The Economic Meaning of Settlement Hierarchies: a Case Study from the Roman Upper Volturno Basin

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After 70 years of archaeological surveys, many scholars agree that, between the 3rd and the 6th century AD, the countryside of the Italian peninsula suffered a strong demographic contraction.[1] Nonetheless, due to its methodological limitations, the contribution of survey archaeology to clarify the economic nuances of this trend is still minor[2] and debate is yet ongoing on fundamental issues as the intensity of land exploitation, the emergence of minor centres and the role of towns in this declining period. Amongst others, a crucial methodological problem lies in the conflict between the fixity of archaeological site classification compared to the dynamism of rural settlement hierarchies that it is meant to describe. This article shows that a more flexible approach to settlement categorisation can be obtained by linking the size of ceramic scatters to the fertility of settlement catchments. This approach has the potential of highlighting changes in the organization of rural economy while also including cities in landscape histories. Using two survey datasets in the Upper Volturno Basin (UVB, central Italy), this research reviews legacy data with a dynamic site categorisation and adds new important details on the emergence of "minor centres" and on their economic relation to cities.

The UVB is one of the widest valleys in the Apennines, dividing the Mainarde from the Matese, and hosts, on a travertine outcrop to the east, the Roman colony of *Aesernia* and, on a plateau just below the Mainarde massif, the Late Antique site of San Vincenzo al Volturno (fig. 1). The availability of two survey projects, the San Vincenzo Project (SVP)[4] to the west and the Colonial Landscape Project (CLP)[5] to the east, allows a seamless reconstruction of the demographic history in this region and contextualises the histories of the two sites within their shared territory. The thirty years elapsed between the two projects created a significant methodological gap, thus a comparison could only be achieved after a thorough reanalysis of the ceramic material and a resurvey of specific areas of the SVP.[6] There is no space here to get in the details of this process.[7] Suffice to say that this reanalysis mitigated the negative outlook provided in the final publication of the SVP, but settlement trends clearly show a seamless quantitative decline from the Republican until the early Medieval period, when it reaches its all-time low (fig. 2a).

Traditionally, survey archaeologists distinguish site types depending on the size of their ceramic scatter.[8] This categorisation is problematic, as size is only one feature defining the socio-economic role of a settlement:[9] a large scatter could identify either a village devoted to mixed farming or a large estate centre focused on monoculture. A method elaborated in Maya archaeology[10] offers a way to create categories by plotting site-size versus catchment-productivity. According to this method, the size of an agrarian settlement is directly proportional to its catchment productivity ($Vj = kPj$), while sites

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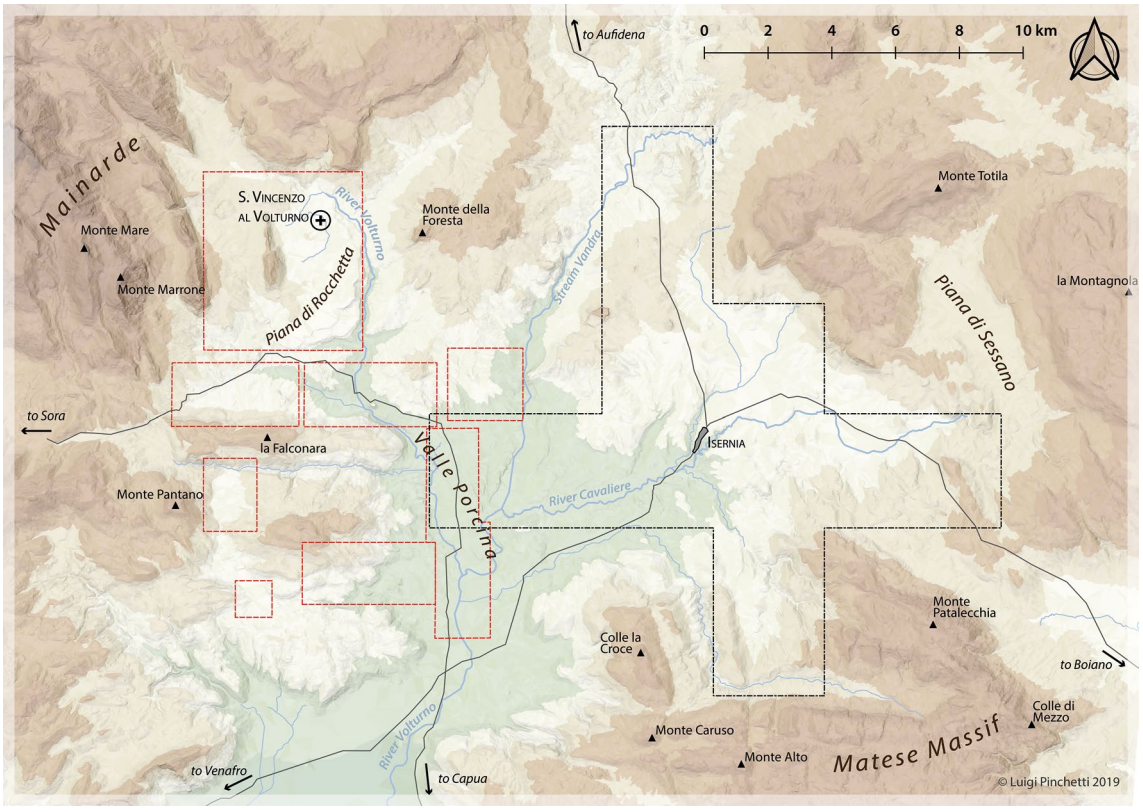

