

Preface

Over the last few years, the fairly new concept of the food–energy–water nexus has become one of the most interesting and promising references in the analysis and identification of environmental strategies both at global and at local levels. Among the different approaches that rely on this concept, this book considers the nexus not only as a relevant issue for environmental sustainability, but also in relation to the concepts of resilience towards environmental changes and natural disasters. In this respect, the book considers three main issues: the nexus in Peri-Urban areas; the effective management of the nexus as a means to create resilience towards environmental changes and in particular to climate change; and an effective management of the nexus in risk mitigation policies.

In fact, as for the first innovative aspect, the relationship between agricultural and urban areas has become particularly crucial in large metropolitan areas. Production of food in large urban areas has been indicated as an important opportunity to make cities more sustainable and to provide ecological services.

The development and protection of these services requires an integrated management of the major resources that characterize the metabolism of a city. Furthermore, it requires a stronger coordination between the stakeholders who weight differently the services that are relevant to them in an urban environment. Moreover, any strategy aimed at achieving both sustainability and resilience has to integrate efforts towards environmental protection, adaptation to and prevention of climate change and disaster risk mitigation. A more sustainable city is one that offers the best combination of environmentally compatible production and exploitation of energy and food and optimizes cycles of water use and reuse, leading to an overall reduction of carbon dioxide emissions. In the meantime, a better management of the nexus can significantly contribute to the adaptation to climate change. The nexus is also implied in disaster risk reduction, basically in all phases of the so-called disaster cycle, from the pre-event mitigation to recovery and reconstruction. The perception of the nexus before, during and after disasters may be different in developing countries and in rich ones, but clearly the energy

production processes and water management are core aspects of many disasters all over the world.

Considering the nexus in such a broad perspective requires a large effort of integration, first between disciplines and scientific and technical approaches and second between policies. The need to integrate approaches, methods and tools specific to different disciplines that deal with food–energy–water has been already pinpointed by researchers and scholars. However, an even larger effort has to be made in the management of the nexus in climate change adaptation and in disaster risk mitigation that until now have been considered rather separately from environmental policies in general.

An additional challenge refers to the integration of policies on the nexus that are generally conducted in a rather sectorial fashion by administrations, agencies and stakeholders who rarely consider the countereffects that their decisions have on those sectors that they do not manage directly. In this regard, the presence among the authors of this book of stakeholders pertaining to public administrations with different responsibilities at various scales is of great relevance, showing that also at the political and decision makers' level, something is moving and changing.

The book is organized into two parts. The first addresses some general issues, including the need to consider the nexus not only in ordinary times, but also in relation to adaptation policies to climate change and in the context of resilience to disaster risks.

The second part is devoted to discussing case studies and reflections regarding the nexus approach, looking in particular at the nexus through water-, food- and energy-related angles.

Four chapters deal with the nexus from a water-related perspective. Water is considered as a resource that has to be managed within qualitative and quantitative safe boundaries. As for qualitative aspects, clean water is the basis for life and everyone should have access to it. Unfortunately, this is not what happens in many developing and poor countries; however, water pollution is an issue also concerning the developed ones and requires the adoption of ad hoc policies and controls. From a quantitative perspective, that is granted more attention in the book, water scarcity, due to arid climatic conditions (that may be worsened by climate change), droughts and poor management system, is tackled in Guido Minucci's contribution. Too much water, resulting in floods, also threatens human settlements and may provoke severe damage to many sectors, including agriculture. Those aspects are developed in Patrick Pigeon's contribution. Francesco Puma, for many years general secretary of the Po River Basin Authority, describes the plans and the programmes developed and implemented in particular in response to the Water Framework Directive in an attempt to couple ecological and environmental sustainability and flood risk mitigation. They discuss the results, including successes and limits of their activity that have been carried out through European funded projects and local initiatives.

The food issue is approached as an integrated aspect of Peri-Urban areas management with regard to urban–regional metabolism. Specific emphasis is put on the interrelations of food with neighbouring fields, such as landscape, water and energy, connecting the social, economic and ecological dimensions of Peri-Urban

development. Against this background, different aspects of Peri-Urban governance are explored, including questions of multi-level (local/regional/supra-regional), multi-actor (public/private, including businesses as well as citizens) and multi-instrumental (formal/informal; processual; economic/incentives; organizational). Jörg Knieling and Elena Jachia discuss examples of urban–rural partnerships that allow integrating regional potential of food production with the urban demand and have become relevant issues at the European and international levels (OECD programmes, EU programmes and policies, etc.).

Mara Cossu and Silvia Pezzoli show that new methods and tools of evaluation of “Peri-Urban” policies aimed at reinforcing local resilience are needed.

In the last part, three contributions present good practices and results of research projects focusing on food chains integrating environmental, social and economic aspects. By illustrating good practices and innovative responses, Rolf Oldejans and Aurora Cavallo, Benedetta Di Donato, Rossella Guadagno and Davide Marino identify the complex range of services that could be provided by Peri-Urban areas in terms of ecosystem, social and leisure services. Finally, Gioia Gibelli, Luca Bisogni and Angela Colucci show the advantages of innovative practices in both economic and ecologic terms, and mutual advantages derived from an integrated approach.

The last articles, related to the “energy” perspective, mainly focus on the contributions that different areas, and especially the Peri-Urban ones, can give in meeting the energy demand of cities and on the effects on water management, agricultural production, economy, landscape and ecosystem services.

Two issues have been tackled in particular, the first one being the production of energy. Eugenio Morello discusses the criteria of use and actions required to produce renewable energy in Peri-Urban areas; Chiara Cortinovis suggests an innovative and more efficient way to develop district heating as an urban infrastructure, while Mauro Brolis presents strategies to reduce the use of fossil fuels in the Lombardy region increasing energy efficiency and the use of renewable energy sources.

The second one is focused on the connection between energy and agriculture. The concept of bioregion is defined and explained by Gianni Scudo and Matteo Clementi. They consider the bioregion as a fundamental reference to evaluate strategies aimed at increasing the eco-efficiency of an area.

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