

Penalty and punishment. Designing effective sanctions for freerider's behaviour on early modern Dutch commons¹

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1. Introduction

In the literature on the use and management of common pool resources it is generally accepted that there is a need for an appropriate sanctioning system to accompany regulation, in order to prevent freeriding or avoid the repetition of it and to steer the whole group of users towards a satisfactory level of cooperation. It is also generally agreed upon that sanctioning can be expensive, both for the individual as for the group. Members of the common pool institution need to invest time and effort into designing appropriate sanctions, to detect freeriding, to implement the sanction itself and if all of this doesn't work, to take the defector to court. Although sanctions can scare of potential defectors or compensate for the harm done, there are also other potential negative effects to sanctions besides the cost of design and implementation. Sanctioning may affect the level of trust within a group and create a hostile environment (Nikiforakis, 2008; Fehr and Rockenbach, 2003; Mulder et al., 2006). Many experimental studies have tried to establish what an effective and efficient sanctioning system should look like by studying what the right level of a fine should be, to what extent people are willing to punish each other, what the structure of a fine should be (pool punishment or not; the choice between "carrots" or "sticks"), and to what extent external enforcement can be efficiently used to implement sanctions in an effective way. In the meanwhile, field research has also demonstrated that sanctioning indeed takes place, that human beings also in real life are not afraid of determining sanctions and executing punishments in case of freeriding, and it has been suggested by a.o. Ostrom (1990) that a specific type of sanctioning, graduated sanctioning, is a good way to prevent future problems. Given these results from experimental studies, the question remains whether sanctioning is the only option to avoid and punish freeriding on the commons.

In this paper we will explore the use of sanctioning in a number of very-long-lived commons in the Netherlands. European history provides us with examples of institutions for collective action that have managed to survive literally centuries (see De Moor, 2009). The longevity of the cases we study varies from 695 to 236 years. The archival sources allow us to retrieve who the commoners were (access rules), how the use of their common resources was regulated (use rules), how access and use were managed (management rules) and how the governance of the institution as a whole was arranged (governance rules). Moreover, we can include in our analyses not only the rules as such, but also analyse the type and level of the sanctions that were used to threaten and punish those who did not follow those rules. The data we have collected allow us to approach the above mentioned issues related to sanctioning in a different way. We consider the total body of rules that each of the commons we use as case-studies as the total effort the commoners spent designing the regulation of their institution. We assume that commoners wanted to keep this effort as small as possible. This approach is used to find out which aspects (access, use, management, governance) the commoners found most important to regulate, and as well, to sanction and we relate this effort to the longevity of the case-studies.

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In the first part of the article, we will give a brief overview of our case-studies and methodology. Also, we will provide some additional background information on how these commons were organised in terms of the setting of rules, the monitoring of compliance, and the execution of sanctioning. In the second part, we will discuss the design of sanctions, and how this design differs from case to case. In the last part we will concentrate on the dynamics of the rules and related sanctions.

1. Methodology and case studies

So far, experimental methods have as yet proven not to be able to deal with periods of time that are of a sufficient length in order to capture the effects of individual users' behaviour. To some extent, experiments – e.g. infinitely repeated games (Casari 2007) – can capture experiences from, and the effect of, behavioural choices in previous periods, but it is hard – if not impossible – to incorporate also the many changes in the regulation and sanctioning and the external circumstances that may have induced such changes at the same time. Another problem we face with experimental studies as a way to understand the functioning of institutions for collective action, is the focus on individual behaviour and the difficulty to relate this behaviour to decisions made on the institutional level. How are individual preferences and choices translated into rules and at which point do changes in those individual preferences lead to a group decision to change the institutional setting? This last question can be answered by intensive field research, as has been demonstrated for the first time by Elinor Ostrom in the 1990s (Ostrom, 1990). But still, capturing and explaining the long-term dynamics of institutions for collective action beyond an institutional life-time of more than 1 century remains out of reach.

