RURAL INFERNO: ENVIRONMENTAL AND SOCIO-ECONOMIC CONSEQUENCES OF WILDFIRES IN SEVENTEENTH-CENTURY WESTERN FINLAND

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ABSTRACT: This article addresses the impact of wildfires on rural peasant communities during the pre-modern period. It demonstrates how and when wildfires started, what was done to limit their occurrence, what economic and environmental consequences followed, and what social safety-nets existed. By using the case of Lower Satakunta (Western Finland) during the seventeenth century, the article reveals that the occurrence of wildfires was strongly correlated with agricultural methods, climate variability, and weather conditions. The environmental consequences often led to substantial loss of forest and agricultural lands and the economic consequences were often such that, without aid from the local community, the future existence of peasant households was impossible. Nevertheless, through the renewed medieval laws on fire support (Sw. *brandstod*), peasant communities were able to create socio-economic safety nets that helped them withstand and recover from fire disasters.

KEYWORDS: Wildfire, forest, agriculture, climate, environmental hazards

Introduction

Fire is a prerequisite for life. Without it, civilisation would not have emerged. Historically, it has provided humankind with warmth that made it possible to survive nature's elements and heat with which food was prepared, and it has been a cornerstone of industrialisation. But it is also a terrible force. From just one spark, it can spread with breathtaking speed, laying waste to buildings, cities, forests and life. Within historical research, scholars have mainly focused on urban environments, with fire labelled as the greatest threat to cities and towns during the early modern period (Allemeyer 2007: 146). In early modern Europe, perhaps the most notorious example is the Great Fire of London, which began in the oven of a bakery on Pudding Lane on 1 September 1666. When the smoke had settled, roughly 13,200 houses had been destroyed and 100,000 people had been rendered homeless (Garrioch 2016: 319). In a Swedish context, the royal castle *Tre Kronor* (En. Three Crowns) in Stockholm almost completely burnt down, consuming most of Sweden's old national archives and its royal library on 7 May 1697, presumably due to a poorly maintained chimney (Söderlund 2001: 153–67).

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Historically, there have been many reasons why fires broke out, although they did not happen at random. The frequency and intensity of fires (fire regime) has shifted over the centuries, which can be explained by changing economic, commercial, industrial, social and environmental conditions (Bankoff et al. 2012). However, the impact of climatic conditions on the occurrence of urban fires has only recently been the subject of more detailed investigation, which has shown how episodes of drought and particularly dry and hot years coincided with major urban fires during the Little Ice Age (Zwierlein 2021; Garrioch 2024). Whilst the study of urban fires makes it possible to better understand how the use of fire has affected and changed past societies, the use of fire and consequent disasters also occurred in the countryside. As such, this article takes a different approach in arguing that sustainable use and (mis)management of fire has played a much more crucial role in rural environments than current historiography has shown. The aim of the article is thus to quantitatively and qualitatively examine fire disasters in the Finnish countryside during the seventeenth century. The hitherto virtually unaddressed issues of how and when rural fires started, how they spread and what was done to prevent them, their environmental and economic consequences, and what socio-economic safety nets existed for rural communities will be examined, as well as how climatological variations can be used to explain this development.

Lower Satakunta

The region under investigation in this article is Satakunta, today located in Western Finland, which was a part of the Swedish Kingdom until 1809. Administratively, it was a part of the Province of Turku and Pori (Sw. *Åbo och Björneborgs län*) and was divided into two parts, Lower and Upper Satakunta, of which this article focuses on the former. The region had two towns, Pori (Sw. *Björneborg*) and Rauma (Sw. *Raumo*), but it was an economic-geographic area characterised by agriculture and cattle breeding (Huhtamies 2004: 25). Peasant farmers constituted the majority of the rural population (with a small portion of landless people), which grew from around 30,000 at the beginning of the seventeenth century to over 50,000 in the mid-1690s (Koskinen 2017: 90). Many villages were located along the rivers stretching from the coast and throughout the landscape, and most people belonged to, and worked within, a peasant household of between seven and nine inhabitants. As such, the peasant population shared certain circumstances in terms of living conditions, although other circumstances separated them distinctly. Whilst field cultivation was practised throughout the region, this was complemented by a higher degree of cattle breeding in the southern parishes, whereas grain cultivation was more

important for the peasant economy in the north. Furthermore, the northern and southern parishes differed in the matter of land ownership. The proportion of peasants cultivating homesteads owned by the nobility (Sw. *frälsehemman*) was larger in the north than in the south where freeholding peasants and Crown holdings (Sw. *kronohemman*) were more common (Huhtamies 2004: 25 & 48–49). However, much land that had been given to noble families by the Swedish Crown during earlier centuries was recalled with the Great Reduction (Sw. *den stora reduktionen*) in 1680, which changed the composition of land ownership (Prytz 2013: 224–25; Koskinen 2017).

Another circumstance that created further divisions among the peasant population was brought on by the wars of the seventeenth century, especially the Swedish Kingdom's involvement in the Thirty Years' war (1618–1648). The parishes of the region became successively characterised by a noticeable wealth inequality due to the socio-economic advances taken by some peasant homesteads in becoming *rusthåll* (Huhtamies 2004: 50–51). This was a maintenance and recruitment solution where each peasant was responsible for providing the army with a cavalryman and horse as well as for paying for the equipment and the rider's salary (Thisner 2014: 20–21). Furthermore, as explained by Mikko Huhtamies (2004: 159–63), peasant households that kept more livestock could more easily overcome the socio-economic challenges associated with recurrent conscriptions. Earlier research has shown that the level of vulnerability, or social vulnerability, can differ considerably between different groups depending on economic, social and political factors (Van Onacker 2019). Considering the differing circumstances in terms of living conditions in Lower Satakunta, the hypothesis has been that those living under less favourable economic conditions were worse off and more vulnerable as fire disasters occurred.

The relevance of the region in terms of studying rural fires can be established based on the different ways in which fire was used in everyday life. In the Swedish Kingdom, and especially in Finland, slash-and-burn agriculture was practised throughout the Middle Ages and continued until the early twentieth century (Myllyntaus et al. 2002). It is an extensive form of cultivation that has been, and still is, used by rural populations all over the world (Kleinman et al. 1995; Scherjon et al. 2015; Tedim et al. 2015; Tomson et al. 2015). It includes cutting and burning forested or bush-covered areas, the ash from which boosts soil fertility, which allows productive cultivation for one or several years. In Finland, it was also common to dry grain in grain barns (Fi. *riihi*; Sw. *ria*) where it was laid on thinly spaced bars under which a fire was lit. Both practices naturally entailed an elevated risk of fires breaking out and demanded meticulous supervision. Furthermore, the wealth of source materials from this region makes it possible to use a bottom-up perspective.

These materials consist of local district court protocols containing first-hand accounts of the course of fire events and tax records that reveal the subsequent economic impact on peasant households.

