

## Introduction

### Food for a growing Empire: reframing an old debate

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**Abstract:** This introduction explains the premise, content and aims of the volume, while it also frames the historiographical debate on land and people in the Roman world. Finally, it briefly touches upon possible research directions in the future regarding this theme.

**Keywords:** Roman economy, demography, agriculture, land, resilience, regionality, globalisation, economic growth

#### Introduction

At a certain point in their existence, all successful pre-industrial societies became faced with a fundamental challenge inherent to peasant-based economies: feeding a growing population while coping with the limits imposed by the natural environment and the available farming and processing techniques. Still, as medieval and later European history has repeatedly shown us (Grigg 1980), such problems did not automatically – or at least not immediately – lead to catastrophic Malthusian scenarios. Instead, it has rather reminded us how the threat of overpopulation stimulated agrarian communities to adopt a wide variety of strategies that – despite the inevitable decline of overall living standards – enabled them to maintain the balance between population and resources. Some of these solutions might be defined as “Boserupian” responses – that is, seeing population growth as a major driving force behind agricultural intensification and agro-technological innovation – and include the reduction of the natural fallow (ultimately leading to the omission of the technique in favour of rotation or multiple cropping systems) and changes in the type of crops grown (high- vs. low-yielding crops or crops with low vs. high agronomic needs). In other cases the flag does not cover the cargo, and societies often resorted to using a combination of demographic and agrarian adjustments, as there are birth control, migration (seasonal or permanent), changes in the organization of labour, or the expansion of the cultivated area into newly acquired or marginal territory, often at the expense of grazing- and woodland.

The link between demography and agriculture in economies preceding the industrialization era is a widely acknowledged feature in historical studies focusing on 13<sup>th</sup>-19<sup>th</sup> century Europe. Recent work by scholars such as Bruce W. Frier, Neville Morley and Walter Scheidel has

stressed the need for a deeper integration of population issues in Roman scholarship, as well as the profound lack thereof in socio-economic studies on classical antiquity (Frier 2001; Morley 2011; Scheidel 2001). However, archaeology and ancient history have already provided us with potential clues that may hint at the existence of population pressure in certain places and periods of the Mediterranean under Roman hegemony. One may recall here some of the survey evidence for the Italian peninsula, which suggests the bringing into cultivation of new and often marginal land in areas such as southern Etruria (Tuscany) (Potter 1979), central Picenum (Marche) (Van Limbergen et al. 2017) and the Po plain (e.g. Traina 1983; Bottazzi et al. 1990) in the Late Republic and the Early Empire. Other possible signs include the many remains of land reclamations, such as drainage works in marshy lands (Quilici and Quilici Gigli 1995; De Haas 2010; Frassine 2013; Pelgrom 2018; Walsh et al. 2014) or terrace constructions on hillslopes (Foxhall 1996). And what about some of the comments made by the ancient agronomists, like Columella who in the 1<sup>st</sup> century AD discusses the practice of turning woodland and pasturage into arable land; an action that in the end resulted in diminishing returns (Col. *Rust.* 3.11.3; 2.1.3-5; 2.8; 17.3)? Or what to say with regard to some of the epigraphic sources, which contain references to competition over (marginal) land in the Early Imperial period in Italy? (Paci 1996/1997; Campagnoli and Giorgi 2003)? Are we seeing here the effects of (over)population on (limited) land availability?

Whatever the case, the potential impact of demographic developments on agrarian structures deserves a more prominent place in explanatory models of the Roman economy. This volume wishes to address this hiatus, and brings together a group of international scholars to discuss the relationship between population dynamics and regional development in the Roman world from the perspective of

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archaeology. By adopting a comparative approach, the focus of the volume lies on exploring the various ways in which regional communities actively responded to population growth – or decline for that matter – in order to keep going on the land available to them. The theoretical framework – or at least starting point – for our case studies are the agricultural intensification models developed by Thomas Malthus and Ester Boserup. In order to advance the debate on the validity of these models for identifying the societal and economic pathways of the Roman world, we incorporate the concepts of resilience and diversity into our approach, and shift our attention from the longue-durée to how people managed to sustain themselves along the way, that is, over shorter periods of time.

When trying to decipher the dynamic between demography and land use, archaeologists and historians have indeed often resorted to the works of Thomas Malthus and Ester Boserup. In essence the Malthusian theory on the relationship between population and ecology in pre-industrial economies posits that a population continues to grow until it begins to approach – and eventually surpasses – the carrying capacity of the land that is available to them. As such, this process leads to so-called ‘positive checks’; that is, any kind of event that increased the death rate within a society, e.g. famine, war, and epidemic diseases, hence leading to a reduction of the population, and thus to demographic decline and socio-economic collapse (Malthus 1798). This process has become known as the ‘Malthusian trap’.

