknowns, reminding us that, as a new set of technologies with some promise, with nanotechnology there is much that is not known. This includes the possible effects of nanotechnology on the environment, health and society, for which there is currently, because of its novelty, insufficient governance.

The book's editor provides a balanced reflection on the current industrial enthusiasm for nanotechnology (which regards it as the next industrial revolution) that is tempered with reflections of previous 'good things' that have turned out to have (not entirely unforeseen to some people) adverse consequences, eventually resulting in regulation.

The chapter on the functions and promise of nanotechnology summarises the reasons some people are so excited about it. Despite having very little understanding of the science involved, I was pleasantly surprised to find I could comprehend most of what was presented, and could grasp why it is such an exciting area to be involved in. Nanotechnology scientists believe that it is going to solve a whole raft of the world's problems. These include providing better ways of producing energy now and also imaginative mechanisms for energy conservation (for example, new kinds of glass in buildings), and new ways of screening for contaminants in food and the environment. However, the use of such tiny particles in the environment is untested; therefore, there may be effects on human and environmental health that are as yet unidentified. As the writer of the preface states: '*Ignorance is not bliss*'. The promises and problems of nanotechnology are hard to imagine, located as they are in the future.

Promise can also turn to panic in the public eye, not all of it justified. Some of the discussion, ethics aside, revisits the public anxiety that accompanied the introduction of genetically modified (GM) foods and forced political retreats, which were generally harmful to the industry and unhelpful to the public. However, there are justified concerns about the ability of governments – in this case the US federal and state governments – to appropriately provide the policy direction needed for the introduction of these new technologies. The remaining chapters

provide a technical description of what nanotechnology is, offer thoughts about a potential regulatory framework, and consider the regulatory roles of the Environmental Protection Agency and various governments in this context. A chapter called 'The EPA and nanotechnology' is devoted to exploring the role of an established national body in defining and exploring nano risks. The book also explores the role of the (US) state governments, providing some strategic models for policy, some focussing on economic development and others including economics and environmental protection, with accompanying examples. (No examples including population health are provided, presumably as this is a federal issue.)

Given the uncertainties of how nanotechnology will be used and the problems it might cause, there is, of course, considerable uncertainty about precisely what is to be regulated, when and why. Even categorising nanomaterials is a complex issue, and the adequacy of existing mechanisms for risk assessment and legislation are not at all clear. Issues of self-regulation and partnership agreements in the climate of funding for research and development provide even more complexity. The chapters addressing regulation skilfully pick their way through the issues and present options for flexible and proactive arrangements, such as performance standards, disclosure of some kinds of information and management-based regulation (also thought of as enforced self-regulation), which puts regulatory responsibility on those who most understand the potential risks because they are the people working with the technology. A thoughtful and interesting discussion of voluntary regulation provides summaries of existing American environmental programmes for monitoring for regulatory purposes.

The final chapter of the book includes a section that acknowledges that all new technologies '*...eventually pose a range of environmental and health problems, some unique to that technology and others of a generic kind... It is not too soon to ask how we might handle the potential side effects of nanotechnology even before they are made manifest. We have been down this road before*' (p. 134). The reader is invited to consider ways of living with uncertainty (even learning to like it), but shows how this can only occur in a climate of regulatory transparency. The final sentence of the book says it in a nutshell:

'Getting it right will matter'.

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