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Resilience and vulnerability in the Syrian Desert in the first millennium CE: The case of the oasis city Tadmor (Palmyra)

Abstract

Urban resilience in past societies is challenging to measure given the nature of our data, which for the most part gives insight into past processes only through their archeological and historical outcomes. We therefore suggest to approach the issue in conjunction with vulnerability, which was only too familiar to ancient societies, and outcomes, which represent suitable proxies of whether societies were capable of dealing with their vulnerabilities, i.e. if they were resilient. The city of Tadmor (Palmyra), situated in a marginal desert landscape on the border between large empires, constitutes a pertinent test case with a clear set of vulnerabilities and a record of historical and archaeological outcomes spanning the best part of a millennium. Using urban development as our measure of urban resilience, we discuss the case of Palmyra in relation to its geopolitical situation, climate change and subsistence, funerary tradition and long-distance trade, arguing that resilience and vulnerability play out on different scales and on various levels.

Keywords: Palmyra, Tadmor, Urban resilience, Climate change, Roman Near East, Late Antiquity, Early Islamic period.

Resilience and vulnerability. Two sides of the same coin?

Interest in resilience, defined as the capacity to recover quickly or respond timely to crises, has exploded in urban studies over the last decade.¹ Scholars investigating the human past have followed suit,² challenging a still vibrant, but now less dominant discourse on societal collapse.³ Measuring urban resilience in the past remains challenging, given the incomplete, but at the same time complex evidence left by now gone societies.⁴ The term furthermore carries many different and partly problematic implications, since it may pertain to a number

¹ E.g. Jha *et al.* 2013; Yamagata, Maruyama 2016; Allam *et al.* 2020.

² Faulzeit 2015; Inamura, Nara 2020.

³ Tainter 1988; McAnany, Yoffee 2010; Diamond 2011; Seland 2020.

⁴ Fletcher 2010.

of factors and levels in societies – direct and indirect impacts – visible and invisible impacts – sudden and long-term impacts.⁵ Recent discussions have focused on the impact of climate change on resilience or on resilience in the face of climate change.⁶ This has most often been done within the framework of prehistorical societies. Only within the last decade have larger works tackling such issues also been published for historical societies, in a broader perspective as well as for case studies.⁷ Resilience is closely connected with sustainability, another aspect foregrounded in recent scholarship. This further complicates matters, since the two phenomena, while closely related, remain difficult to disentangle.⁸ Sustainability cannot be easily transferred to historical contexts. Ancient societies were not concerned with these issues in the way we define and understand the term. This was due to a number of factors, most importantly a lack of awareness of and knowledge about the perishable and depletable nature of resources.⁹

If resilience in Antiquity was not connected with an awareness of sustainability and therefore also not with strategies that involved discourses on regeneration, recovery or saving of resources, what, then, was in fact involved and how do we begin to discuss resilience in ancient societies? This is where factors of vulnerability and outcome come into the question. Ancient societies had to be conscious of their vulnerabilities – if they were not, they were at risk. Disasters – natural or man-made – such as diseases, droughts, floods, earthquakes, war, and political or religious instability had the capability of creating demographic and economic crises that could have grave impacts on society and settlement, up to and including collapse or abandonment. Therefore, the concept of vulnerability and aspects of vulnerability in practice are central to tackling issues of resilience in Antiquity. Awareness of vulnerabilities and strategies to cope with these give insight into how societies tried to create resilient behavioral patterns, even if they were not aware of resilience issues as such. If we can get closer to understanding on which parameters a society was vulnerable, then we might in fact also come closer to understanding how or to what extent a society could be resilient or not.

