

Ecosystem Services in Floodplains

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“Ecosystem services nella bassa pianura dell’Adige e del Bacchiglione
dal medioevo all’età contemporanea”

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Introduction

Dario Canzian and Elisabetta Novello

This volume is a collection of essays by European environmental scholars on the ecosystem services theme. The Millennium Ecosystem Assessment (MEA), carried out between 2001 and 2005 at the behest of the United Nations General Assembly, was designed to assess the consequences of the changes which have taken place in the environment on human wellbeing as well as to improve conservation and the sustainable use of ecosystems by identifying the contributions these made to economic and social progress over the course of the centuries. Scholars have been conducting research on the ecosystem services-human wellbeing interaction for some years now, but no long-term historical study of this topic – from the Middle Ages to the present day – has yet been attempted, and we believe this to be a fertile field of enquiry. In particular, this volume deals with the relationship between ecosystems and the well-being of the people living in a certain area in the widest sense, focusing on *ecosystemic services*. These latter are the services available to a community on the strength of an appropriate management of ecosystems which, in turn, can be characterised by more or less intensive human activity (undisturbed ecosystems such as natural forests do exist, as do other considerably modified ones, such as agricultural land and urban areas).

Ecosystemic services can be categorised as follows: *provisioning services* (food, water, timber, fuel, etc.); *regulating services* (effects of human activity on the climate, provisioning regulations, health and safety standards, waste management, water quality checks, hydro-geological framework monitoring); *cultural services* (services offering recreational, aesthetic and educational benefits, etc.) and *supporting services* (soil formation, maintenance of the chemical composition of the atmosphere, the nutritional cycle underlying growth and production, etc.).

From a long-term historical perspective it is interesting to assess the way environmental transformations have impacted on human wellbeing both in the past and today. This wellbeing is made up of a range of components:

- basic material for a good life (safe and adequate means of subsistence, sufficient food at all times and in all situations, shelters/huts/houses, clothing, access to goods);
- health (including a physical environment perceived to be healthy);
- good social relations (social cohesion, reciprocal respect, ability to provide for the more vulnerable and unproductive social elements);
- security (safe access to natural or non-natural resources, personal safety, protection from natural or man-made disasters).

In our opinion, historical-environmental studies designed to study in depth the relationships between ecosystemic services and the dominant economic and social factors in the various communities can make a crucial contribution to the development of a new interpretation of the process whereby environmental resources are used and economic development choices made over the years.

Environmental historians are unlikely to have much to offer in the *supporting services* field, but feel more at home in dealing with provisioning services. This is the sphere which encompasses themes linked to the production of economic goods, primarily foodstuffs, water provisioning, raw material management (timber, salt, sand and clay) and the production and/or management of energy resources (water, peat, timber, carbon and natural gas).

Regulating services provide an opportunity for environmental historians to analyse all aspects of anthropisation and regulation of water and other energy resources. The settlement distribution network is also to be assessed diachronically: was there a hierarchy (administrative, economic, residential)? And what relationships were there between the various elements in this network? Were resources regulated locally and supra-locally? Were residential and rural settlement operations co-ordinated by the authorities – lordships, citizens, statutes? What were the communication routes?

Lastly, the *cultural services* sphere is a matter of recreational, aesthetic and educational benefits by definition. This category encompasses research focusing on the artistic representation of the area and its landscape (paintings, photographs, literary descriptions, cartography). For the Middle Ages identifying this type of services would appear, in the context of reference, not to be immediate but still possible. It should not, for example, be forgotten that activities such as hunting were the wealthy classes' primary pastime, with hunting and tournaments being seen as a peacetime opportunity to retain one's skills in what was considered the aristocratic pursuit *par excellence* – war. As to the contemporary age, considerations on the tourist and recreational use of the area are also essential. The essays in this volume attempt to identify the various direct or indirect drivers of change which have long influenced the human species-ecosystem interaction, opening up new avenues of research in the field of environmental history.

The *indirect drivers* of change category encompasses demographic, economic (markets, commerce, globalisation, political framework), scientific, technological and cultural factors. *Direct drivers* of change include changes in land use, the introduction of new animal and plant species or their extinction, technology adaptations and use, external input (use of fertilisers, pesticides, drainage and irrigation systems), consumption of resources, climate change and natural, physical and biological change factors.

It was decided to limit the spatial scope of this volume to floodplains, and case studies, whilst mainly Italian, also cover other European and non-European contexts. The reconstruction of specific historical circumstances which are directly related to the subject of floodplains was guided by the ecosystem services analysis model, despite the fact that this was developed only recently to analyse the contemporary era.

Contributions follow a classic chronological approach because this seems to be the criterion best able to highlight continuity and discontinuity in the phenomena analysed.

Thus a first nucleus of work examines the Middle Ages. This section begins with an analysis of safety – and food provisioning – related services, the two primary forms of medieval wellbeing protection in the context of the Veneto flood plain, with insights into settlement forms and foodstuffs distribution in the towns and countryside of the lower plains. Villages, castles and towns, roads and waterways: the infrastructure network was conceived for medieval man's *bonum statum*, on which subject a great deal of research remains to be done (Canzian).