The Boserup model, on the other hand, turns this view around. Instead of considering population size as an outcome dependent on – and thus restricted by – the available farm land, it sees population as an independent variable able to trigger agro-technological progress. In Boserup’s view, this progress or change in land use as a response to population growth followed an extensive-intensive trajectory, along which people over and over again adapted more intensive labour- and capital demanding agricultural strategies and technologies, aimed in the first place at increasing the cropping frequency – and thus the carrying capacity – of the land (Boserup 1965).

The main reasons for the success – and at the same time the problematic nature – of these explanatory models in archaeology and ancient history are their simplicity and universality. Indeed, the Malthusian population dynamic is highly attractive because of the inescapable logic behind it, that is, the fact that there are physical limits to the amount of cultivable land on the earth. The Boserupian reasoning too has that very same appeal, as it starts from a unitary course, applicable to all pre-modern societies, which sees communities responding to population pressure in an identical way, by intensifying their cropping systems. But these are also the principal reasons why both models have (rightly) been criticized.

The most obvious and important critique on Malthus is that he assumed that soil capacity was a static and

thus unchangeable element. So he did not consider the effects of an evolving agriculture, both in technological advancements that improved the fertility, productivity and thus efficiency of land use, and in interventions that increased the quantity of cultivable land, such as land clearance, irrigation, drainage and land reclamation; all actions that enabled to raise the level of carrying capacity, and thus to maintain the balance between population and resources. To this, we might add that the total carrying capacity of the land can also change ‘naturally’, independent from human intervention, because of climatic effects (Lo Cascio and Malanima 2005).

The Boserup model did acknowledge the power of human agency to alter the productive capacity of its environment, but its main weakness was the unilateral and universal nature of these interventions (Boserup 1965). Indeed, the model displays a significant lack in variability and diversity when it comes to human productive and intensification strategies. There are many ways in which an agricultural regime may be intensified, that is, not only through proper intensification with an increase in labour and capital, but also through a range of specialisation and diversification strategies. In other words, no single path towards intensification exists. So the first model considered population size as limited by man’s inability to alter and adapt its environment, while the second model reversed man’s position and saw population as a key driver for environmental adaptations, even if from a too narrow point of view.

By mostly adopting this essence of Malthus and Boserup, however, scholars have too often stressed the apparent juxtaposition of both models, while they are – in a sense – compatible. Indeed, Malthus did acknowledge that population growth might stimulate people to intensify their production, while Boserup realised that responses other than the intensification of production could also be the outcome of population growth. So we might in fact imagine a range of intermediate scenarios in which, for example, a Boserupian response to population growth might prevent the Malthusian trap to set itself in motion.

The aim of this volume is thus not to discard the very basics of the theories of Malthus and Boserup, but rather to deconstruct too strict Malthusian (cf. Erdkamp 2016) or Boserupian scenarios, and as such introduce novel and more layered ways of thinking by exploring resilience and variability in human responses to population (growth). The last decade has seen a firm resurgence of sustainability and resilience studies in archaeo-historical scholarship. These have greatly enhanced our knowledge on how case-specific interactions of endogenous and exogenous factors either helped or hindered people in dealing with such unfavourable circumstances in medieval and early modern Europe, Classic and post-Classic America, and some parts of pre-modern Asia, Africa and Australia (e.g. Costanza et al. 2007; Curtis 2014; Faulseit 2015; Fisher et al. 2009). There is a lacuna, however, for the Mediterranean area in Roman times (ca. 500 BC – AD 500). Indeed, it remains

very much an open question how Roman civilization managed – at least for a while – to respond actively to population (growth) in its various sub-regions, and thus to remain stable over a long period of time. In order to start formulating some answers, this volume follows a regional trajectory by systematically going through some of its more important subareas in a series of six case studies (Figure 1.1). The focus is hereby on the Western Roman Empire between the 1<sup>st</sup> and the 3<sup>rd</sup> century AD. We believe that this approach can successfully offer interesting new points of reflection, as it will show how local (re)actions to demographic changes were in part determined by local environmental and climate within the vast Roman Empire.