Consequently, since the peasant population shared certain living conditions whilst other circumstances separated them, the article will discuss the degree to which they, as a larger community, dealt with disaster events that, in one way or another, concerned and affected them all. As such, it will be possible to determine whether certain parts of the population were made more vulnerable than others after fire disasters occurred.

Sources

For clarity, a definition of the word 'wildfire' is needed. In the *Oxford English Dictionary*, it is defined as a 'Furious or destructive fire'[1] that spreads 'with immense rapidity and effect; very swiftly and forcibly: usually with run, spread, etc.'[2] In this article, the terms *forest fire* and *settlement fire* are used, which indicate the fires' place of origin. Nevertheless, the word *wildfire* is sometimes used as an umbrella term when fires are discussed in general.

Three categories of sources are analysed in this article, the first and main one being local court records (Fi. *Renevoidut tuomiokirjat*). The seventeenth-century local court was a place where people went to make their complaints heard, to make collective decisions and come to terms with each other over a plethora of different issues. It was a place where both formal and informal rules and agreements were discussed and, as such, it was an important conflict-solving arena for the rural population (Korpiola 2014; Larsson 2016: 1101–102; Starlander 2023: 70–76). It was also here that people went after a fire had struck in order to determine who had started it, what the damage was and what level of compensation should be given to the suffering parties. These sources make it possible to get a detailed grass-root perspective of the chain of events leading up to fires occurring, but also to reveal the after-effects. However, whilst the court records contain valuable descriptive information on the nature of how fire events occurred, it is difficult to establish exact statistics of their occurrence. The reason is because not all fire events were reported to the courts, which is similar to urban fires (Garrioch 2018: 203). This becomes evident from a court case that took place in Loimaa parish in 1691. As the homestead of chaplain Mathias Rungius was to be appraised, it was reported how the

1. *Oxford English Dictionary*, s.v. 'wildfire (n.), sense 1', https://doi.org/10.1093/OED/7031123310 (accessed 10 April 2024).
2. *Oxford English Dictionary*, s.v. '"like wildfire" in wildfire (n.), sense 5.c', https://doi.org/10.1093/OED/1913611847 (accessed 10 April 2024).

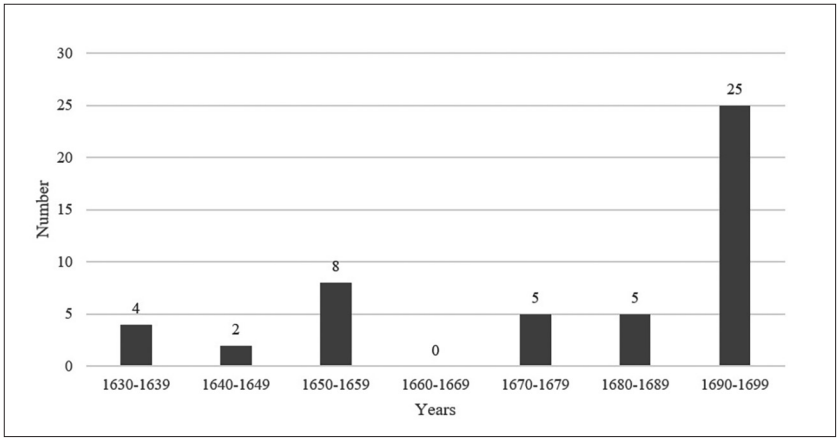

Figure 1. Recorded forest fires in Lower Satakunta in ten-year increments, 1634–1699. Data source: NAF, Court Records.

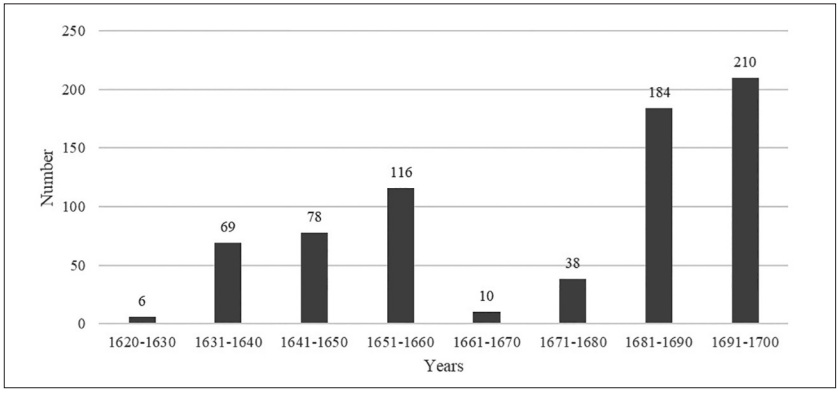

Figure 2. Applications for fire support in Lower Satakunta, 1620–1700. Data source: NAF, Court Records.

'concerned homestead and its stakeholders' forest and outlying lands during fifteen years had burnt down five times', yet no mentions of the preceding fires are found in the court records.[3] Furthermore, when it comes to forest fires, each case does not always represent one fire event. This is because particularly severe fires could be recurrently discussed at the local courts several years after

3. Vinterting, Loimaa parish, 7, 9 and 10 March 1691, NAF, Court Records, II KO a:6, 1691–1691, act 65. Original text: 'ber:de hemmans och dess Intressenters tilhörige skogh och uthmarck uthi fembton åhrs tidh femb gånger afbrunnit'.

they had happened. However, qualitative investigation has made it possible to determine that a total of 49 individual forest fires are referenced in the court records between 1634 and 1699 (Figure 1). In addition to these, 711 cases concerning applications for economic relief following a fire event have been found (Figure 2).

To evaluate the efficiency of the economic relief system, the second source category is seventeenth-century tax records. These provide information revealing whether peasant households were able to resume the cultivation of their homesteads after having been exposed to a fire. Lastly, Swedish legislation has been used to establish what impact this had on the peasants' ability to resume and rebuild their lives.

Forest fire legislation and climate

As mentioned earlier, where there is human life there is also fire. This means that the nature of how fires start, and thus what consequences they have for the natural environment and society, is shaped by human activity since its induction is often anthropogenic, caused by human industry or mismanagement (Kala 2023). However, climatic conditions and the biophysical environment in which people live and work are circumstances that similarly contribute to how and when fires break out (Mhawej et al. 2015).

During the seventeenth century, the Swedish Crown experienced growing fear of a wood shortage in the kingdom. This resulted in new forest legislation being decreed that put greater responsibility on the rural population in terms of how they managed their forests (Warde 2018: 78–79; Starlander 2023: 42). In the Swedish part of the realm, slash-and-burn agriculture was heavily restricted in the new legislation since authorities viewed it as wasteful and because of the risk of wildfires, although it remained commonplace in the Finnish part of the realm (Kuisma 1984; Sundin 1992: 372). However, the escalating trend of forest fires eventually led legislators to pass the Royal Forest Fire Ordinance in early 1690, which decreed that 'during the times and the year that a great drought occurs, no swidden should be lit, or burned that year, but be postponed to another year and a more convenient time'.[4]

The success of the new legislation is difficult to determine. However, it is noteworthy that 24 of the 25 reported fires in the 1690s occurred between 1690 and 1693 (Figure 3).