Fig. 1: The Upper Volturno Basin and the research areas of SVP and CLP.

sustained through an external input (e.g. rent income, market exchange, etc.), follow alternative formulas (e.g. $Vj = kPj + kt\Sigma Pij$), in which each additional feature determines its hierarchical layer. Vertical separation between layers in the size/catchment plot indicate the level of social differentiation between social groups. Throughout time, the position within the graph of a specific settlement can change if modifications appear in any of the two defining attributes.

Steponaitis' approach requires an accurate calculation of the potential of settlement catchments. This is dependent on the size of settlement catchments and on the method used to evaluate land fertility. The boundaries of site catchments were set at 10-minutes walking distance, as this equated half of the mean distance between sites, and were calculated in GRASS GIS. When waterways were broader than 1 metre and a half, these were considered as boundaries. Fertile areas within catchments were identified with Land Suitability Analysis, a GIS-based analysis used in modern landscape planning to identify appropriate patterns of land-use.[11] In agriculture the tool is used to pinpoint the areas more suited to certain cultivations depending on the requirements of crops.[12] In the case of the UVB, land suitability was estimated starting from the physiological necessities of the "Mediterranean triad": cereals, vines and olives. To better approximate the ancient land use pattern, the suitability estimation followed the judgements provided

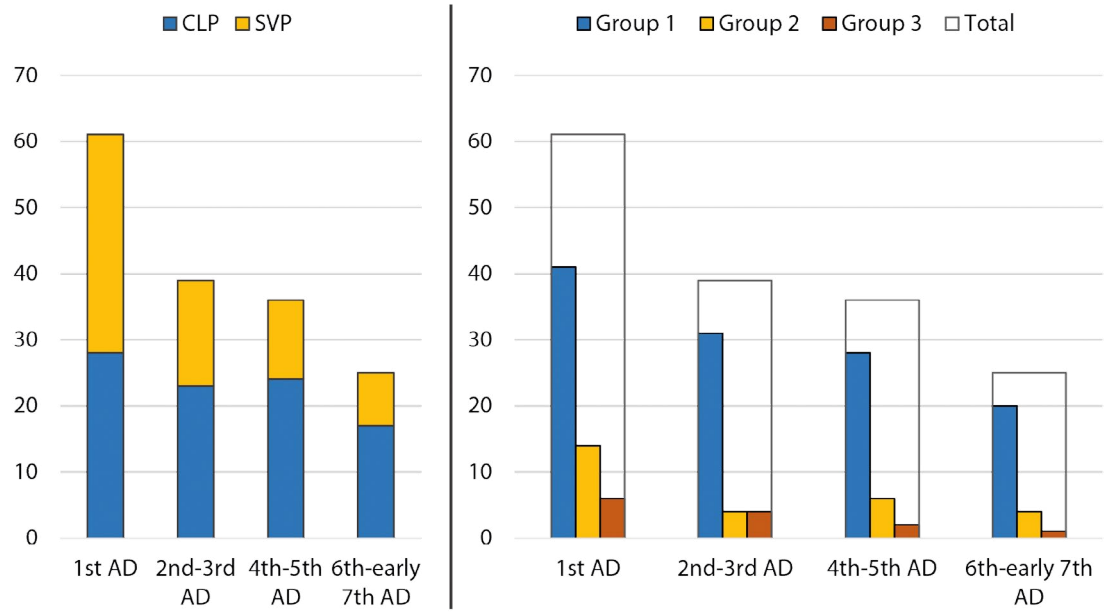

Fig. 2: Settlement dynamics in the UVB: per project (left); per group (right).

by Roman agronomists, similarly to the method used in southern Etruria by Helen Goodchild.[13]

The graphs (fig. 3) show the relation existing between site sizes and catchment productivity at four different periods. Three different groups can be recognised, and despite some changes, they always follow three almost parallel lines in each of the investigated period. The first group is characterised by small scatter sizes (0–0.5 ha), but highly productive catchments. The group follows a line that can be described through the formula (1) and therefore these sites can be interpreted as farmsteads of different sizes and it is expected that these sites were responsible of most of the agrarian output in the UVB. A second group is positioned in the lower left quarter of the plots, characterised by medium scatter size (0,2–1 ha) and low productive catchments. These sites could not have been completely self-sufficient and therefore depended to some extent on the agrarian product of group 1. These sites can be interpreted as "non-agrarian" rural settlements, which includes anything like *stationes*, workshops, pastoral sites or small villas. Finally, a third group of sites is characterised by medium-large scatter size (>0,5 ha) and occupies the top of the chart. The sites belonging to this last group could be generically termed as secondary rural centres, as their size implies a relatively high population, but it is to be expected a fluctuating involvement in agriculture depending on the horizontal position on the plot. Above all these sites can be located a fourth level, that of cities, which will be considered at a later stage.

A cross-chronological outlook allows some considerations on the changing organisation of rural settlements in the UVB. In general, the graphs highlight a compression of settlement hierarchies that could be interpreted as a symptom of economic simplification.