In this paper we present another approach that allows us to cover very lengthy periods of time (at least two centuries) of institutional change. We systematically analyse the regulation of eight cases of common pool institutions (CPI's) in the Netherlands and its changes, and we try to relate these institutional changes to changes in the environment of the common. Our approach to understanding institutional change has not been tried out before, probably because – although it delivers interesting results and new perspectives – it is a daunting task. Reaching a consensus on how to analyse these regulations for several countries has already proven to be a considerable challenge because of the huge variety in local forms of use and formulation of rules. Entering, translating, and analysing for several cases each rule that had been recorded in the course of several centuries has been extremely time-consuming. This paper is an exploration of the potential value of our data for institutional analysis for just one of the European countries we are dealing with (albeit for a still limited number of cases (eight), all located within a particular region). Regarding the analysis, we have limited ourselves to very simple methods, whereby we mainly looked at the distribution of different types of rules and sanctions and in particular how this relates to the longevity of the specific cases, thereby including some detailed examples of specific cases. With the small number of cases we are currently dealing with, our current approach does not meet any real problems. In due time, when we have explored the possibilities of our data in various fields, we will seek to develop more specific methods in order to deal with more specific research questions on the dynamics of institutions for collective action. Such methods however are currently not yet well-defined in literature.

Contrary to experimental studies, we cannot identify the role of individual preferences in our sources, but we can determine what type of collective choice to mediate the behaviour of individual members of the common has been preferred over other types. We consider this first attempt to analyse regulation of commons on a large scale as a way to bridge the gaps between experimental studies and fields studies on regulation in general, and on sanctioning in particular. So far, these methodologies are, to a large extent, still isolated. From a merely methodological point of view, our approach is much closer to field studies, but our results make clear that in the past many more instruments for managing common pool resources (CPR's) were available than have been

considered so far in experimental studies. We cannot identify the individual preferences, but we can determine how the willingness to cooperate and sanction was translated in collectively set group norms. Although our results will not fundamentally change the possibilities within experimental or present-day field research, long-term historical research could highlight a number of best – or worst – practices. Also as we will show, generally accepted sanctioning instruments, such as graduated sanctioning, although they may have proven to be usefulness in short-term studies, may not necessarily have played an important role in the survival of commons in the very long-term.

In the Netherlands, there are two main forms of commons to be found. In the eastern (particular in the provinces of Gelderland and Overijssel) and more central part of the Netherlands, commons usually took the form of *markegenootschappen* (also known as *marken*), which were associations of a number of members that were entirely self-governing (although their organization did need to be formally recognized by the local authority (Beekman 1913-1938; Slicher van Bath 1978, 242; Hoppenbrouwers 2002, 93-4)). Elsewhere in the Netherlands, in particularly in the southern province of Brabant, we also find the so-called *meenten* whereby the right to use the common was usually reserved to the inhabitants of the village in which the common was situated; the management of such commons was often in the hands of representatives of that village (Hoppenbrouwers 2002, 92). The degree in which commoners were actively involved in deciding upon new rules in most cases was probably less for *meenten* than for *markegenootschappen*. For our study, we therefore focused on eight *markegenootschappen*, all situated in the eastern part of the Netherlands;² appendix 1 provides a more detailed overview of a number of features of these commons. Notwithstanding the similarities in their “institutional format”, each of these *marken* could be rather different from the others: in the types of resources they could harvest, in the way they set up their rules and sanctions, in their longevity as an institution. Our interest in this paper, however, is in the common denominators of these commons, and we try to determine these denominators by analysing the regulation of these commons in great detail. The regulation of the selected commons – in total we analysed 2,553 rules for the eight case studies-was entered rule by rule into a database, and was also analyzed rule by rule. Using a pre-set number of variables that allowed us to specify both the content of the rule as well as the sanction that was applied if the rule was breached. On the most basic level, rules were identified as being related to access, use, management or governance structure. Appendix 3 gives a description of the types of rules that were comprised in each category. The content of the rule furthermore was analysed in other ways, related the type of the rule (obligation, permission, etc.), the type of resource (peat, water, hay, grass, etc.), the activities (digging, management tasks, etc.) the rule refers to, and the specific circumstances in which a rule was applicable (time of the day, in case of the use of specific tools, etc.). Furthermore, we analysed the sanction that was to be executed in case the rule was breached. This again was analysed in detail, determining e.g. the party that was breaching the rule, the party affected by the offence, the kind of sanction that was set (fines, penning up of cattle, exclusion from common, etc.), the type of the sanction (singular, graduated, differentiated), the level of the sanction, as well as some specific issues such as the eventual inclusion of a liability clause within the rule.³