4. *Kongl. May.tz Förordning, Angående Skogz-Eldar, sampt deras förekommande och släckiande. Gifwen Stockholm den 10 Novembr. Åhr 1690* (1690). Stockholm, Printed Kongl. Booktryckerijet, Sal. Wankijfs Effterlefwerska. Original text: 'De tijder och det Åhr/ som stoor Tårcka infaller/ skall icke någon Swedja antändas/ eller det Åhret brännas/ uthan där med upskiutas till annat Åhr och beqwemligare tijd'.

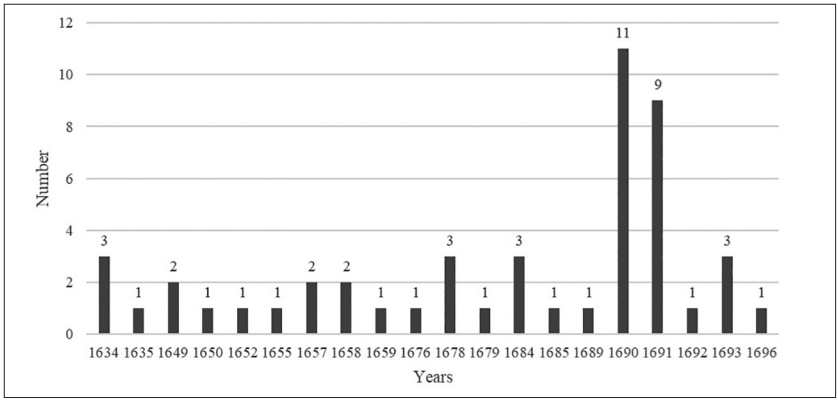

Figure 3. Recorded yearly occurrence of forest fires in Lower Satakunta, 1634–1699. Data source: NAF, Court Records.

There are several possible reasons for the absence of fires during the post-1693 period. Although it took three years, it is possible that the fire-repressive instructions contained in the Royal Forest Fire Ordinance gradually gained influence among the rural population, which made fire prevention measures more effective. Another possible explanation can be drawn from the fact that the region saw a significant cultivation and population growth during the later decades of the century up until the great famine of 1695–1697 when as much as 28 per cent of the population perished (Koskinen 2017: 57, 90). The number of fires could well have been a result of this development, given the exploitation and cultivation practices used in the region, and it may explain the absence of fire events during the latter part of the decade. However, it can also be explained by climatic conditions. As can be seen in Figure 4, the mean temperatures during the summer months (June, July, August) were notably higher during the period 1689–1694 than during the succeeding years, as a drastic shift can be noted in 1695, which persisted throughout the century. Furthermore, the summer months of 1689–1694 were the warmest consecutive summers during the whole study period (Figure 5), which could have strongly affected the occurrence of wildfires. This is further substantiated by written accounts as the records of both Kokemäki and Eura parish contain descriptions of the 'very dry summer' of 1691 and that 'drought' persisted.[5]

5. Ting, Kokemäki parish, 8 and 9 Oct. 1691, NAF, Court Records, II KO a:6, 1691–1691, act 250–251. Original text: 'muckit tårr sommar.' Sommarting, Eura parish, 3 and 4 June 1692, NAF, Court Records, II KO a:7, 1692–1692, act 63. Original text: 'torka'.

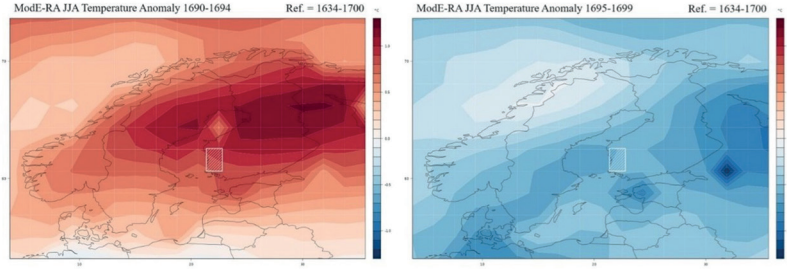

Figure 4. Mean temperature during JJA (June, July, August) during 1689–1694 to the left and mean temperature during JJA during 1695–1699 to the right. Data source: Warren et al. (preprint).

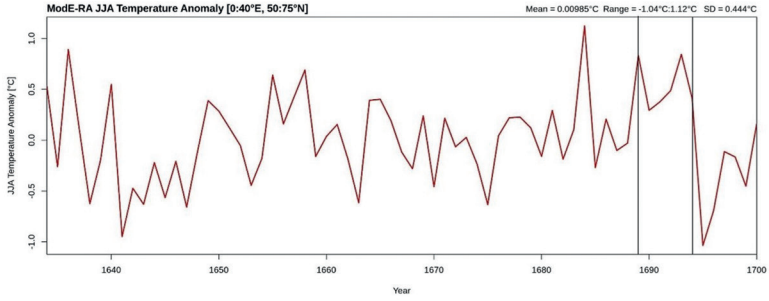

Figure 5. Temperature anomalies during JJA (June, July, August) between 1643–1700, showing the warmest consecutive summers between 1689–1694. Data source: Warren et al. (preprint).

How and when fires started

There were many ways in which a forest fire could start. In 1649, for example, the peasant Erich Jönsson was accused of causing a forest fire by failing to sufficiently supervise his cooking fire, which quickly spread and caused great damage to the forest.[6] In June 1659, a young girl called Lisa got lost in the forest and a group of women and men went in search of her; however, they were unable to locate her before darkness fell. They were forced to make camp

6. Höstting, Huittinen parish, 2 and 3 Nov. 1649, NAF, Court Records, I KO a:6, 1644–1649, act 604–605.

for the night and made a fire in an old pine stump, which they forgot to put out 'and thus the forest was destroyed'.[7] However, fires were more commonly caused through forestry and agricultural work.

Slash-and-burn agriculture was a common agricultural practice in the Baltic region during the early modern period (Myllyntaus et al. 2002). This included Finland, but also places like Estonia, where it has been shown that this fire cultivation played a significant role in the formation of present-day forest landscapes as such cultivation sites are now covered by mature trees (Tomson et al. 2015), and it has been proven that an intermediate level of forest disturbance boosts forest diversity (Kleinman et al. 1994; Downey et al. 2023).