### Contents of the volume

The first chapter by Pierre Ouzoulias serves as both a broader introduction to the theories of Malthus and Boserup, and a critical reappraisal of recent syntheses on ancient demography. It then applies the Boserup paradigm to explore the expansion of agriculture in four marginal areas of northern Roman Gaul (Figure 1.1, region 1). Despite natural adversities, all regions show an intensification of both agriculture and habitation during the High Empire. In the Haye forest, a network of small and medium-sized villas got the most out of the poor soils through a system of walled and terraced fields. Similarly, in the Châtillon forest, the very thin layer of top soil covering a bedrock was

intensely worked and even fertilized. The archaeological data from the Vosges foothills points to a remarkable connectivity of what appears to be a secluded area with the larger Roman cultural sphere. In the Brie Boisée district, it was not the introduction of new technologies or techniques, but a more intense and more productive application of traditional agricultural methods that improved the output of the land. Ouzoulias interestingly links this more intense cultivation of marginal lands to the growing urbanisation and the accompanying rise in demography in this part of the Empire. Indigenous family units running modest farms still formed the agricultural basis of this land, but the incorporation in a larger network incited them to increase the scale and maximize the results of their agricultural system. Such small farms are also the first victims when the times of boom are over and demand is on the wane.

The second chapter by Maaïke Groot shifts the attention more to the northeast, and further explores the ideas of Ester Boserup for understanding agricultural developments in the provinces of *Germania Inferior* and *Germania Superior*, in particular to entangle the relationship between demography and animal husbandry (Figure 1.1, region 2). The archaeological evidence shows (at least) three ways how cattle breeding could cope with a rising demand as a result of increasing urbanisation. One response was to breed larger cattle. Three strategies seem to have been adopted: improve the cattle's nutrition, selective breeding