Figure 1: Location of the eight case studies: 1) Marke Berkum⁴, 2) Marke Rozengaarde⁵, 3) Marke Raalterwoold⁶, 4) Marke Bestmen, 5) Marke Geesteren, Mander,

² The *marke* Coevorden, one of our case studies, differs a little from this general pattern. The *marke* was originally managed by the representatives of the town, in a similar way as applied to the *meenten*. However, over time regulations came to be designed by an external institution. This *marke* does differ from *meenten*, as the use of the common was not available to all inhabitants, and the members or their representatives were involved in the decisions about the common.

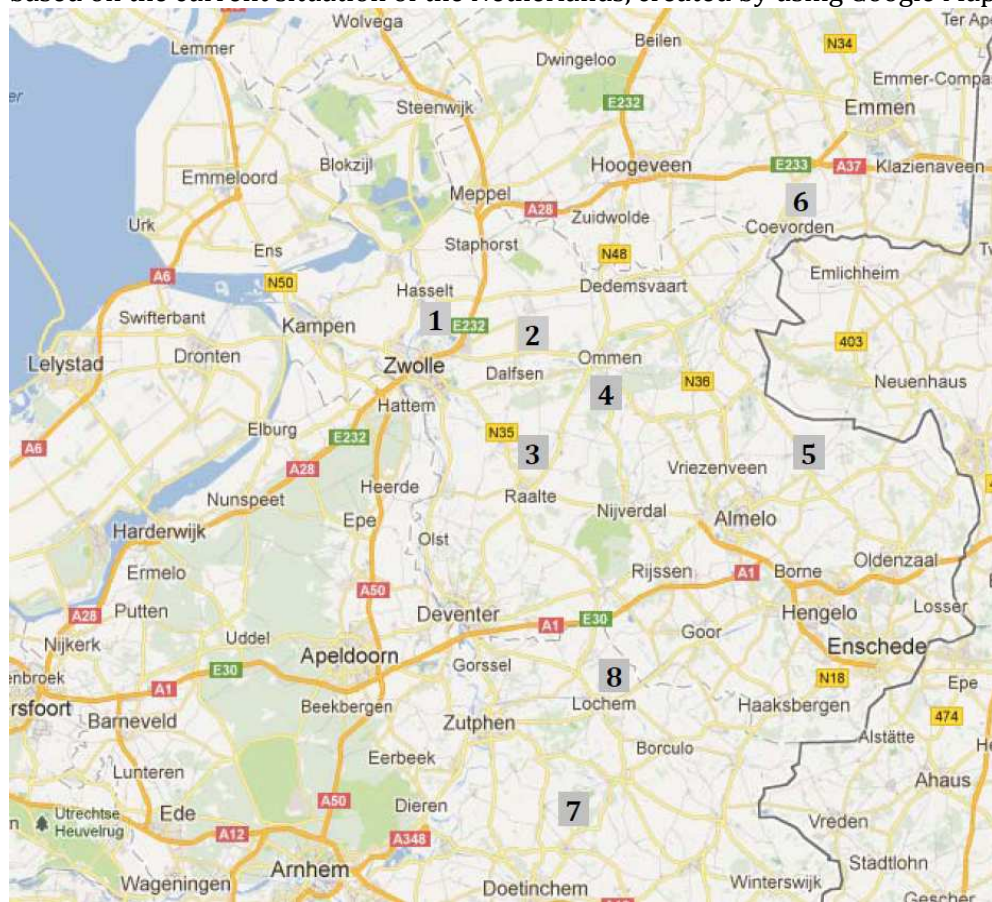
³ Details on the variables that were included in the analysis can be found in the codebook that was developed for the purpose of this database, see: http://www.collective-action.info/_PRO_NWO_CommonRules_Codebook