Still, our interest in resilience and vulnerability needs to be tuned to the available data. This does not directly express the social world of ancient Palmyra nor the material and immaterial vulnerabilities it faced, but rather the archaeological and historical outcomes of their interaction.¹⁰ In this contribution, we discuss resilience and vulnerability of Roman-period Palmyra based on parameters that pertain to the evidence from the city, including the general urban development, the development in climate, subsistence and rural settlement, funerary culture and caravan trade. These parameters offer empirical evidence, and we test whether we, through this evidence, might be able to come closer to conclusions about vulnerability awareness and, in turn, scales and levels of resilience of the city over time.

⁵ McAnany, Yoffee 2010; Faulzeit 2015.

⁶ See in general issue 50 of *World Archaeology*, but also in particular: Brewer, Riede 2018; Conolly, Lane 2018; Jha *et al.* 2016.

⁷ McCormick *et al.* 2013; Harper, McCormick 2018; Scheidel 2018; Holdridge *et al.* 2017; 2020; Lichtenberger *et al.* 2019.

⁸ Schliephake 2017; 2020.

⁹ See for example Schliephake *et al.* 2020; Thommen 2020; Bekker-Nielsen 2022.

¹⁰ Fletcher 2010.

Palmyra. An oasis city in the Syrian steppe desert

Palmyra has fascinated scholars and travelers alike for centuries (FIG. 1).¹¹ The city figures in European travel accounts as early as the twelfth century CE, when the Spanish rabbi Benjamin Tudela described his most likely fictitious visit to the site. After the expedition of James Dawkins and Robert Wood in 1751 and the ensuing publication of the splendid drawings of the architecture and sculpture from the site, the city truly re-entered European imaginations of the ancient world in the East.¹² While we know that human activity had taken place at the site also in prehistoric periods,¹³ it is only around the turn of the first millennium CE that we begin to grasp the urban nature of the settlement,¹⁴ and it was in the first three centuries CE that the city flourished, due to its position as a nodal point in the caravan trade between East and West and the general trade infrastructure of the region.¹⁵ This is also the reason why this contribution exclusively deals with the evidence from the Roman period onwards in order to discuss issues of resilience and vulnerability at the site in a *longue durée* perspective.

Urban development

While the urban origins of Palmyra are likely to be sought in the late Hellenistic period,¹⁶ the oasis city located in the Syrian steppe desert experienced strong growth from the first century CE onwards, in the period after Roman political domination had become well established in the region. Palmyra was not and never became a megacity like Rome, Antioch, Cairo and Baghdad. It was at most somewhat larger than middle-sized cities in the region, having recently been estimated to cover 120 hectares at the time when it was at its largest in the late second century CE.¹⁷ After the Roman sack of the city in 273 CE, the urban core was reduced to approximately half of its earlier size. Urban development continued into the Byzantine and Early Islamic period, with the construction of several churches, at least one mosque and an Umayyad-period *suq* (market) in the erstwhile main colonnade.¹⁸ Possibly as early as in the ninth century,¹⁹ but at the latest in the twelfth century,²⁰ the settlement had retracted within the walls of the erstwhile Sanctuary of Bel, where it remained until the forced relocation of the local population to the current urban center during the mandate period, with c. 350 families living in the village in 1912.²¹ However, as in so many other places, archaeological research in Palmyra has focused on the monumental public and religious buildings as well as

¹¹ Sartre-Fauriat 2019.

¹² Wood 1753; Raja 2019a, 11-60.

¹³ Cremaschi, Zerboni 2016.

¹⁴ Hammad 2010.

¹⁵ Seland 2016; forthcoming; Raja 2022, for an overview of the development of the site.

¹⁶ Schmidt-Colinet *et al.* 2008.

¹⁷ Hanson 2016, 769-771; also see map by Schnädelbach 2010; Gawlikowski 2019, for the urban development of Palmyra. Intagliata 2018, 65-67 for mosques.

¹⁸ Gawlikowski 2005; Intagliata 2018.

¹⁹ Gawlikowski 2009, 91.

²⁰ Intagliata 2018, 107-108.