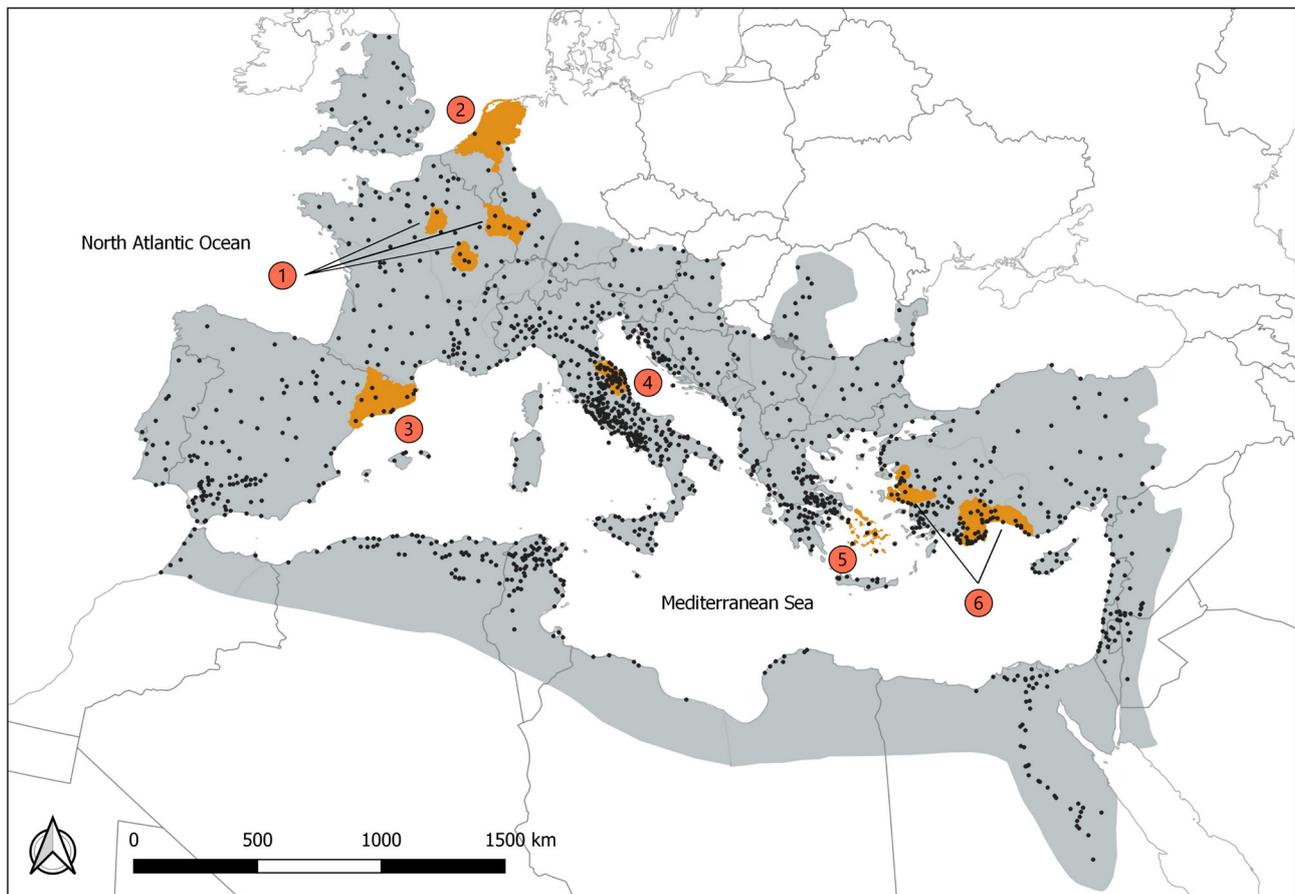


Figure 1.1. Localisation of the six study areas (yellow) within the Roman Empire (limits in AD 117), with indication of Roman towns (based on Hanson 2016).

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of larger animals, and importing larger species for cross-breeding with local stock. A second response was to increase the stock by conquering new lands: marginal areas were put to good use. At last, a third response consisted of a specialization of cattle breeding. Evidence points to farms that focussed on wool production or the breeding of horses. In urban contexts, this specialization can be distinguished in the development of new crafts (glue production, bone working, tanning, etc.). Urbanisation and population growth and the resulting ‘pressure’ on farmers was not necessarily a bad thing, concludes Groot, as the new relationship between city and countryside also created new opportunities, new products and sometimes more wealth.

With the third chapter by Antoni Martin I Oliveras et al., we move to the heartland of the Mediterranean and the Roman wine industry with a case study of the Laetanian region in coastal Roman Spain (Figure 1.1, region 3). The intensification and specialization of viticulture, most notably perceivable by an increase of rural estates and amphora workshops, is linked to a demographic rise during the late Republic and Early Imperial period. The article investigates the complex economic interplay between production, trade and consumption from the regional level, to the inter-regional and eventually extra-regional empire-wide market. Hopkin’s tax-and-trade model is used as a starting point for this analysis. The use of mathematics, statistics and linear programming models allows the authors to analyse, interpret, and make predictions and reconstructions about the evolution of an ancient economic system.

The fourth chapter by Dimitri Van Limbergen explores the potential of the *arbustum* as an ingenious response to land constraints in central Adriatic Italy in Early and Mid-Imperial times (ca. 25 BC-AD 200) (Figure 1.1, region 4). The *arbustum* was a plantation with vines trained on rows of host trees placed within crop fields. These fields were usually reserved for grain, legumes and vegetables, but sometimes they were also used for animal rearing. This type of silvo-arable agroforestry is a long-standing tradition in Italy (with later variants playing a central role in commercial viticulture up until the mid-20<sup>th</sup> century) (Sereni 19), but scholarly discussion on the *arbustum* has largely revolved around its place within subsistence agriculture and small-scale viticulture (Tchernia 1986). While the origin of this cultivation technique undeniably lies within this context, the system clearly broke through into Roman commercial farming as well. In fact, already in the 2<sup>nd</sup> century BC, Cato recommends the *arbustum* to farmers who grow vines for the urban market. About two centuries later, both Pliny the Elder and Columella consider the *arbustum* fully part of the Italian wine landscape. Furthermore, the literary evidence suggests that Italian farmers began systematizing and perfecting the *arbustum* from the mid-1<sup>st</sup> century BC onwards, with the practice reaching its most organized and widespread form in the course of the 1<sup>st</sup> and 2<sup>nd</sup> century AD. Recent archaeological and historical research in central Adriatic

Italy has identified this period as a time of significant urban and rural demographic vitality. Taking as a starting point the possible causal link between these two processes, this chapter represents a first attempt to study this ancient agroforestry system, and in particular to analyze its qualities as a sustainable agricultural strategy in this part of Roman Italy. As such, it aims at integrating vine agroforestry into our narratives of viticulture and wine production in the Late Republic and the Early/High Empire.