⁴ See also: http://www.collective-action.info/_CAS_COM_NET_Berkum

⁵ See also: http://www.collective-action.info/_CAS_COM_NET_DivisionRosengaerdermarke

⁶ See also: http://www.collective-action.info/_CAS_COM_NET_Raalterwoold

and Vasse, 6) Marke Coevorden, 7) Dunsborger Hattermer Marke⁷, 8) Marke Exel⁸ (Map based on the current situation of the Netherlands, created by using Google Maps)



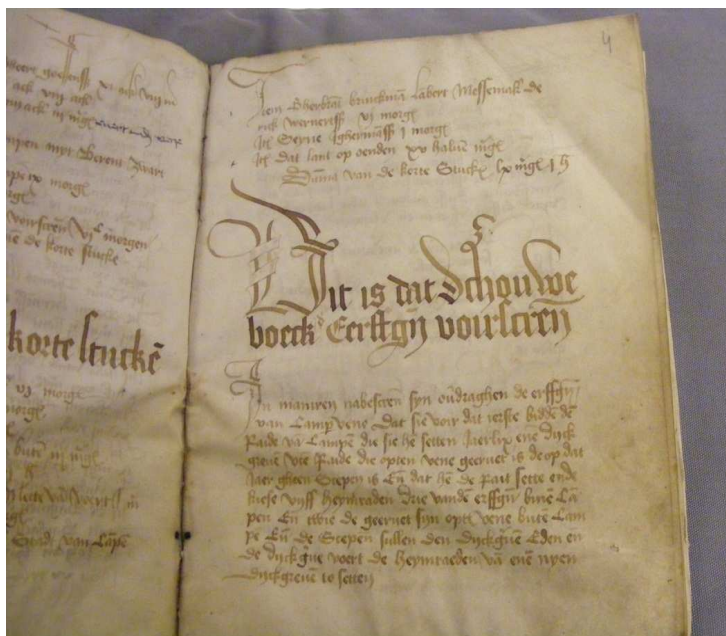
Since written – and other – sources become more and more scarce as we go back in time – and also given the lack of a uniform definition of the concept of the ‘*marke*’ – it is hardly, if ever, possible to exactly pinpoint the year of origin of the *marks* (see discussion mentioned by Hoppenbrouwers 2002, 93). Paskamp-van Santen (1997) describes that the *buurschappen* (hamlets), which became part of the *marke* later on, already had a form of legal self-governance, having their own jurisdiction, jurisprudence, and its own governance system; however, primary sources from this early stages of this informal institution hardly exist. Hence, a more decisive criterium would be the first appearance of the *marke* as being a formal institution, usually taking the form of the first (or at least the oldest preserved) set of rules that applied to the access, use, and management of the common. The oldest examples of such regulations often exist of one single document, written on parchment and sealed by the local authority or authorities and date back to the end of the thirteenth and the beginning of the fourteenth century. In cases where the first regulations preserved date from a later period, the first set of rules – sometimes in transcribed form, as was the case for *marke Raalterwoold* – often cover the starting pages of the so-called *markeboeken*, in which the regulations – and often also the resolutions taken at annual and other general meetings – were recorded. We know from the case study of the *marke* of Exel that, in regard to the registration of rules, a combined form was also in use: it appears from the text of the resolutions of this *marke* that the regulations and resolutions of previous meetings were inserted into the collected body of regulations as being the first point of order at the next meeting. Next to the regulations and resolutions agreed upon at the general meetings, the *markeboek* was often used for

⁷ See also: http://www.collective-action.info/_CAS_COM_NET_DunsborgerHattermerMark

⁸ See also: http://www.collective-action.info/_CAS_COM_NET_Exel

administrative purposes, such as the registration of shares or other, more and for financial matters (see also Van Weeren and De Moor 2012).

Figure 1: picture of a page of the markeboek of the Marke Raalterwoold (Overijssel), that was started in 1615⁹



These *markeboeken* are the historical sources on which we have based our analysis for this study. We have made a preselection of cases on the basis of availability of such *markeboeken* and a minimum longevity of the institution for 200 years. Furthermore, we selected only those cases that had, within those two centuries, at least three changes of regulation (at least one at the beginning of that period, at the end and somewhere in between). Usually more than just one rule at a time was changed

and the regulation was often adjusted far more frequently than three times in two centuries. The list of years in which the regulation was changed in Appendix 1 demonstrates this very clearly. This in itself already demonstrates a high degree of "dynamism" of these regulations, but we will come up with more sophisticated ways to evaluate "dynamism" further on in this article.