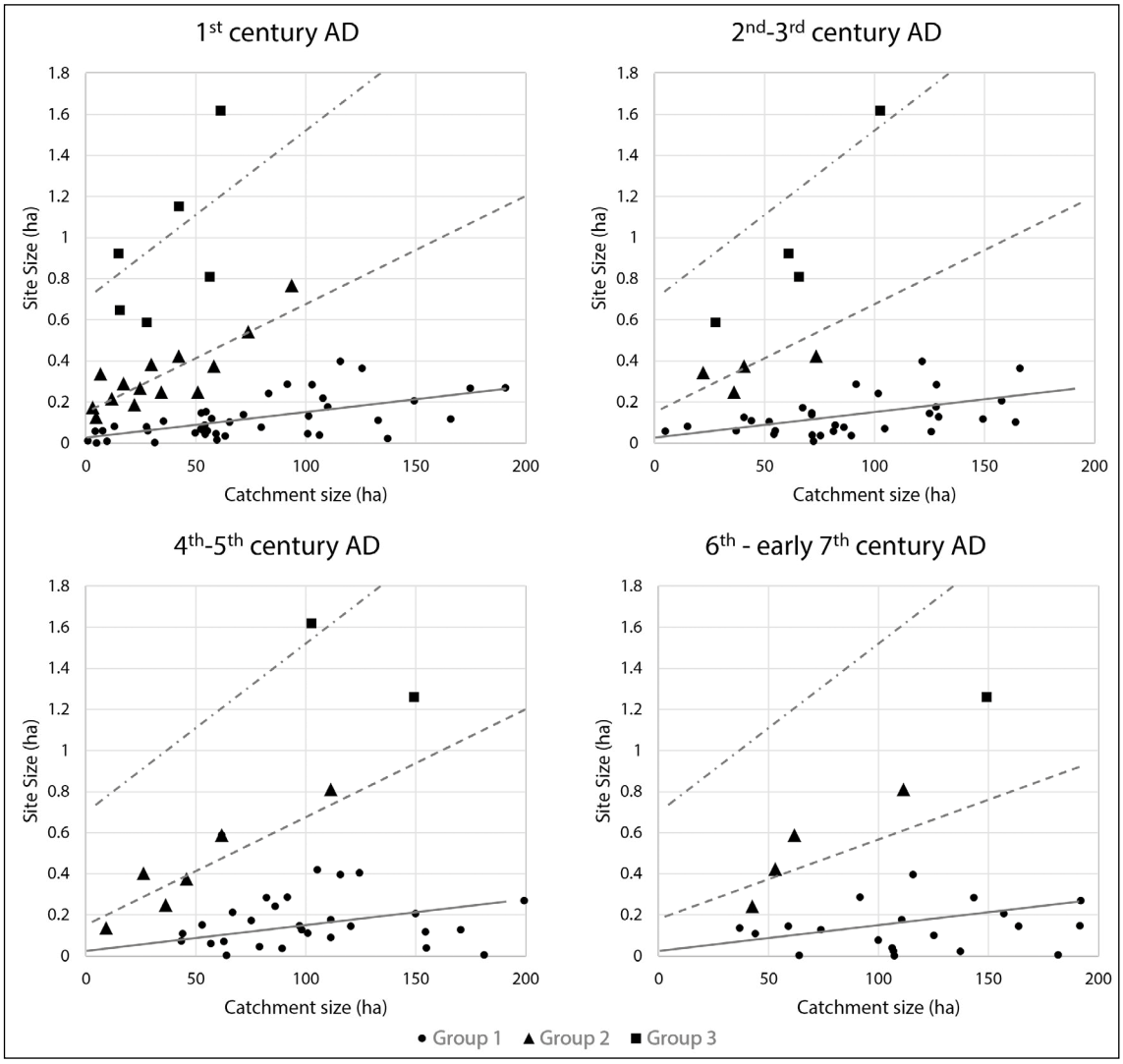

Fig. 3: Site size/catchment productivity graphs of the UVB sites between the 1st and the early 7th century AD.

The disappearance of sites from the top left quadrant indicate that the late antique economic framework envisaged a growing focus on agrarian productivity, and this fits the hypothesis that the late antique agriculture was turning to subsistence necessities, with a gradual abandonment of market economy.[14] If the general framework is unchanged, the approach presented here allows to chronologically follow the steps undertaken to accomplish this economic reconversion and to analyse the reaction of peasantry and of the urban centre to these stages. It appears beneficial to adopt the framework of evolutionary economics, according to which the process of site reduction can be interpreted as an example of "selection mechanism". In a selection mechanism, given a group of agents in a period of economic change, only those fitting the new socio-economic context are

able to prosper.[15] In economic geography, a successful pattern of settlements stems out of a selection of optimal sites located within so-called 'spatial margins of profitability' whose boundaries change depending on the geographic and economic circumstances.[16] Consequently, different rates of continuity in ancient settlement patterns can inform on the changes in the economic environment. The UVB data shows two main moments of "selection": the 2nd century AD (from 61 to 39 sites, -36%) and the 6th century AD (from 36 to 25 sites, -31%). Historically, the first drop can be interpreted as the last act of the agglomeration of the Republican small properties into the Imperial *latifundia* system,[17] while the second is linked to the socio-economic instability caused by the Greek-Gothic wars.[18] By analysing the rates of group resilience in these two decisive moments, it is possible to see how differently these changes affected the rural settlement organisation.