The cutting was often done during the spring and the trees and branches were laid to dry until the following year when they were ignited during spring or early summer (Lindman 2005: 10–11). The risk of fires spreading from such a combustion-rich environment was always present. The Lower Satakunta court records reveal that this exploitation type was the most common factor in triggering forest fires. For example, in the parish of Eura in 1652, the peasant Henrich Thomasson explained how fire had spread from a swidden belonging to two peasants from a neighbouring village and that 'the fire thereby caused great damage to their forest'.[8] In late June 1690, in the same parish, Mårthen Henrichsson accused Jacob Matsson and the soldier Anders Simonsson of having let the fire from their swidden spread, which had burnt 'the entire outlying land and caused incurable and priceless damage'. Whilst Jacob was present at the court meeting and denied all accusations, the soldier Anders was not. However, his wife Karin Henrichsdotter was, and she told the court how Jacob 'had asked her to go with him to light the swidden, which she also did, and when Jacob had set fire to his swidden, he gave her fire, which she carried and put in her swidden, which was close by Jacob's'. The layman Anders Otila further informed the court that 'the fire lingered for five weeks close to the burned land, and simmered, until it widened and broke loose, where it could well have been extinguished and prevented, but no one saw to take care of it'.[9]

7. Sommarting, Ulvila parish, 8 and 9 Aug. 1659, NAF, Court Records, I KO a:3, 1658–1659, act 292–293. Original text: 'och således Skogen förderfwadt'.
8. Höstting, Eura parish, 25, 26 and 27 Oct. 1652, NAF, Court Records, I KO a:7, 1650–1652, act 475. Original text: 'der igenom Elden stoor skadha opå deras skogh giordt'.
9. Höstting, Eura parish, 17, 18 and 19 Sept. 1691, NAF, Court Records, II KO a:6, 1691–1691, act 197–198. Original text: 'heele uthmarcken förbränt och obotelig sampt owärderlig skada giort'; 'bedit henne gå medh sigh att itända sweden, dett hon och giort, och enär Jacob hade satt eldh i sin swedh, gaf han henne eldh, som hon baar och satte i sin swedh, hwilcken när inn widh Jacobs war'; 'elden drögdts femb weckors tidh, när inn widh bemt: swedieland, och Kyttiat, förr än der sigh wigdade och lööskom, hwarest den wähl kunnat släckias och i tijdh förekommas, men ingen sigh der om wårdat'.

Settlement fires were many times more common than forest fires, which is not altogether surprising. Even though slash-and-burn agriculture and fire clearing of unploughed meadows (Sw. *ängsröjning*) or forest lands was hazardous, these were relatively infrequent events seen over the course of a whole year, whereas fire was a constant feature of life at the homestead. Out of the 711 cases concerning settlement fires, 161 cases (22.6 per cent) were treated by the local court in Huittinen parish alone. These cases have been studied in detail and provide valuable information on the seasonality of settlement fires. Not only do they contain information on how the fires started and what consequences followed, but also often the month (sometimes the exact date) when they occurred. In the case of Huittinen, this is specified in 95 of the applications. More than half the fires (51.5 per cent) took place during the autumn months (September, October, November), whereas less than a fifth (17.8 per cent) occurred during the hottest months of the year (June, July, August).[10]

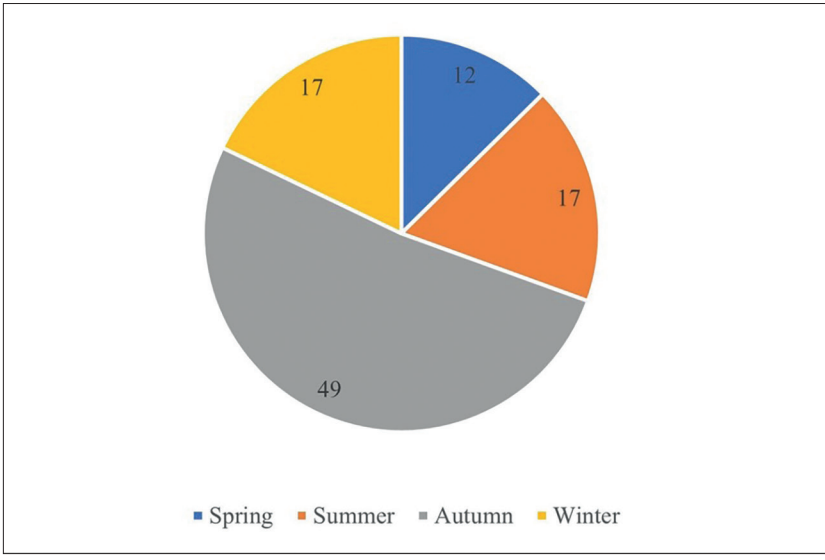

Figure 6. Seasonality of settlement fires in Huittinen parish. Data source: NAF, Court Records.

Fluctuations in the occurrence of fires during certain historical periods have much to do with climate. It has been argued, for example, that the risk of fires during the climatic regime of the Little Ice Age was generally low. However,

10. The percentage for the winter months (December, January, February) is 17.8 per cent and for the spring months (March, April, May) 12.6 per cent (see Fig. 6).

since the colder climate required people to heat their homes for longer periods of the year, it has been theorised that it could have led to an increase in urban fires (Garrioch 2018: 206–07). This may be one reason why settlement fires were more frequent in the autumn than in summer. However, a more compelling factor has to do with the time of harvest. The harvest season typically occurred in August and September. As mentioned earlier, it was common to dry the harvested grain in grain barns (Fi. *riihi*; Sw. *ria*) using fire. However, it was not uncommon that the heat ignited the grain and ultimately the barn itself. If it had been a dry summer and the wind was strong, the distance between the buildings did little to prevent the fire from spreading. For example, in October 1691, the peasant Mårten Henrichsson from the village of Jalanoja told the local court that a recent fire had consumed several buildings and barns containing much of that year's harvest worth 100 copper thalers. When asked how the fire had started, Mårten's neighbours explained that the fire had started in the drying barn and that 'the fire at the wall of the oven was burning, of which no one knew until it in the grain had the upper hand, which later could not be extinguished'.[11]

In establishing how and when forest and settlement fires started, it can be determined that there was a strong correlation between forest fires and the practice of slash-and-burn agriculture – in other words, that they were caused by anthropogenic factors, including exploitation type and proximity to forests and agricultural lands. Settlement fires were common throughout the century, with most occurring during the harvest times due to the practices of grain drying. However, even though the different kinds of fire events contrasted in terms of how and when they occurred, they were both equally affected by factors related to the nature of how fire spreads.