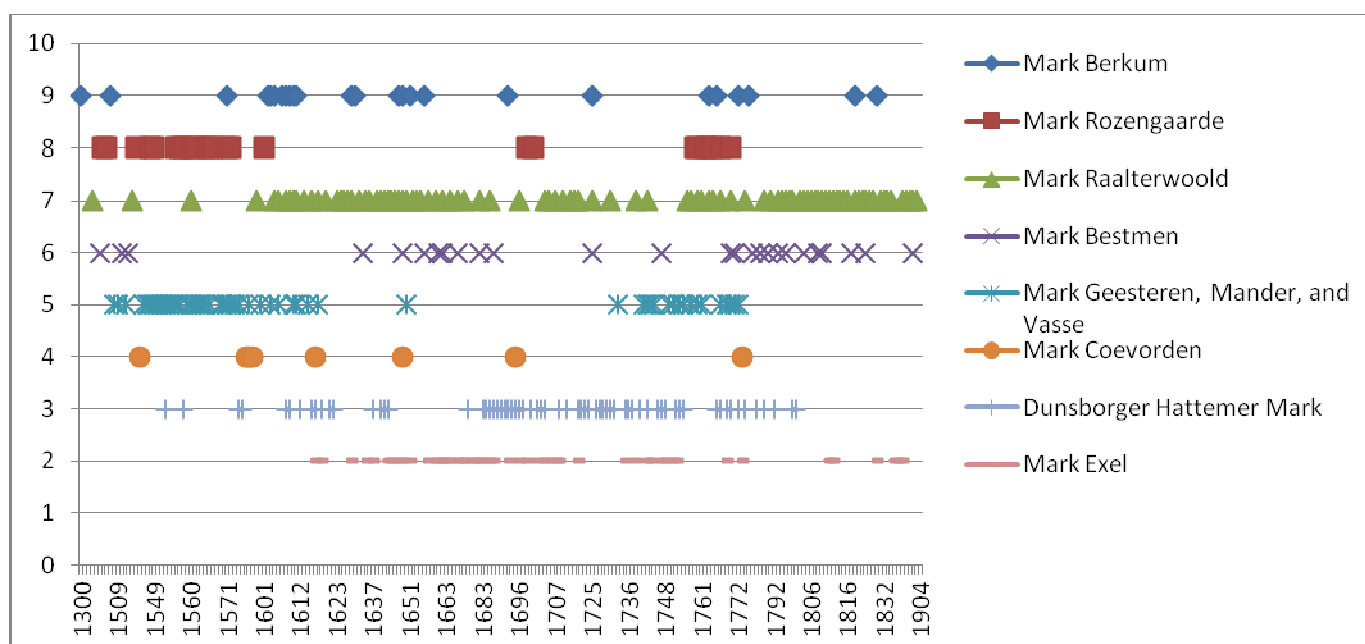
Fortunately, the historical archives offer us plenty of choice for multiple case studies, but due to the very high labour-intensity of entering data from these *markeboeken* into databases and analysing their regulation we selected only eight cases. In all but one of the cases, the origins of the common as an institution dates back to at least the middle of the sixteenth century; they were dissolved no earlier than 1847. All of these cases thus managed to survive for at least 236 years, with an absolute record for the *marke* of Berkum, which common has a documented existence of nearly 700 years. Markedly, the two cases with the shortest (though still considerable) life spans in our selection, the Dunsborger Hattermer *marke* and the *marke* of Exel had the most frequent changes during their life-spans when looking at the ratio between the number of occasions when regulation was changed and the total number of years of survival (Please note that this, however, does not relate to the number of rules that were changed per occasion that changes were made; see further). On the whole shorter living commons such as Dunsborger Hattermer *marke* or the *marke* of Exel adjusted their regulation less frequent, than longer living commons, like the *marke* Berkum. The latter had to change the regulation on average every nineteen years (see

Table 1) and when they did so, they changed relatively few rules. Shorter living commons changed their regulation less frequent and changed a lot of rules every time they did so. Important to note is that changing the regulation required convocating and holding a general meeting, with all the commoners attending, hence causing a substantial amount of administration, and thus also cost for both the individuals attending as for the group as a whole that would have to carry the cost of administration. The graph shown in

⁹ See also <http://grotenhuis.natuurlijk.nl/documents/Markeboek%20van%20Raalterwoold.pdf> for a complete transcription of this Markeboek.