In relation to the Costa di Rovigo site, Remy Simonetti illustrates an extremely significant ecosystem services production laboratory linked to an amphibious environmental context. Fallow land resources, hunting and fishing, timber exploitation, use of the waters of River Adigetto, a branch of the River Adige, as a vital artery for the local community's multiplicity of activities: these are highlighted on the strength of an analysis of previously unseen documents examined for the occasion. The Adige River basin is also the subject of Francesco Tognana's paper, as regards the vocationally semi-urban area of Este, fulcrum of the marquisate which took its name from the town. Este's commercial potential bound up with its river network is highlighted here. This was reinforced in the late Middle Ages in work involving digging canals sponsored by the Padua commune for the purposes of improving river flood containment in the plains and, at the same time, maintaining water levels sufficient to ensure navigation and economic use.

With Alexei Kraikovski and Margarita Dadykina's work we move outside Italy to Northern Russia, the region bordering on the White Sea. Here, from the

15th century onwards, some monastic communities made use of local resources, first and foremost water, promoting agriculture and livestock farming and also salt production and fishing. Monastic intervention favoured the area's urbanisation and modified its environment, for example via the digging of canals which are still drawing in tourists today to the Solovkie islands.

In the Early Modern Era community access to ecosystemic resources was transformed alongside renewal of the forms of political power and changes in the social equilibrium. In this respect Raphaël Morera enquires into the relationship between political and social change on one hand, and uses relating to the exploitation of wetlands on the other. In an approximately three century long overview of the whole Ancien Régime period, Morera shows that, however unevenly, in the 16th and 17th centuries the French wetlands were progressively incorporated into the capitalist market and economy, thanks to the action first of locally powerful groups supported by the monarchy and then the king's most trusted men. The monarchy saw reclamation and farming of fallow land, both wetlands and otherwise, as a means of affirming central power. The wetlands, after their transformation, thus ended up offering political services above all. From a different starting point – sustainability as the ability to use resources without imbalances and degradation of the productive structures or deconstructing the communities involved, in the pre-industrial age – Matteo di Tullio and Claudio Lorenzini's analysis encompasses an examination of the relationships between new forms of political power and local customs. Two case studies are examined here: the plains between Milan and Brescia and Carnia, as regards the management of water and forests and the conflicts deriving from it. In this respect, in the 16th and 17th centuries, consolidating state bureaucracies tended to compete with local institutions for the management of environmental resources. The increasing awareness of the importance of water in the Early Modern Age also brought about the adoption of measures designed to contain damage done by rivers bursting their banks. Paolo Buonora focuses on the cultural and ideological horizons of those seeking explanations for such catastrophes and solutions to them. Nature and culture, theology and science, luck and virtue interwove in the considerations of decision-makers, engineers and intellectuals until the 19th century. Today, the author believes, a scientific approach combined with historical analysis would enable an adequate database to be created for the Tiber River for the purposes of generating effective environmental disaster prevention systems.

The last section of this volume deals with the contemporary era, encompassing global geographical horizons. Silvia Piovan and Michael Hodgson focus on a specific ecosystemic function of water, namely its use in war. A rapid overview illustrates some examples covering the period from 1938 to the end of World

War Two, in reference to the Möhne and Eder Rivers in Northern Germany and the Yellow River in China and the Pacific Ocean. The authors also focus on a fortunately non-implemented plan to flood a large section of the lower Veneto plains, along the Mincio-Po and Adige-Gorzone axes, as an extreme response to a hypothetical in-depth Austrian penetration of Italian territory in the wake of the Italian defeat at Caporetto in 1917.

With Armel Sambo's contribution we shift our attention to Lake Chad, an extremely important lake as far as ecosystemic services to those living on its shores in Chad, Cameroon, Nigeria and Niger are concerned and under great environmental stress in recent decades due to the effects of climate change aggravated by increases in demic pressure. For this reason, the author argues, multilateral co-ordination of the lake's ecosystemic services is desirable, both those linked to the past (fishing, livestock, irrigation) and those bound up with new services such as tourism.

Tourism is also the focus of Elisa Tizzoni's contribution, which concentrates not on the flood plains but the Tuscan-Emilian Apennines (Abetone and Colle Cerreto). In this case the author highlights a sort of collective raised awareness of the ecosystemic sustainability principle amongst all those co-operating in tourist promotion in these two sites, as regards the exploitation of environmental, cultural and landscape resources in these middle mountain sites. It is clearly a model transferable to other areas in which local and international tourism can be a valid alternative to super-exploitation in local resource production terms (primary or secondary).

Elisabetta Novello's essay focuses on direct and indirect drivers of change. By examining the various phases in the evolution of the notion of "land reclamation" and providing an analysis of the contributions of the state and private financial sector to environmental improvement work from Unification to the Fascist age, the essay highlights the way in which ecosystemic services offered in marginal areas are frequently subject to diverse interpretation in the long term. The attention of lawmakers shifted from analysing the more strictly financial factors to technological and scientific and then social factors. The lawmakers' readings both influenced, and were influenced by, the construction of 'artificial lands', within which new economies, new power relationships and new identities gradually took shape.

This volume, which includes contributions on the services offered by water ecosystems, intends to break down academic and disciplinary barriers as far as possible, and therefore relies on the co-operation of specialists from a wide range of sectors.

We are very grateful to all those who agreed to work on this project and hope that this co-operation will continue in the future.