²¹ Musil 1928a, 145.

the numerous graves that dot the landscape around the city.²² The domestic architecture of the city has received less attention.²³ This makes it difficult to estimate how large the population in Palmyra was in the Roman period and which kinds of fluctuations there would have been over the first three centuries CE.²⁴ New work undertaken within the framework of the Palmyra Portrait Project based at Aarhus University has, however, shown that when modelling all available data from the funerary sphere, clear patterns emerge indicating that the city's population would have fluctuated according to known and until now unknown events, such as the Antonine plague and military unrest in the third century CE.²⁵ The local Palmyrene elite must have been the drivers of the local development of the urban landscape as well as the funerary landscape.²⁶ They were in charge of the resources and finances, and therefore we can use the evidence from this sphere as one measure of resilience and vulnerability.

Geopolitical setting

The origin and formation of the Palmyrene polity are not documented, but must probably be sought in the period after the Seleucid withdrawal from Mesopotamia (146 BCE) and before the Roman annexation of the rump kingdom (64 BCE). In a time of opportunity when semi-nomadic groups in the Syrian and Arabian deserts made use of the power vacuum to establish cities and states in the transition zone between the desert and agricultural land, the Nabataeans, Itureans, Emesa and Osrohene constitute other and in fact better documented examples.²⁷ At an unknown point in the late first century BCE or first century CE, likely the early years of the reign of Tiberius (14-37 CE),²⁸ Palmyra came under Roman rule, but retained considerable autonomy and control with its own territory and the frontier towards the desert and the Arsacid and Sassanid empires to the east.²⁹ After the rebellion against Rome and the subsequent sacks of the city (in 272 and 273 CE), Palmyra became, on the one hand, an ordinary fortified Roman border city with a garrison, a council (*curia*) and later also a bishop; on the other hand, the territory had now been taken over by the nomadic confederacy of the Tanukhids, later eclipsed by the Jafnids (Ghassanids) as Rome's regional ally, with the Christian Banu Kalb being the dominant tribe around Palmyra from the fourth to the eighth century. The city was conquered by the Arab armies, reportedly without bloodshed, in 634 CE, and continued to be a political center associated with the Banu Kalb until the Abbasid revolution and the move of the capital to Mesopotamia in the eighth century CE.³⁰

²² Henning 2013 and 2019; Gawlikowski 1970.

²³ Schmidt-Colinet, Al-As'ad 2013; Gawlikowski 2007.

²⁴ Now, however, see Campmany Jiménez *et al.* 2022, also Crouch 1972 as well as Savino 1999 for earlier attempts at such estimations.

²⁵ Raja *et al.* 2021; Romanowska *et al.* 2021.

²⁶ Bobou *et al.* 2021.

²⁷ Gawlikowski 2003; Sommer 2018, 58-73.

²⁸ Seyrig 1932.

²⁹ Sommer 2020.

³⁰ Intagliata 2018, 97-100.

Climate, subsistence and rural settlement

The regional climate in Palmyra has been semi-arid throughout the Holocene period. Hot, arid summers are followed by cool winters, c. 140 mm of annual rainfall (modern annual average) being concentrated between October and April. Local palaeoclimatological series are lacking, but in summary regional evidence indicates moister climate than the present during the so-called Roman Climate Optimum, c. 300 BCE-200 CE; a more unstable climate, c. 200-350 CE; a dry period described as the Late Roman Megadrought, c. 350-470 CE; a historically wet period, c. 470-670 CE, interrupted briefly by the 536 climate crisis; and then desiccating conditions until the ninth century CE.³¹ The resources of the Syrian Desert have been exploited by hunter-gatherers since the Paleolithic, by semi-nomads keeping sheep and goats at least since the third millennium BCE and by camel pastoralists since the first millennium BCE.³²