Figure 1 allows us to visually inspect the moments of rule-change throughout the life of the respective cases discussed here. It shows that each common apparently followed its own strategy: some, like the *marke* Raalterwoold had continuous changes in their regulation, whereas others, like the *marke* of Coevorden, had very concentrated moments of rule-change. To some extent, this can also have been influenced by the amount of available sources: for some cases there were more continuous sources left than for others.¹⁰ However, the graph demonstrates that commons in a very similar area – all commons are located within a radius of 40 kilometers from their common (virtual) centre point – were not influenced by external factors in the same way, or at least did not all respond – i.e. by adapting their rules – to specific external factors in a similar fashion. Continuity, constant adaptation to changing circumstances, was clearly far more important than ad hoc-responses to external shocks or crises.

Figure 2: overview of the years new rules were introduced or old rules were repeated or adjusted, per case-study



The rules and sanctions for the commons in our case-studies were all designed by the commoners or their representatives. Representation was common, as especially in large commons with many members it would have been nearly impossible for all members to be directly involved in designing rules and sanctions. While new rules and sanctions generally had to be ratified by the assembly of the *marke* at a general meeting, the day to day management of the common was generally entrusted to a small group of representatives ("commissioned members, together with the chairman of the assembly"). Members with shares (and sometimes also owners of partial shares) generally had the right to speak and to vote at the meetings of the *marke* and were obliged to attend the meeting or send a representative, at the risk of being fined when being absent without a proper reason or without sending a representative. In *marke* Raalterwoold, for instance, any landlord who failed to attend the meeting without excusing himself would – temporarily – lose his vote, and be fined one *heren pond* – equal to one guilder.¹¹ Furthermore, to verify that all the members with shares knew that a meeting was being

¹⁰ For *marke* Coevorden no *markeboek* has survived, but the changes in regulations have been handed down by several lists with regulations.

¹¹ Raalterwoold, 1445: Ten 28. Wanneer die marckenrichteren laten kerckenspraeke doen, dat die erfgenamen te samen sullen komen, sall ider meijer dat sijnen lantheren laten weten, bij poena, soe die meijer datt versumede, van een heeren punt. Unde soe die lantheer dan niet en queme, offte sande sinen gewarthen bade niet, offte sich niet leete excusieren, soe verloere hij voerierst sijne stemme, unde verbrockede een heeren puntt, unde sulcken brocke salmen van den meijer durch die geswarenen affpenden, unde die mijer salt sijnen lantheeren ahn sijne gelt offte saetpacht mogen korten..

held, other members, often their tenants, or appointed officials were obliged to inform them. In *marke* Geesteren, Mander and Vasse the tenant farmer from Mander was required to inform all hereditary shareholders of a pending meeting, and he would have to get their signatures and present this at the meeting, to prove that all inheritors were notified.¹² To ensure that all members were familiar with the regulations too, members without shares – or representatives chosen from their midst – were usually required to attend the meeting too. For instance, in *marke* Rozengarde the neighbours were obliged to attend the meeting, or if they had a good reason for being absent they could send a replacement, otherwise they would be fined two *heren pond* – equal to 2 guilders.¹³ Decisions made at the meeting were often announced after the meeting – most often in church, and sometimes repeated during several consecutive weeks thereafter, in order to ensure that no one could claim ignorance about the changing of regulations. For instance, in 1609 in the Dunsborger Hattemer *marke* a publication was made at church about a new regulation for impounding all pigs that would cause damage to the common in order to prevent that any person could claim ignorance about this rule.¹⁴ So, the commoners set the rules and sanctions that they had to obey to themselves, and ensured that all persons to whom these rules and sanctions applied were familiar with the rules or changes in them.