The relationship between population and local viticulture is also discussed in the next chapter by Emlyn Dodd, this time for Delos (Figure 1.1, region 5). This chapter is atypical, however, in the way that it 1) discusses the potential effects of population decline (and not growth) on the local wine industry, 2) does so not for the mainland, but for an island in the Mediterranean, and 3) focuses on Late Antiquity (4<sup>th</sup>-6<sup>th</sup> century AD) rather than the core period of this volume, that is the 1<sup>st</sup> to 3<sup>rd</sup> century AD. Still, its inclusion in this volume represents a valuable opportunity to explore the dynamic between population and land use in a unique geographical setting, and within the distinct framework of island archaeology, characterised by a high degree of interconnectivity and the common formation of productive niches. In particular, the author combines an original archaeological dataset (i.e. wine production installations) with socio-cultural and socio-economic theory to sketch a picture of unexpected resilience in a time of allegedly ‘negative developments’ (population decrease). He so provides a seminal example of how a reduced population might ‘respond’ agriculturally in a positive way, thus contradicting typical Malthusian or Boserupian scenarios. At the same time, his study serves as a firm reminder not to reconstruct societal evolution *a priori* in too strict terms of prosperity and crisis.

The sixth and final chapter by Rinse Willet moves even further to the Roman East, and discusses the relationship between urbanisation, demography (town and country) and agricultural processes in *Asia Minor* (Figure 1.1, region 6). On the basis of four case studies – the cities of Kyaneai, Sagalassos, Ephesos and Pergamon – the author questions whether the noticeable increase in the number of cities in *Asia Minor* between the 2<sup>nd</sup> century BC and the 3<sup>rd</sup> century AD also represents an urban demographic growth, and if so, how this growth impacted agriculture and land use in their territories. Through the use of archaeology, epigraphy and a selection of historical and comparative sources, he argues that demographic growth did take place in both town and country, but that in most cases these towns did not outgrow their agricultural potential. For bigger towns such as Ephesos and Pergamon, however, the situation might be different. In any case, an increase in agricultural productivity as a result of these processes is likely, but the Malthusian axiom seems once again ill-adapted to frame these developments. In the end, this leads the author to discard the so-called low-equilibrium trap in favour of a “gradually improving equilibrium”.

## Implications and future prospects

Ever since the publication of Gibbon's *Decline and Fall* in 1788, scientists have been fascinated by the end of Rome and the reason(s) why it ended (e.g. Simkhovitch 1916; Huntington 1917; Tainter 1988; 2000; 2014). As Gibbon himself has phrased so eloquently, however, the wonder is not that Rome eventually fell, but rather that it managed to last for so long (Gibbon 1776-1788). Some of the answers necessarily lie in the ways in which the Romans dealt with the population-land equilibrium. The papers in this volume hopefully testify to the potential of archaeology – if integrated within a holistic and multidisciplinary approach – as a tool for reconstructing such trajectories on a regional scale. While some arguments and conclusions necessarily remain tentative, the picture that emerges from the selected case studies is a positive one; that is, one that shows how the Romans dealt actively with demography and resources in many different ways, either by using more (marginal) lands (northern Gaul, *Asia Minor*), adapting their farming strategies (central Adriatic Italy), ramping-up and/or specializing production (Delos, Laetanian Spain), or by combining a variety of strategies (*Germania*). In all cases, the solutions point to an intelligent and maximal use of the local environment. Obviously, from a modern point of view, these solutions all had their intrinsic limits – and an inevitable expiration date – but on the face of it, they were at least successful in establishing and/or notably prolonging regional equilibria between people and natural resources. These first observations allow for some cautious optimism when it comes to assessing the level and impact of population pressure on land use and the food economy in these areas and times of the Roman world (Flohre 2019).

We are aware that the collection of papers presented here is not comprehensive. Much remains to be done – and here we formulate a clear call for many more regional archaeological datasets and case studies, especially for North Africa and the East – but we are convinced that the present volume has established a helpful framework, both conceptually and methodologically, to further tackle the fundamental link between population, natural resources and regional developments in the Roman world. The six papers in this book have shown in particular how in-depth regional studies can contribute to the understanding of the diversity in land exploitation – and in the human drivers and responses to it – that existed within the Roman Empire. At first sight, globalization theory may seem useful to investigate this 'diversity within a new shared (Roman) cultural framework' (Versluys 2014, 14). But as Pitts and Versluys have rightly pointed out, globalization is a multi-sided theory, with variations and adaptations of the concept giving rise to different interpretations of the phenomenon (Pitts and Versluys 2015, 10-13). It comes as no surprise then, that the application of globalization to the ancient economy is quite problematic. Indeed, Neville Morley has rightly argued that a key marker of modern globalization, that is the compression of space and time,