The second-century CE tariff inscription from Palmyra (FIG. 2) and the numerous hunting motifs in Palmyrene art show that these activities were economically and culturally important – also during the peak of Palmyrene urbanism – and they continued to be part of the regional repertoire of subsistence until motorized transport and modern hunting weapons changed the old ways in the early twentieth century.³³ Since Schlumberger's pioneering work on settlement in the Palmyrene countryside, published in the 1930s and 1950s,³⁴ new important research has been undertaken and published. The surveys undertaken by Italian and Norwegian-Syrian teams have added incredible amounts of knowledge about the hinterland of Palmyra and the way in which it related to the urban core.³⁵ Again, detailed chronologies are not available, but agriculture in the main oasis of Palmyra seems to have a continuous history from the Neolithic until the present day.³⁶ Throughout history, the population of the Syrian Desert has also cultivated barley using surface run-off gathered from watercourses (*wadis*) in artificial or natural depressions.³⁷ At the urban peak of the city, the mountains north of Palmyra were densely settled with villages and farmsteads combining this kind of farming with livestock and also horticulture wherever perennial springs were available.³⁸ West of the city, large fields were cultivated using run-off irrigation. In the Umayyad period and probably also earlier, the monumental Harbaqa dam (FIG. 3), 70 km south-west of Palmyra, provided possibilities for large-scale irrigation.³⁹ In the Byzantine period, the countryside of Palmyra became home to hermits and several monasteries and, in the Early Islamic period, also to the famous desert castles of the Umayyad elite, which underlines that the region as such – but not the urban site – retained some centrality and importance.⁴⁰

³¹ Izdebski *et al.* 2016; Labuhn *et al.* 2016; Harper, McCormick 2018.

³² Retsö 1991; Rosen, Saidel 2010; Schou 2015; Cremaschi, Zerboni 2016.

³³ Compare Musil 1928b and Lancaster 1981.

³⁴ Schlumberger 1951.

³⁵ Morandi, Iamoni 2012; Meyer 2017.

³⁶ Cremaschi, Zerboni 2016. Also Hoffmann-Salz 2015 on the Roman period.

³⁷ Meyer 2017, 36-41; 2020.

³⁸ Meyer 2013; 2017.

³⁹ Meyer 2017, 46-51; 2020.

⁴⁰ Genequand 2012.

Funerary culture

The funerary sphere of Palmyra has been extensively researched since 2012, and material has been comprehensively quantified within the framework of the Palmyra Portrait Project, which has compiled about 4000 portraits, more than 300 tomb buildings and almost 800 individual burials, based on material in collections and publications (FIG. 4).⁴¹ The corpus is in its current state unique in the context of the ancient world.⁴² The funerary sculpture represents elite members of Palmyrene society: men and women – as well as children, a small but crucial segment of the city’s society.⁴³ The introduction of the portrait habit in Palmyra can be traced to approximately the end of the first century BCE or the beginning of the first century CE, but cannot be traced beyond the last sack of the city in 273 CE.⁴⁴ They therefore provide a *terminus post quem* and a *terminus ante quem*, which is an outstanding situation when it comes to material from the ancient world. The Palmyrene funerary portraits span a variety of types. The most common type is the rectangular limestone slab upon which one or more portraits were carved in relief. Furthermore a stela motif existed, which depicted full-body or under-life-size representations also carved in high relief. A third type is the banqueting reliefs showing dining scenes. All these types of reliefs covered burial niches in the Palmyrene graves. Later, sarcophagi were introduced. These lavish monuments could display more than 10 individuals in what should be interpreted as comprised family scenes – depicting close and more remote family members side by side.⁴⁵

On the basis of recent modelling of the material, including grave buildings and the extensive corpus of funerary sculpture, it is now possible to track the development and fluctuation in the activity in the funerary sphere across almost three centuries. This material currently offers the best proxies for discussing continuations and breaks in Palmyra’s resilience and for pinpointing specific moments in time when the city seems to have undergone changes that impacted the funerary sculptural production, indicating moments or periods of particular vulnerability. While the material does not give direct insight into the causes for growth and decline, it offers insight into a period during which fluctuations were particularly present and which we must look to for explanations.⁴⁶ Recently, the development of the funerary sculpture over time has been investigated in detail within the framework of the Palmyra Portrait Project, and modelling of the funerary portraiture has shown that the time of the benign period of the Pax Romana as well as the time of the Antonine Plague, for example, can indeed be seen to have had a direct and immediate impact on the funerary sphere. Other vulnerable points in time have also been detected through the modelling, such as the Sasanian military operations in Mesopotamia in the mid-third century.⁴⁷