How fires spread and were prevented

The location at which a fire started determined the devastation it left behind (Garrioch 2018). Fires that started in buildings were often confined to a peasant farm or village, and rarely spread further into the forest and outlying lands. However, cultivated lands and infields were vulnerable due to their proximity to buildings, which sometimes resulted in the annual growth of one or several homesteads being completely burnt. Nevertheless, the infields functioned as a kind of buffer zone since measures to halt or redirect the fire were more easily carried out here than in the forest. This was done, for example, by clearing areas

11. Höstting, Huittinen parish, 1, 2 and 3 Oct. 1691, NAF, Court Records, II KO a:6, 1691–1691, act 241. Original text: 'elden sigh widh ugnen wäggen itändt, hwar af ingen wetat, för än den uthi der insatte säden hafft öfwerhanden, som sedermera eij stodh att släckia'.

and digging ditches to separate as-yet unaffected biomass from the spreading fire, something that a few peasants in Huittinen parish successfully did in 1693 when a fire was spreading in the area where they lived.[12]

The severity of a fire is dependent on several factors, such as weather conditions, including drought, low relative humidity, unstable air and strong surface wind (Werth et al. 2011: 25; Lecina-Diaz et al. 2014). In the latter case, earlier research has established different spread schemes and factors where wind plays a determinative role in the severity and spread of wildfires. There are convection or plume-dominated, wind-driven and topographic fires. The main difference between them is their behaviour and the intensity with which they burn, with convection or plume-dominated fires being the most extreme and topographic fires being less severe and more influenced by local winds shaped by topographic factors (Sande Silva et al. 2010: 126; Lecina-Diaz et al. 2014). Historically, information about the danger and propelling effects of wind can be found, for example, in reports produced after the devastating fire in the Swedish town of Sundsvall on 25 June 1888. Not only had the days preceding the fire been particularly hot and dry, but strong winds contributed greatly to its spread, ultimately making around 9,000 of the city's 10,000 inhabitants homeless (Rohland 2011: 157, 161).

Similar accounts can be found in seventeenth-century Lower Satakunta as well – for example, in the parish of Ulvila in 1693. The peasant Johan Andersson told the local court that several of his outbuildings had burnt down in late September that year, to which his neighbours Olof Henriksson and Gertrud Simonsdotter further added that the fire had started in a nearby field from which it quickly spread due to the 'persistent storm'.[13] Another example is from the neighbouring parish of Kokemäki as the circumstances related to a particularly severe wildfire caused by mismanaged slash-and-burn agriculture were discussed. Three individuals stood to answer the court on the matter of who had instigated the fire that had 'caused irreparable damage, that cannot be assessed' to the outlying lands and forests of several villages in the parish, including all the outlying lands of the village of Harjavalta during the summer of 1691. As one of the accused, the peasant Henrich Eriksson, called upon one of his witnesses, it was explained how the fire had spread from the village of Hiirijärvi located approximately five kilometres away 'and ultimately in the great storm over the public road threw itself'. At an earlier stage, the members of the court had similarly explained how the fire had been 'so fierce that it spread from the trees over the great Kokemäki river and began to burn' and that

12. Sommarting, Huittinen parish, 21 and 22 July 1693, NAF, Court Records, KO a:13, 1693–1693, act 359.

13. Höstting, Ulvila parish, 18, 19 and 20 Oct. 1693, NAF, Court Records, II KO a:1, 1693–1693, act 197. Original text: 'påliggande stårmen'.

'especially timber and bark forest as well as some meadows were destroyed by fire'. It was also described how the rapid spread was enhanced by the 'very dry summer' of that year.[14]

The effect strong winds had on the development and spread of a fire was something that both the rural population and Swedish legislators knew. In the case of the latter, the Royal Forest Fire Ordinance of 1690 specified how swidden 'must not be lit during stormy weather'.[15] Another example can be drawn from the precautionary measures taken in castles and fortifications during the eighteenth century as an increased number of guards were put on fire watch during such weather conditions (Sundin 1992: 404). Nevertheless, the accused in Kokemäki said that they had all made sure that their swidden had been put out several weeks before the great fire had started. However, the laymen of the court explained that they had seen how 'smoke had risen all summer since the fire had been simmering in the earth … even though it had been raining', which meant that it 'finally in one day extended over half a mile'.[16] The only thing that could be done under conditions like those of the summer of 1691 was to warn everyone of the rapidly spreading wildfire, which Henrich's wife Agnes Thomasdotter had done as she 'sat up on a horse and rode to the nearest villages with terrified shouts to come and help her'.[17]

Judging by the surviving accounts, the Kokemäki fire of 1691 can be categorised as a convection/plume-dominated or wind-driven fire, considering its reportedly violent behaviour, the propelling effects of the persistent wind and the availability of combustible biomass (Lecina-Diaz 2014: 2). Wildfires as severe as the one in 1691 are unprecedented in the records of Lower Satakunta during the seventeenth century. However, fires of a lesser magnitude could still cause irreparable damage and devastation for individual households

14. Ting, Kokemäki parish, 8 and 9 Oct. 1691, NAF, Court Records, II KO a:6, 1691–1691, act 250–251. Original text: 'giort een obotelig skada, som intet skall kunna verderas', 'så häfftigh att den ifrån trään slagit öfwer stoora Cumo Elfwen och begyntt brinna', 'besynneligast timber och näfwerskogene sampt några ängiar wara af eldh fördärfwade'; 'muckit tårr sommar.' Ting, Kokemäki parish, 4, 5 and 6 Oct. 1692, NAF, Court Records, II KO a:7, 1692–1692, act 216–217. Original text: 'och omsijder i stora stårmen öf.r allmänne wägen sig kastat'.

15. *Kongl. May.tz Förordning, Angående Skogz-Eldar, sampt deras förekommande och släckiande. Gifwen Stockholm den 10 Novembr. Åhr 1690* (1690). Stockholm, Printed Kongl. Booktryckerijet, Sal. Wankijfs Effterlefwerska. Original text: 'Måste icke påtändas när Stormwäder är'.

16. Höstting, Kumo parish, 8 and 9 Oct. 1691, NAF, Court Records, KO a:6, 1691, act 250–251. Original text: 'röök slåtts på den kantten upgå heela Sommaren hwarest elden i jorden legat och Pyttiat … fast om dett regnat', 'omsider på een dag fahrit öfwer half mijhl wägh'.

17. Kokemäki parish, 4, 5 and 6 Oct. 1692, NAF, Court Records, II KO a:7, 1692–1692, act 216–217. Original text: 'satt sig på hästen och näste byarne tillrijdit medh farligit anskrij komma at hielpa henne'.

and villages. Nevertheless, the spread of fires that were more sensitive to topographic variations could be repressed by measures that are recounted in the court records, such as digging ditches as mentioned above. However, another strategy was to counter the spreading fire with a new one.