did not really occur in Roman times, at least not in such a way that it caused a radical shift of economic activities from a local to a regional scale, and certainly not from a regional to a global scale (Morley 2015, 56). Production remained oriented primarily towards local markets, while imports were percentage-wise often at their peak in the early phases of Roman conquest, only to be replaced later by local imitations and regional productions. On the other hand, what we can take away from globalization theory is the fact that economic changes were not always a process directed by the state. The distinct local responses pointed out in the contributions in this volume, often rooted in native traditions (cf. Ouzoulias; Van Limbergen), amply attest to this phenomenon. An increase in specialization due to changed consumption patterns – and hence changes in demand – is also clear from several cases (cf. Groot; Dodd), but these may also be interpreted as the economic consequence of cultural globalization (Morley 2015, 61). Finally, an increase in scale (cf. Oliveras et al.; Willet) and consumption surely makes the Roman world differ from preceding eras, but not necessarily in a way that this resulted in a significant reduction of journey time (time compression) in a totally interconnected world (space compression); both indispensable markers of economic globalization.

If not globalized, the Roman world certainly became much more integrated along the way. Yet we should not envision this integration process as total and unified, but rather as having led to a series of separate but interlinked market systems, organized around specific products, and to a large degree steered by the state (Tchernia 2016; Van Limbergen 2019). As Groot's chapter in particular has suggested, this distinct form of market integration may in part have resulted from an increase in (urban) demand for manufactured goods and raw materials. This proliferation of the non-agricultural sector was then precisely possible because of population growth and the larger availability of (rural) labour (e.g. Erdkamp 2015; 2020). Particularly lucrative and environmentally determined products such as wine and olive oil were another important part of such demarcated (long-distance) supply networks, and this may help to explain the remarkable recovery of Delos in Late Antiquity (Dodd), or the rise of the wine industry in *Hispania Citerior Tarraconensis* in the late 1<sup>st</sup> century BC (Oliveras et al.). Together with the central Adriatic area (Van Limbergen), the Laetanian case also provides a clear example of the apparent rise in rural settlement numbers that seems to characterize much of the Western Roman world in the Late Republic and the Early Empire (cf. Jongman 2017). Still, more so than anything else, the papers in this volume all highlight the intrinsic link between regional food production and consumption, and stress how this deep connection remained the prime driver for the dynamics between population and land. Depending on factors like the rate of urbanisation and the nature of the territory, this process could seemingly play out better in some areas (Willet) than in others (Ouzoulias), but always in distinct and sometimes even unique ways (Van Limbergen). It is precisely this diversity in human

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responses to the wider phenomenon of demographic growth in the Roman world that this volume wants to emphasize.

Finally, it remains difficult to determine what kind of economic growth accompanied this growth in population. Delos left aside, the archaeological data discussed in this volume clearly show signs of aggregate economic growth of local economies; that is, more (urban and rural) people meant more consumption, and hence more production. It is less clear, however, how this process impacted overall standards of living. How well-off were people in these areas? The matter of per capita growth in the Roman world remains heavily debated (e.g. Frier 2001; Jongman 2007; Erdkamp 2020), but most of our archaeological samples are insufficient in size to give definite answers (cf. De Haas et al. 2011). The chapters in this volume are, alas, no exception. Still, based on the data presented here, the potential for achieving real growth at least seems to have differed from one region to the other. Indeed, some material and epigraphic remains appear to reflect higher levels of urban and rural prosperity (e.g. *Asia Minor*, central Adriatic Italy) than others (e.g. northern Gaul, *Germania*, *Hispania*), and this is again a strong reminder of the different cultural backgrounds (Greek-Hellenistic in the Mediterranean, Celtic in the North) and subsequent regionality of such developments in the Roman world. But whatever the nature of these developments, they all seem to have been connected to investments in some way: investments in agricultural specialization (wine in *Hispania* and Delos, cattle breeding in *Germania*), in the extension and/or reorganisation of land (central Adriatic Italy, Gaul), in public and private building programs (e.g. *Asia Minor*), and in infrastructure such as harbours and roads. So if we were to draw up the balance sheet right now, we suggest that most of the areas discussed in this volume were able to sustain trajectories that involved more than just aggregate economic growth (cf. the ‘moderate growth’ models explored in De Haas et al. 2011; Launaro 2011; Poblome et al. 2011), but that is as far as the current evidence can bring us. In any case, we hope that with this volume we can at least push the long-standing debate on growth and sustainability in the Roman world into promising new directions.

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