⁴¹ Raja 2019b; 2018, Raja *et al.* 2021; Romanowska *et al.* 2021; the Palmyra Portrait Project (<https://projects.au.dk/palmyraportrait/>).

⁴² Raja 2019b; Blömer, Raja 2019a; 2019b.

⁴³ Raja 2020; 2019b.

⁴⁴ Raja 2017; 2019c.

⁴⁵ For a general introduction to the funerary sculpture, see Raja 2015.

⁴⁶ Raja *et al.* 2021; Romanowska *et al.* 2021.

⁴⁷ Raja *et al.* 2021.

Caravan trade

The Palmyrene elite was deeply involved in long-distance trade (FIG. 5). Palmyrene trade seems to have started with the operation of caravans through the Syrian Desert in the first century BCE, but over time the Palmyrenes expanded into the western Indian Ocean trade by way of the Persian Gulf and the Red Sea. Palmyrene elite members owned ships and maintained extended networks in Mesopotamia, Egypt and of course in Rome itself. The basis for Palmyrene trade was the exchange between the Mediterranean and the Indian Ocean region, textiles, wine, money, spices, aromatics and gemstones being some of the important commodities.⁴⁸

The approximately 35 inscriptions documenting Palmyrene long-distance trade, spanning from 19 CE until the final years of the city's autonomous existence,⁴⁹ do not allow a detailed reconstruction of the development of Palmyrene trade. However, the evidence offers insight into Mesopotamia in the first century CE, into Mesopotamia and the Persian Gulf in the second century and into Mesopotamia, Egypt and the Red Sea/western Indian Ocean in the third century CE, likely giving an indication of areas of interest over time. It is not known if operations were discontinued immediately after the events of 273 CE, but no further evidence of Palmyrene engagement in caravan trade exists. The evidence that documents Palmyrene activity in Rome also does not allow for inference that the Palmyrene connections existed beyond this time horizon.⁵⁰

Discussion

Palmyra was settled throughout the Holocene period, but the recorded urban settlement belongs to the first millennium CE. The growth of the urban center coincided with the Roman annexation of Syria and the take-off of the trans-regional caravan trade as well as maritime trade. The urban peak was reached in the second to third centuries CE and coincided with greatest geographical extent of the Palmyrene trade networks, which were closely tied to the military power held by the Palmyrenes in the region. The establishment and expansion of the city coincided with the benign climate of the Roman Climate Optimum. While increased rain was not sufficient to change the arid nature of the regional climate, it provided more water for irrigation, urban consumption and pastures.⁵¹ Most likely, rain-fed agriculture also became more tenable in the mountains north of Palmyra. While the third century was generally not a period of expansion in urban settlements in the Roman Empire, the continued prosperity of Palmyra may be explained by the role the city played as *de facto* capital of the Roman East after Odaenathus's victory over the Sassanids and his ascension to the title of "king of kings". The urban center survived the shock of the Roman conquest and sack, 272 and 273 CE, albeit on a reduced scale, and went through a development with similarities to other centers of secondary importance in the fourth to sixth centuries. Its development, however, was less pros-

⁴⁸ Seland 2016.

⁴⁹ Yon 2002, 263-264.

⁵⁰ Equini-Schneider 1987.