The transition to the 2nd century AD is characterised in the whole peninsula by a stronger continuity amongst larger settlements while smaller sites tended to suffer stronger declines,[19] a trend commonly associated with the expansion of large *latifundia* at the expenses of small landholding.[20] Initially, this trend was also observed in the San Vincenzo's dataset,[21] but merging the SVP and CLP results revealed a different situation. First, the average site size remains stable throughout the first half of the 1st millennium AD (fig. 4), suggesting that the nucleation in larger settlements must have affected only a minor part of the rural population in the UVB. Second, the strongest contraction occurred amongst the medium-sized sites of group-2, while a much lighter decrease affected group-1 and group-3 (fig. 2b). Then it can be argued that in the 2nd century AD the success of a site was more dependent on the productivity of its hinterland, rather than on its size. Noticeably, this fact does not play out the eventuality that in this period large land units incorporated smaller plots, as indeed the average catchment productivity grows. Nonetheless, it certainly scales down the expectancies on the presence of large estate centres in this region of Italy and proves that this settlement type did not dominate the Samnite landscape as in Lucania[22] or Apulia[23]. The growing necessity of the elites of Samnium to sustain their political prestige, either locally or in Rome,[24] could partially explain the new structure of the rural settlement pattern. If the local aristocracy based its richness on land output, it would try to position its workers in the most fertile locations, even though, not necessarily in fewer larger settlements. Similarly, if the aim were to gain political power, the profits would be reinvested either in the closest town (Isernia or Venafro) or in Rome itself. Accordingly, the reinvestments reaching their rural properties would have been limited to productive enhancements (e.g. acquirement of new land, installation of facilities to transform or store rural products), but also to the maintenance of locally prominent locations, eventually leading to an impoverishment of the rural population and the abandonment of sites lacking fertile surroundings or social prestige. This scenario envisages an agriculture that, in the 2nd century AD, still worked within a larger integrated system of exchange. It is possible that few remote sites turned already to subsistence strategies, but there is no evidence that a closed economy was already dominating by this date.

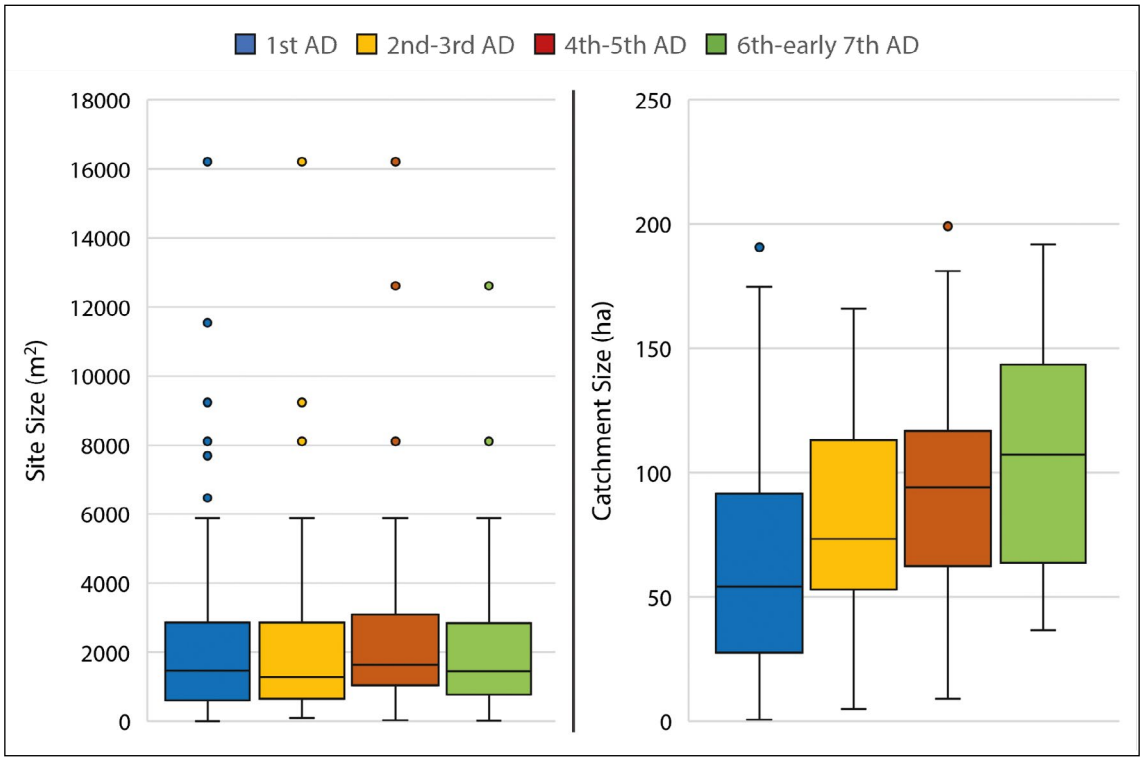

Fig. 4: Site size (left) and catchment productivity (right) averages between the 1st and the early 7th century AD.