In Sweden, prescribed burning (or controlled burning) has been practised since the 1890s (Cogos et al. 2020). It is a method by which one intentionally starts a fire, thereby clearing an area of hazardous fuels that can intensify the severity of a wildfire and thus decreasing the risk of wildfires occurring altogether. A much older and similar agricultural tradition is slash-and-burn agriculture, which was, as mentioned earlier, widely practised in Finland for many centuries (Kardell et al. 1980: 10–11; Myrdal and Söderberg 1991: 356; Lindman 2005). Controlling intentionally ignited fires was therefore something the rural population knew a lot about, and the benefit these could serve as a fire hazard reduction method is evident in the court records. For example, in 1693, the peasant Jacob Matsson stood accused of having unleashed a fire that had spread throughout the forest common of his and a few other villages. However, Jacob explained that the fire was started by a soldier named Sigfred Matsson and that he himself had witnessed the fire approaching his homestead and therefore 'started another fire, in order thereby to avert a greater danger, which would run against the soldier's fire'. The fences surrounding Jacob's meadow were nonetheless burnt, although his homestead survived.[18] It is evident, therefore, that whilst mismanagement of fire and accidents was in some sense inevitable, the rural peasant population possessed knowledge of how to effectively quench fire with fire.

In the wake of fire – environmental consequences

When properly controlled, slash-and-burn agriculture yielded nutritive soils favourable for cultivation. However, recent studies have highlighted the fact that the burning of organic matter (either controlled or uncontrolled) has consequences for soil resilience as it affects the chemical properties of the soil, leading to either an increase or decrease of available nutrients. This is determined by the fire's intensity, extent and recurrence, as well as by the amount of available biomass that is burnt and the characteristics of the soil (Datta 2021: 2; Agbeshie et al. 2022: 1420; Chicco et al. 2023: 1–2). However, even though the regeneration capacity of soils and organic matter is often high, particularly severe fires can result in long-lasting degradation and aridity,

18. Sommarting, Huittinen parish, 21 and 22 July 1693, NAF, Court Records, KO a:13, 1693–1693, act 357–359. Original text: 'han optendt en annan eldh i mening att der medh afwäria en större fara, som skulle löpa emot Såldatens eldh'.

sometimes for tens of years (Zavala et al. 2014: 311). This is substantiated by the Lower Satakunta court records, as two cases were discussed in 1681 in the parish of Loimaa. The first concerned a fire that the peasant Jacob Jöransson had caused many years previously. At that time, the fire had spread and burnt the chaplain's lands, consuming three loads of winter hay. However, the more pressing point was that the soil had burnt so fiercely 'that it in 10 years did not come to its previous growth'.[19] The second case concerned a forest fire that broke out in 1678 that had spread into the fields of a certain homestead, which 'had become severely emaciated' since the fire had 'burned so deep in the earth, that it is impossible to determine when any grass will grow again'.[20]

The environmental devastation of wildfires often leads to a severe reduction of available resources that are essential for rural households, but it can also drastically reduce their ability to import and export resources and products that they produce (Kala 2023: 291). The most important export commodities from Lower Satakunta were livestock, livestock products and to a certain degree tar (Huhtamies 2004: 48). Given that the animals grazed in the forests during summer, livestock production was negatively affected when a wildfire eliminated this possibility, but spreading fires could also claim the lives of the animals themselves. In 1693, a fire was quickly spreading in the parish of Ulvila at the same time as a servant girl named Lisa Enutsdotter was grazing a herd of cows in the forest. As the fire was approaching, she moved the animals away from the fire, although one cow 'had hidden in a dense forest, obscured in the smoke because of horseflies and flies, so that Lisa did not notice it, until she came upon the cow a little later lying under a tree'.[21]

Whenever forest areas had burnt, estimations were not made of how large the area was worth in monetary terms. However, descriptions of the aftermath can be found. For example, in 1690 in Loimaa parish, a forest common belonging to a few villages had been 'completely burned so that not one fresh twig remained there'.[22] In the same parish, an adjacent forest that had survived the fire of the year before had burned due to a mismanaged swidden, meaning 'some suitable house timber, some bark and spruce twigs are available apart

19. Vinterting, Loimaa parish, 22, 23 and 24 March 1681, NAF, Court Records, I KO a:5, 1679–1680, act 663. Original text: 'att dhet uthi 10 åhr intet kom koma till sin förra wäxt'.
20. Vinterting, Loimaa parish, 22, 23 and 24 March 1681, NAF, Court Records, I KO a:5, 1679–1680, act 676. Original text: 'illa uthmerglat blifwit'; 'att man intet kan pröfwa när såsom dhe åter kunna kommat till någon grääswäxt igen'.
21. Vinterting, Ulvia parish, 12 and 13 March 1694, NAF, Court Records, II KO a:3, 1694–1694, act 34. Original text: 'undandålt sig i een trång skog, trängiandes sig till röken för brombser och flugor, att Lijsa den intet warsse blifwit, förr än hon koon lijtet der efter liggandes under träd påkommit'.
22. Vinterting, Loimaa parish, 7, 9 and 10th March 1691, NAF, Court Records, II KO a:6, 1691–1691, act 71. Original text: 'aldeles brunnit, att icke een färsk qwist der å mera qwarblifwit'.

from the logs that have already fallen, and those that are still standing are so burnt by the fire that they cannot be used'.[23]

Fire support and compensation

Swedish laws concerning the management of wildfires exist from the mid-fourteenth century. In the Country Law of King Magnus Eriksson from the 1350s, instructions are given on how to punish those who cause a fire and how different causes of such events merit different punishments. During the seventeenth century, one specific paragraph increased in importance, namely the one concerning fire support (Sw. *brandstod*), which was an early form of a 'half-public mutual fire and property insurance organisation at the countryside' (Hägg 1998: 110). It stipulated that '[i]n whatever hundred such damage has occurred, as has now been said, the hundred owes him fire support, according to how the damage is estimated', and furthermore how '[a]ll will take and give fire support, who are residents, clerics, and laymen, and likewise the members of their household. No one should be free from this.'[24]

As the frequency of rural fires increased during the seventeenth century, new legislative efforts were made as the medieval laws were updated to better aid those who suffered from fire disasters. This was done in 1642 with the renewed Beggar Regulation and in King Karl XI's House Inspection Ordinance of 1681. The motivation behind the revived legislation was the central government's desire to ensure a stable and continued flow of tax revenues. As such, the state emphasised the importance of fire support for the restoration of peasant homesteads, and in doing so, often allowed peasants three years of tax exemption (Sw. *frihetsår*) if it was deemed necessary.[25] To receive fire support from the parish community, a detailed investigation into why the fire had occurred and the extent of damage had to precede the application to the local court. In most of the applications, the content makes it possible to establish how severe the fires were, what was lost and what level of compensation was

23. Höstting, Loimaa parish, 24, 25 and 26 Sept. 1691, NAF, Court Records, II KO a:6, 1691–1691, act 208–209. Original text: 'något dugeligit huustimber, mindre näfwer och granris, finnes, föruthan dhe ståckar som dehls ellaredan äro needfallne, dehls och af dhe som ännu oprätt stå, af elden så förbrände, att de inte kunna nyttias'.

24. *Magnus Erikssons landslag, i nusvensk tolkning av Åke Holmbäck och Elias Wessén* (Stockholm: Nord. bokh. (distr.), 1962), p. 120. Original text: 'I vilket härad en sådan skada än har kommit till, som nu är sagt, så är häradet skyldigt honom brandstod, allt efter som skadan blir uppmätt'; 'Alla skola taga och giva brandstod, som äro bofasta, klerker och lekmän, och likaså deras husfolk. Det skall ingen vara fri från.'