⁵¹ Campmany Jiménez *et al.* 2022.

perous than what was seen in the Decapolis region or Northern Syria, for example. It entailed the construction of churches and the transformation of temples into churches in the fourth century, while there is a relative lack of historical evidence and building activities in the fifth century, followed by a renewed boom in the sixth century connected with Justinian's policy of *renovatio imperii*. The establishment of Palmyra as a Christian center must also be seen in context with the city's role as an urban focal point for the Christian nomadic confederacies in the region. The lack of evidence of urban development in the fifth century coincides with the so-called Late Roman Megadrought and the political crises elsewhere in the empire, which led to the collapse of the western half and political turmoil in the eastern half. The revitalization of the urban center and the boom in the countryside took place during the Byzantine/Early Islamic wet period. While the renewed activity in the city came as a result of political initiative, this must have greatly facilitated the increased activity in the countryside. The end of the urban center and the relocation of the settlement on a smaller scale to the former Bel Sanctuary as well as the abandonment of settlements in the countryside find parallels elsewhere in the region, and they must be seen in conjunction with the move of the imperial capital to Mesopotamia in the mid-eighth century, and drier climate making both agriculture and pastures more marginal in this period.⁵²

Conclusion

Resilience and vulnerability in Palmyra are complex issues to investigate. When taking into consideration the factors outlined above, there is no doubt that the complexity comes to the forefront. On the one hand, it is clear that evidence often does not allow for in-depth studies of development over time or even at specific moments in time. On the other hand, it is clear from, for example, the inscriptional material as well as the funerary sculptural material that some trends can be studied across longer periods of time and sustain the impression that resilience and continuity certainly were present in Palmyrene society.

The development of Palmyra arguably reveals vulnerabilities connected to epidemics, as evident in the recent studies of funerary culture; climate change, as seen in the fluctuating activity and settlement in the countryside as well as in the peaks and lows of urban activity; and long-distance networks, as the urban peak coincides with Palmyra's important role in international commerce. Above all, however, the vulnerabilities are related to geopolitical changes, as expressed in the urban growth during the early Roman period, the short-lived Palmyrene empire of the third century, the subsequent reduction and militarization of the city, the Christianization and later Islamization of Syria and the relocation of the center of the Islamic Caliphate from Syria to Mesopotamia.

On the Holocene timescale, Palmyra shows resilience only on the level of subsistence, the combination of oasis agriculture, village settlement, pastoralism and hunting constituting a basis over millennia. With regard to urban resilience, the city was able to cope with its vulnerabilities through most of the first millennium. On the face of it, this shows remarkable resilience, but the large changes in urban area, population number and culture, as expressed in language, religion, and architecture, show that this resilience came at immense costs, and

⁵² Izdebski *et al.* 2016; Intagliata 2018, 106-108.

highlights our observation in the introduction that resilience can only be understood in conjunction with vulnerability.

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FIG. 1 – Aerial view of Palmyra from the 1930s courtesy of Mary Ebba Underdown (Palmyra Portrait Project and Rubina Raja).



FIG. 2 – Tax Tariff (courtesy of Jørgen Christian Meyer).



FIG. 3 — The now silted Umayyad-period Harbaqa dam with its possible Roman predecessor testifies to the potential for irrigation and agriculture in the hinterland of Palmyra (Eivind Heldaas Seland).



FIG. 4 – Combined image of funerary portraiture. Loculus reliefs: stele depicting a boy, Musée du Louvre, inv. no. AO 3984; relief depicting a male bust, National Museum of Damascus, inv. no. Dam 19; relief depicting two siblings, Antikensammlung der Friedrich-Alexander Universität Erlangen, inv. no. 1184; relief depicting a mother and her two children, Arthur M. Sackler Museum, Harvard University, inv. no. 1908.3. (All images Palmyra Portrait Project and Rubina Raja from Ingholt Archive at Ny Carlsberg Glyptotek).



FIG. 5 – Relief from the grave of Julius Aureus Marona, showing a man between a ship (right) and a camel (only feet and reins preserved) (courtesy of Jørgen Christian Meyer).