Between the 2nd and the 5th century AD site numbers show a certain continuity, demonstrating a reached equilibrium and a successful integration within the mid-Imperial economy. Site typologies are also quite stable: the only major change is the movement of group-3 sites to the top right of the graph, representing a growth in site size and catchment productivity. However, with the 6th century considerable novelties are introduced, but in a substantially different fashion from the 2nd century AD. In the academic debate, the 6th century marks the end of the Roman villa-system[25] and, in Samnium, it is at this date that farmsteads and villa almost completely disappear.[26] As in other areas of central Italy, only few sherds of African pottery post-date the 500 AD in the UVB[27] and even in Isernia it is hard to trace evidence from this period.[28] The combined analysis of the SVP and CLP data confirms that in the 6th century the UVB was lightly populated as only 25 sites show some evidence of occupation. Differently from the 2nd century AD, in the 6th century all the groups share a similar percentual decrease (ca. 30%; group-1 from 28 to 20; group-2 from 6 to 4; group-3 from 2 to 1). This uniform decrease substantiates the hypothesis that the crisis was caused by an event affecting indiscriminately the whole rural population, a feature that fits the effects of long-lasting warfare and, thus, of the Greek-Gothic wars. Despite the quantitative regression, it is noticeable

that the hierarchical organisation of settlements remained substantially unvaried.[29] This fact suggests that until the early 7th century the Roman settlement pattern was still providing the essential framework in which it was organised the rural population. This evidence indicates, firstly, an economic continuity between the late Roman Empire and the Gothic kingdom[30] and, secondly, a rather indirect influence of the Greek-Gothic wars on the UVB. Therefore, the data collected in the UVB is suggesting that the Roman settlement structure reached the 7th century AD, when the first traces of hilltop occupation appear on Le Mura-Mennella[31] and with the inclusion of Isernia in the Lombard Duchy of Benevento.[32]

It is now necessary to understand how the events occurring in the UVB intertwine with the history of Isernia, but also whether the approach outlined in this article can help perceive variations in the economic centrality of the city. For the history of the UVB this is particularly helpful, as late antique Isernia is almost completely unknown archaeologically.[33] The only certain information concerns the restoration of the market and the wall after an earthquake in 346 AD and that the city was never completely abandoned, despite evidence of a strong demographic decline[34]. Contemporarily, san Vincenzo stood out amongst the other rural settlements, with some religious[35] and economic[36] power. In the 5th–6th century, its architectural and material evidence resembled closely that of Isernia.[37] These elements lead to hypothesise that the late antique San Vincenzo was a developing central place,[38] somehow alternative to the city. Kim Bowes[39] rejected this hypothesis as survey evidence suggests a detachment of San Vincenzo from the local economy and identified the source of San Vincenzo's richness in extra-regional investments. With the approach proposed in this article it is possible to investigate the socio-economic linking these two centres with their territories.

Before the 346 AD earthquake, the town occupied almost the whole travertine outcrop, on which it lied, reaching a size of ca. 12 hectares. Its hinterland was not the most fertile area in the UVB and around 180 hectares were suitable for cultivation. These characteristics indicate that Isernia did not belong to any of the three groups analysed previously and gives a first measure of the town's economic weight in the early and mid-Imperial period. During Late Antiquity, the size of the city shrank, occupying in the 6th century only the area around the modern cathedral (2,5–5 hectares).[40] This contraction "downgraded" Isernia to a position resembling that of the contemporary *vicus* of San Vincenzo (cfr. n.2). These apparently similar sites differed enormously in their relationship with the territory. Considering the geographical distribution of rural settlements will help visualise the difference between city and *vicus*. In fact, despite the strong decrease in number of rural settlements in the UVB (- 60%), the area directly outside the urban walls (< 1 hour walking) suffers a noticeably minor decrease (-30%; fig. 5). Thus, in the 6th century AD, the landscape divided in two concentric belts: a peri-urban area dotted by small farmsteads and a virtually deserted further away. It appears clear that the 'spatial margins of profitability' for scattered settlements