25. For more information on tax exemption (Sw. *frihetsår*), see Huhtamaa et al. (2022: 2087) and Starlander (2023: 73).

given to the applicant, but also on what grounds applications were rejected. Out of the 161 applications in Huittinen parish, the estimated worth of property lost can be established in 106 of the applications between the years 1635 and 1700, which varied between 25 and as much as 1,699 copper thalers for a single applicant. Nevertheless, the average loss was 257.5 copper thalers per case with a median of 120, where the average was within the range of three and the median one and a half annual wages of a shipbuilder during the latter part of the century.[26] Once the damage had been established, the level of compensation was set at a certain amount of money that every household in the parish was obliged to pay. By multiplying this amount by the number of taxpaying households, it is possible to determine how much the applicant ultimately received. The number of households can be found in contemporary tax records, which reveal that, on average, approximately a third of the value lost was reinstated by the parish community. However, larger compensations could sometimes be given if the fire was particularly severe.

In early modern Europe, it has been argued that laws and systems of relief can be seen as a form of control mechanism aimed at adjusting the behaviour of the applicant to what was deemed desirable (Hindle 2004; Spierenburg 2004). Building on questions put forth by Hindle (2004), Healey (2024: 21–22) has focused on reasons why relief was denied or withdrawn from an applicant in early modern England and found that the most common reason was the lack of necessity. In terms of having been exposed to a fire disaster, especially if the damage was minor rather than extensive, the necessity of being given financial aid could, from a contemporary perspective, be called into question. Nevertheless, the only issue that had to be established to receive fire support was whether the fire had been caused by accident or out of carelessness, where the latter led to immediate rejection. For example, in May 1690, the peasant Johan Johansson Ailu from the village of Nanhia explained to the court how he 'last summer by means of a harmful fire lost all his property, including both the house and barn, so that not a single corner of a house was left of the homestead after the fire'. The fire had started in the chimney of a smaller log cabin (Fi. *Pirtti*; Sw. *pörte*) that ignited the roof from which sparks quickly spread throughout the whole farm, consuming everything from buildings and hop yard to fences and fields. Since it could be established that it had not been caused by carelessness, Johan was granted one copper thaler by each homestead in Loimijoki, which amounted to 318.5 copper thalers. However, since the estimated value of the farm was 600 copper thalers, the court argued that 'since this fire support is small compared to the damage taken, Johan is urged

26. According to Koskinen (2017: 134), estimations of the total worth of peasant homesteads in this region were between 200 and 300 copper thalers.

to make a humble application to his Grace High Wellborn Baron and County Governor', so that he may 'enjoy a few years of freedom'.[27]

Even when carelessness could be established as the cause of a fire breaking out, the parish community could nonetheless choose to help the applicant without the court's ruling. Similar expressions of solidarity can also be seen in the Dutch Republic during the eighteenth century, where members of villages that had burnt down received help in the form of foodstuffs and money, both from within the community and from without (Teeuwen 2012; Duiveman 2021: 317–20). Furthermore, it was possible to submit applications in more than one parish if it was deemed reasonable. This can be exemplified by a case from mid-October 1682. Four peasants from the village of Mullila named Johan Davidsson, Pål Eskilsson, Henrich Clementsson and Jöran Henriksson explained to the court in Eurajoki that on 29 August they had lost all their houses and most of their personal property, at an estimated value of 1,934 copper thalers, in a fire. However, the court regretfully informed them that no legal fire support could be given since the fire had been caused by carelessness. Nevertheless, because of the considerable damage, the parish members promised 'to benevolently give them 1 copper thaler from each homestead here in the parish', which amounted to 144 copper thalers. However, given that this was not even a tenth of the value of what had been lost, they were urged to 'humbly seek their gracious lordship for some pardon on the taxes', which they eventually did.[28]

A petition was written and sent to County Governor Carl Gustav Soop who, on 14 November 1682, wrote a reply stating that, considering the great damage they had sustained, and since they 'loudly lamented not being able to build up and inhabit their homesteads and farms again, they should with a few years of freedom be provided and helped, thus and because their homesteads must not completely fall into desolation and become unused, but again be occupied and inhabited'.[29] However, even though they were spared from paying

27. Häradsting, Huittinen parish, 30 Sept. 1690, NAF, Court Records, II KO a:5, 1690–1690, act 199. Original text: 'förl.n Sommar förmedelst een skadelig wådheldh bårtmist all sin ägendohm, så och både Man: och fägården, att icke een Knuut opå dess hemman efter branden qwarblifwit', 'men som denne Brandstudh fast ringa emot tagne skadan förstår, underwisses Johan i ödhmiukheet hos hans nåde högwälborne H.r Baron och Landshöfdingen, ansöchning giöra'; 'några åhrs friheets uthniuta'.

28. Sommarting, Eurajoki parish, 12, 13 and 14 Oct. 1682, NAF, Court Records, II KO a:1, 1682–1686, act 195. Original text: 'opå Sochnens wegnar godwilleligen at gifwa dhem tillhopa 1 d km:t af hwart hemman här i Sochnen', 'ödmiukel. at sökia sit Nådiga Herskap om någon förskoningh på Uthlagorne'; Turun ja Porin läänin tilejä, Asiakirjat, 7355 Maakirja, 1682–1682, act 908.

29. Turun ja Porin läänin tilejä, Asiakirjat, 7358 Tositekirja, 1682–1682, act 1132. Original text: 'beklagandes sigh högeligen icke kunna sine Hemman och Gårdar igen upbygga och beboo, med mindre dhe icke medh några åhrs frijheet blifwa försedda och hulpne, Altså och på der

the king's taxes, it was not enough. Two years later, in early March 1684, the four peasants went to the neighbouring parish of Huittinen and explained their regrettable situation, requesting that they 'like in other parishes here in the hundred where fire support is granted, that in return for the damage they had suffered, that this parish also should give something for their rectification'. The laymen of the court and peasantry replied that they 'out of good will' would give them 8 *öre* copper per homestead, which amounted to about 75 copper thalers, that is, approximately four per cent of the estimated damage.[30] The investigation has not been able to reveal how many parishes the four peasants applied to for fire support, and thus how much economic relief they received. Nevertheless, by examining the tax records, it becomes clear that all of them were paying their taxes seven years after the disastrous event in August 1682, which means that the freedom years granted by the county governor, and the economic support given to them by the peasantry of the hundred, were enough for them to resume cultivation of their homesteads.[31]

