Editorial

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Biographical notes: Giancarlo Barbiroli is a Full Professor of Technology of Production Cycles, and of Environmental Management, at the Faculty of Economics, University of Bologna, where he has been Dean in 1984–1993. Honorary Editor for Theme 1.46 Principles of Sustainable Development for the UNESCO Encyclopedia of Life Supporting Systems. His researches have always been oriented to carry out techno-economic analyses on production activities, in order to draw general assumptions from the measurement of the manifold aspects of performance (materials, energy, environment, quality). He is author of 200 papers published in international journals, and of 14 books.

The question of natural resources limitedness, often scarcity, has become crucial as a consequence of the growing world demand in the old and new industrialised countries, and of the unchanged way of their utilisation (low transformation rates, high dissipation, low utilisation intensity and low durability of durable goods, therefore low productivity). In addition, there is growing concern about the scarcity of eco-systems, that means a limited ability to provide sufficient fresh water, clean air and a stable climate. All of this provides the stimulus to pursue a great increase of resource productivity that should become the guide-line for an economic and social change aimed at replacing open-cycle economic systems with closed ones, and at realising an industrial metabolism, similar to the natural one.

The new phase of industrialisation, started in the 1980s and called the re-industrialisation process, is characterised by great changes and prevailing features such as flexibility and diversification, soft technology and non-material inputs, information, total quality; these are diametrically opposed to those characterising the previous phase, but the way in which natural resources continue to be utilised and the consequent environmental burdens have not changed; on the contrary, many aspects have further worsened, as has been recognised by the *2002 Johannesburg World Summit on Sustainable Development*.

After the Brundtland Report (WECD, 1987), and the 1992 Rio Conference (Agenda 21), many scholars around the world have addressed their researches towards resource utilisation and related questions, and have analysed diverse aspects connected with production systems and consumption patterns. Important directions have been given to pursue the rational and productive utilisation of natural resources, by introducing fundamental and innovative concepts as ‘regeneration’, that can be realised within a new paradigm, sustainable development, that is based on closed-cycle economic and service systems.

The theme chosen for this Special Issue of the *International Journal of Environmental Technology and Management* attempts to highlight some central aspects of the economic and social change that is globally needed to enter a new phase, where the use of natural resources is balanced with the Earth carrying capacity. This can be achieved by placing, at all levels, natural resources at the top of all choices.

This revolution is first and foremost a 'cultural revolution' in the hearts and minds of people. Its success in transforming societies will ultimately depend on its acceptance by individual citizens, large industries and small firms, dealers, service organisations, public administrators and governments, alike.

The scholars who have shared this mission and agreed to contribute to this Special Issue with their latest research findings have demonstrated their high sensitivity toward these concepts. The increase in the number of those who appreciate their commitment and trust in the same concepts will be their best recognition.

This work is dedicated to my Scientific Guide, Professor Walter Ciusa, in the Centenary of his birth (1906–1989, my predecessor in the Chair of Merceologia, Commodity Science, at the Faculty of Economics, University of Bologna), who, since the 1950s, introduced into the scientific panorama innovative and advanced fields of research, such as production cycles technologies, their effects on energy and natural resources, environmental impacts, and even quality features.

His devising capacity has produced high scientific level work, whose value is destined to last.