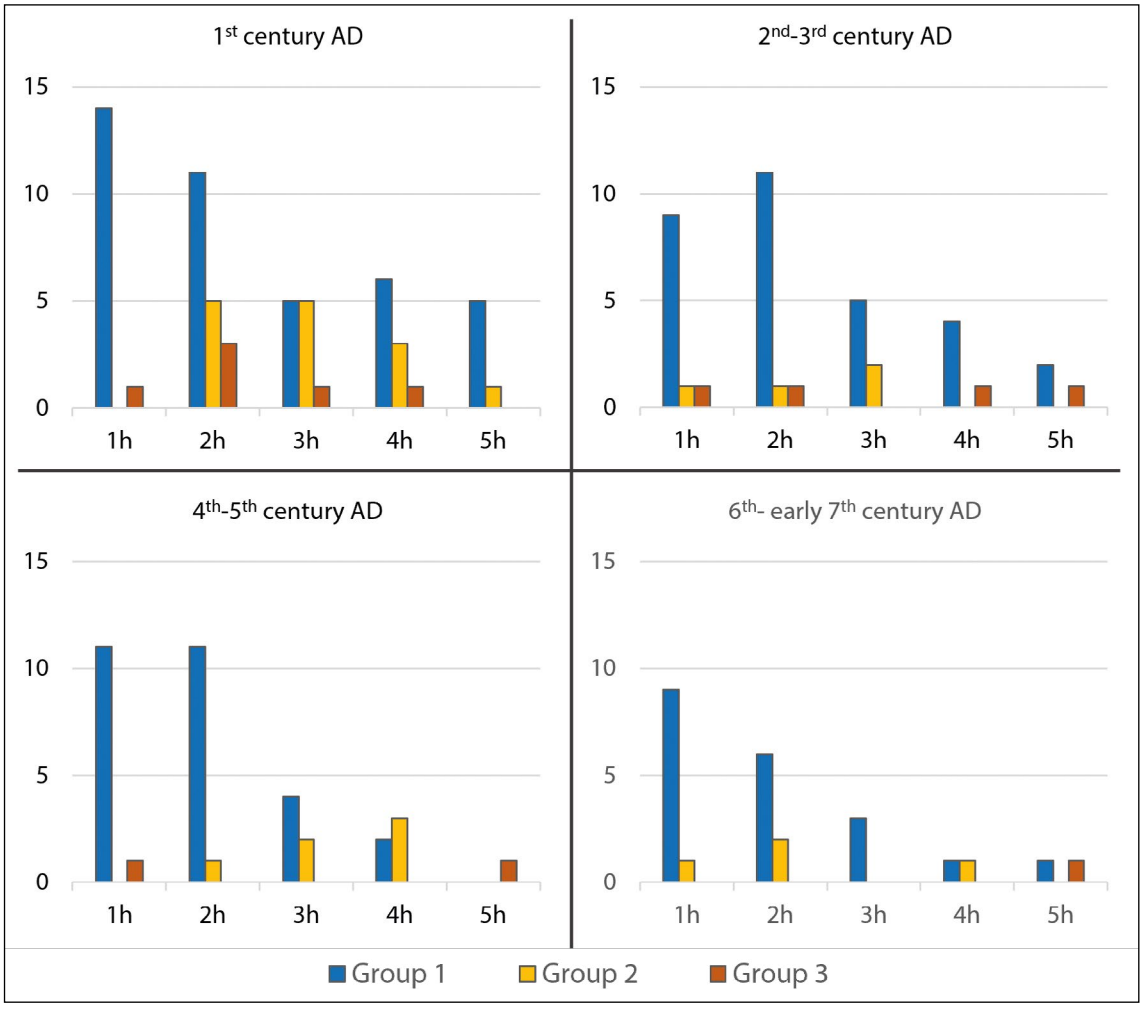

Fig. 5: Site quantities versus distance from Isernia.