Even though any compensation and help received was important for the survival of peasant households that had burnt down, it does not necessarily mean that the assistance strategies were successful. To establish the degree to which fire support was enough or not, the tax records are again useful. In the Swedish Kingdom, taxes levied on the peasant population increased throughout the seventeenth century and, together with conscriptions, were one of the most burdening responsibilities peasant families had to fulfil to be considered faithful subjects (Villstrand 1992: 65). Whenever a household was unable to pay the king's taxes for three years in a row, it became 'deserted' (Sw. *öde*) and was marked as such in the tax records. This did not always mean that it was deserted in a literal sense – the peasant family could sometimes remain at the farm as a tenant of the Crown – but it does indicate an inability to resume a sufficiently productive cultivation of the homestead and can therefore serve, as pointed out by Huhtamaa et al. (2022: 2080), as a proxy for a decline in subsistence. Since the court records contain the name of the applicant, in what village he or she lived and when the fire disaster had occurred, a detailed investigation of the tax records makes it possible to find out whether or not the homestead of an applicant became deserted after a fire. However, the tax and court records differ on a few key points, which makes it difficult to find fire support

Hemman ocke aldeles må komma uthi Ödesmåhl och Obrukade blifwa, Uthan igen uptagne och bebodde'.

30. Vinterting, Huittinen parish, 6, 7, 8 and 10 March 1684, NAF, Court Records, II KO a:1, 1682–1686, act 543. Original text: 'såsom andre Sochnar här i Häradet dhem brandhstudh ähr bewilliat, som emoth deras tagne skadha ringa skall förslå att och denna Sochnen till deras uprättelse något förskjuta wille', 'af een godh willia'.

31. Turun ja Porin läänin tilejä, Asiakirjat, 7384 Maakirja, 1690–1690, act 781.

applicants in the tax records. The person who went to the local court and filed the application and the one who turned up for the yearly tax registration of the peasant homestead was not always the same person. Therefore, only 56 of the 161 applications in Huittinen (34.7 per cent) can be confirmed and traced in the tax records. The results show that only four homesteads (seven per cent) were marked as deserted up to seven years after the fire events occurred. This is a remarkably small number, which proves the utility of the institution of fire support and the resilience of the peasant communities.

As mentioned earlier, the parishes of Lower Satakunta became gradually characterised by wealth inequality (Huhtamies 2004: 50–51). Under such conditions, previous research has determined how social networks and wealth inequality were important factors that affected the ability of peasant households to endure subsistence crises during the early modern period (van Bavel et al. 2018; Huhtamaa et al. 2022). Furthermore, it has been shown how the relative strength of intra-village exchange networks coulds have great implications for the ability of peasant communities to withstand great collective challenges (Vanhaute and Lambrecht 2011). When it comes to fire disasters, the Lower Satakunta case shows that it made no difference whether an applicant was a freeholding peasant or a tenant of the Crown or nobility. All applicants were treated the same by the local courts and were given equal opportunity and support to resume the cultivation of their homesteads after they had been devastated by a fire, which was very much facilitated by the solidarity shown and support given by the peasant communities of the region.

Conclusions

The aim of this article has been to describe and explain a historical development that has been surprisingly neglected in previous research. While fires in the urban space have been much researched by historians, questions about how this affected rural environments and societies still lack sufficiently clear answers. As such, the article has asked: (1) how and when wildfires started; (2) how they spread and were prevented; (3) what the economic and environmental consequences were; and (4) what socio-economic safety nets existed for the rural population. The area of investigation has been Lower Satakunta in Finland during the seventeenth century, a region that was characterised by field cultivation, slash-and-burn agriculture and cattle breeding, as well as growing income inequality during the period.

(1) The results have shown that the most common triggering factor of forest fires was the peasantry's practice of slash-and-burn agriculture. Even though Swedish legislation existed that was meant to prevent peasants from practising

this agricultural method, it remained common in Finland for several centuries after the seventeenth century ended since it generated better yields than arable cultivation. Therefore, and bearing in mind the cultivation and population growth during the latter decades of the century, the number of forest fires reported in the court records increased during the period. Correspondingly, the number of settlement fires also increased. The occurrence of fires had a strong connection with the rhythm of the yearly working seasons. Since the lighting of swidden was carried out during spring and early summer, most forest fires occurred during this period, whereas settlement fires were more common during the autumn months. This was because of the harvesting methods practised, whereby grain was dried in grain barns with the aid of fire. However, it has also been possible to determine how climatic conditions played a role in their occurrence.

(2) The spread of fires was highly dependent on climate and weather conditions. In accordance with earlier research, the investigation has revealed that strong winds coinciding with drought had severe propelling effects on the spread of a fire. Wildfires of considerable magnitude, such as the Kokemäki fire of 1691, left the peasantry with few options other than to warn everyone of the spread. However, those of a lesser scale could be thwarted by digging ditches, clearing not yet affected areas of organic biomass, or by using controlled burning to stop the advance of a spreading fire.

(3) Whilst the fires themselves were life-threatening, the environmental devastation they left behind could be equally disastrous. Not only did many peasant families lose their homes and personal property, but their means of making a living were often also completely extinguished. Particularly intense fires could cause such severe damage to the chemical properties of the soil that cultivated areas did not regain their former growing capacity for tens of years afterwards. Forests burning naturally led to a drastic decrease of wood resources, but also of grazing resources. This furthermore affected the peasantry's ability to produce commodities meant for export, such as livestock products and tar, but also resources meant for household consumption.

(4) In order to overcome the economic struggle of getting back on track after a fire, the peasantry was dependent on Swedish legislation that gave everyone a fighting chance to rebuild their former life. The investigation has shown how applications for fire support increased over the century. Given that the region was characterised by wealth inequality, this led to the hypothesis that those living under less favourable socio-economic conditions were worse off and were made more vulnerable as fire disasters occurred. However, the investigation of the court and tax records from Huittinen parish has shown that no distinction was made in terms of what land an applicant owned or rented, nor on the grounds of socio-economic status – that is, the size of

their homesteads. If it could be proven that the fire had not been caused by carelessness, everyone received on average a third of the value of the property lost, which was given to the applicant in the form of monetary relief, with some exceptions in particularly severe cases when larger sums were given. However, even when fire support was not granted by the local courts, the peasant communities could still decide to voluntarily give money to those they deemed deserving. Together with the possibility of applying to the county governor for three years of tax exemption, enough money could be raised so that most of the peasants who had their homes and lands devastated by a fire could ultimately rebuild their lives and continue to make a living.

It is far from an overstatement to say that fire was an essential part of early modern societies, and that the potential devastation it could wreak was well known to those living in both urban and rural environments. In this article, it has been demonstrated how fire disasters were a recurring feature of rural life during the seventeenth century and that both peasants and legislators made efforts to mitigate the negative outcomes of such events in different ways. By implementing new legislation aimed at restoring peasant households and thanks to the peasantry's volition to go beyond what the law stipulated in aiding their fellow parish members, peasant communities were able to create socio-economic safety nets that increased their resilience and ability to overcome disastrous fire events.

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