

# Foreword

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The notion that waste has value is as old as the hills. For centuries human beings have reused and recycled stone blocks to replace old structures with new ones. Rag-and-bone men, a common sight in nineteenth-century Paris and London, scavenged unwanted rags, bones, metal and other waste from households and sold them to traders; rags were often used for making paper, bones were used as knife handles, toys and ornaments. In 1954, when I worked as an apprentice machinist at a factory near Birmingham, UK, the swarf produced by the lathe I was operating was picked up every afternoon to be baled eventually and sold to a scrap merchant. In 1970, as a member of a World Bank Group delegation meeting with leaders of the Japanese textile industry, a senior official of a cotton spinning mill in Osaka informed me that the person handling the sale of waste cotton ranked on a par with his colleagues handling operations, marketing and finance. The company President explained that the so-called waste from carding and combing operations was, in fact, quite valuable; it was good cotton fibre but of a staple length shorter than what was required for his operation. However, it would be good material for mills spinning coarser count yarns. At the end of the cotton fibre chain, the remaining fibre would be used for the production of blankets, which, in turn, at the end of their life would probably end up as rags for papermaking. Similar examples of intuitive recycling and reuse can be found in many other sectors of production worldwide.

Over the past 25 years, industrial ecology, a multidisciplinary pursuit of knowledge, began looking at non-human ecosystems as models for industrial activity. Many biological ecosystems are especially effective at recycling resources and thus are held out as exemplars for the efficient cycling of materials and energy in industry and society. The multi-industry park in Kalundborg, Denmark, where facilities share resources – materials as well as energy – and also exchange by-products, led to a body of research on ‘industrial symbiosis’ providing an example for the biological analogy.

In recent years, academics in the field of industrial ecology have focused on input-output analysis, studies of resource criticality (using tools of material flow analysis), the integration of social science and operations research, agent-based complexity modelling, and urban metabolism,

among other subjects. Long-term socio-ecological research has become central to the field.

Progress on the academic front of industrial ecology in recent years has, unfortunately, come at a cost. There is a growing divide between the academics and the practitioners; and, at the same time, there is a risk that the field of industrial ecology could splinter into geographical sub-groups and perhaps also into clusters of sub-specialties. The growing divide between academia and the industrial world can only be detrimental to the greater use of industrial ecological principles and their implementation in practice. Industrial ecology has been defined as the study of resource flows in industrial and consumer activities with the ultimate objective of minimizing their use. Based on my observation, most economies, particularly the emerging ones, could benefit greatly by examining their resource flows using industrial ecology tools.

It is precisely for this reason that I welcome the publication of *International Perspectives on Industrial Ecology*, jointly edited by Dr Pauline Deutz of the University of Hull, England, Professor Jun Bi of Nanjing University, China, and Professor Donald I. Lyons of University College Cork, Ireland.

The volume benefits greatly from the international perspective of the three editors who have individually studied and taught at reputable universities around the world. In addition, each of the editors, having had an opportunity to interact first hand with academics and practitioners in various regions of the world, is able to identify the problems and potential of transferring experience from one location to others.

The editors have assembled a qualified and experienced group of international and interdisciplinary contributors to share their views of the state of industrial ecology in their regions. The reader is thus enabled to draw comparisons between different national situations. The contributions, although presented in an academic paper format, are clearly and simply written to be accessible equally to the practitioner in industry or in a policy-making institution and to graduate students seeking new avenues for further research. The focus in the contributions is primarily on industrial symbiosis and the development of eco-industrial parks. These are precisely the areas that present the greatest scope for further research and also rapid implementation on the ground.

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M.V. Dehejia  
President, Alliance for Sustainable Industry and Energy, LLC  
Chevy Chase, MD, USA  
Formerly  
Vice President – Engineering and Technical Assistance,  
International Finance Corporation,  
World Bank Group,  
Washington DC, USA