were restricted to a thin strip of territory around Isernia. Beyond these margins only larger and autonomous settlements could survive, as the evidence from the rest of the Italian peninsula seems also to suggest.[41] Thus, it appears clear that, if Isernia was at the top of a local economic network, San Vincenzo was most likely leading an almost completely self-sufficient agrarian regime, with few or no satellite settlements. Until this autarchic system received the external support of a rich elite class, as that of the Church, this created living conditions that could resemble urban standards. The fragility of San Vincenzo's system became evident in the 7th century, when the external income disappeared and so did its urban resemblance.

Summing up, the evidence from the UVB suggests a profound redefinition of site-hierarchies that occurs in two steps during the imperial period. The first, in the 2nd century, generated a shift of the rural economy towards agrarian productivity, with all

likelihoods triggered by the local aristocracy. This caused a widespread impoverishment of the rural population and the abandonment of mid-sized "non-agrarian" sites, but maintained an active agrarian economy that integrated well in the imperial network, as indicated by the settlement continuity until the 5th century. The second step dates to the 6th century and marked the transition to an economic system with narrower horizons, as visible in the contraction of Isernia's economic influence. This second phase lead to a bipartite landscape with an economically active peri-urban countryside and a poorly settled peripheral territory. In this remote belt, secondary agglomerations had more chances to survive, especially when they could combine subsistence strategies to external investments. Overall, the outlook offered here confirms what has been known for long on the rural changes in the Italian peninsula, but it has emerged how hierarchically superior centres were successful only if they worked as catalysts for short-distance economic networks. Similarly, a more flexible settlement categorisation, able to connect site scatters to their potential economic function, highlighted how different "global" changes had a different impact on the local economic organisation. The method is potentially applicable to any survey dataset and therefore it is hoped that comparisons from other regions will appear in the future.

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Notes

[1] Ward-Perkins 2005; Christie 2006.

[2] Bowden – Lavan 2004.

[3] Brancaccio et al. 1997, 321.

[4] Bowes et al. 2006.

[5] Stek et al. 2015.

[6] Conducted respectively in March and August 2017 by the author.

[7] A full description of the methodology is provided in Pinchetti forthcoming, chapter 3.

[8] Dyson 2003, 39–40.

[9] White 1970, 388.
[10] Steponaitis 1981.
[11] Malczewski 2004, 4–5.
[12] Wang 1994, 265.
[13] Goodchild 2009.
[14] Bowes 2006, 289–290.
[15] Dosi – Nelson 1994, 156–157.
[16] Boschma – Lambooy 1999, 414.
[17] Patterson 1987, 141–142.
[18] Arthur 2004, 110–111; Christie 2006, 458–461.
[19] Christie 2006, 426–427.
[20] Ikeguchi 2004, 241.
[21] Baker et al. 2006, 33.
[22] Small 1999, 335–336.
[23] Volpe 2012, 39.
[24] Patterson 2004, 60–62.
[25] Lewit 2003; Wickham 2005, 473–474.
[26] Lloyd 1995, 253; Bowes 2006, 290.
[27] Ceglia – Marchetta 2015, 653.
[28] Finocchietti 2012, 23–24.
[29] The only group-3 site left, the vicus of San Vincenzo, is larger than what discovered by survey and possibly reached up to 4 hectares Bowes 2006, 296. Therefore, its position moves towards the top of the graph.
[30] Christie 2006, 452–455.
[31] Pani Ermini 2004, 272.
[32] Di Rocco 2009, 18.
[33] Iasiello 2007, 126.
[34] Terzani 2004, 172; Ebanista 2007, 247.
[35] Barnish 1995, 133–137; Bowes 2006, 298–302.
[36] Hodges – Rovelli 1998.
[37] cfr. Hodges 1995, 127; Terzani 2004, 173 n. 54.
[38] Arthur – Patterson 1994, 431.
[39] Bowes 2006.
[40] Ebanista 2007, 250.
[41] Bertoldi et al. 2019, 199–200.

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Fig. 1–5: by the author.

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