For the years that *markeboeken* or their equivalent had been preserved, the rules mentioned within these sources were not necessarily new ones. In some cases the books were copied because older versions had become unreadable, but usually this was also used as an opportunity to actually change or adjust some rules to new circumstances. Whether or not rules were mentioned for the first time, repeated, or adjusted, has been included in our database (and will be analysed in this paper, see further). The table underneath gives an overview of the lifespan of each of the cases included in this paper. The *marke* of Berkum dates back to the beginning of the fourteenth century and was only recently (1995) dissolved, and thus managed to survive over nearly 700 years. At the other side of the spectrum stands the *marke* of Exel that was active as an institution in the seventeenth, eighteenth, and nineteenth centuries, but only for 236 years in total. Most *marken* were dissolved in the mid-nineteenth century. There are a number of other commons like Berkum, that managed also to survive up until the twentieth (and in one very exceptional case even until the present day (see further), but these cases are exceptional. Most of the Dutch commons succumbed to the *marke*-laws that were promulgated during the nineteenth century, which is an evolution to be found all over Europe (Vivier and Démelas 2003). Three legislative measures formed the basis of this "evening tide" of the *marks*. First, the Royal Decree of 10 May 1810 caused a new financial burden for the *marken*: all land had to be taxed, including the uncultivated – and previously untaxed – parts of the *marke*. An additional incentive was the exemption from taxation for newly reclaimed land. However, the status of self-governance of the *marken* remained intact: it was up to the assemblies of the *marken* themselves to decide whether or not to divide the common and uncultivated lands of the *marke*. As the inventarisation performed by Demoed (1987, 65, tab 1) shows, this initial decree seems to have had little effect. The contents of the regulations and resolutions of the assemblies of the *marken*, however, provide more nuance to this figures: although the number of complete and final

¹²Example: Geesteren, Mander, and Vasse, 1772: Convocatie. Op het aenhoudent versoek van eenige boermannen der 3 schigtige marktens Geesteren, Vasse en Manderen, aen d'ondergeschreven gedaen om tot wegneeminge van de nog sweevende verschillen in die marktens voornoemt eene algemeene goedsheerenvergadering te willen convoceren. Soo hebbe om reedenen voorschreven aen haer sulks niet willen verweijgeren en daer toe best geoordeelt, om op den achiende deeser maand april, des morgens om tien uren op het erve Normende in Geesteren t'samen te koomen. Werdende de gesamentlijke goedsheeren versogt om op tijt en plaets te willen verschijnen. En de meijer te Manderen gelast om deese datelijck aen de goedsheeren te doen bekend maaken. En door onderteekeing te doen blijken van recepisse. Actum op den huijze Almeloo den 5den april 1771 [volgt ondertekening van ontvangers.]

¹³Example: Rozengarde, 1481: Item in den eersten dat die markenrichter mijt die erffg[enamen] alle jaer te samen comen sollen des maendages voor meijdage bij den Rutenberch op den brijnck to x uren vor middage end wie daer nijt en kumpt breket ii heren pont en dat mogen verteren die markenrichter met die genne die daer comen. Des gelijken breken oick die boren die daer nijt en comen meer ijn noetsaeken mach en yegelick enen in sijn stede senden. Ende die noetsaek sall de genne daarvan des anderen wegen dan comen wordt den marckenrichter seggen en is die noetsaek betamelick so sall hie daer mede vri wesen.

¹⁴ Example: Dunsborg, 1609: word hier mede ook belastet den schaeters dat alle vee insonderheyt varkens soo wel in den Enk als andere landen te schutten die sij bevinden schade te doen in ander luyden saat en om dat nimant sig mag geexcuseert hebben van enige ignorantie sal dit alles als voornoemt in der kerke gepubliceert worden.

dissolutions of *marks* remained relatively low between 1819 and 1839, the *markeboeken* show increasing concerns of the members of the *marke* about the financial status of the *marke*, often resulting in the decision to sell parts of the common in order to try to solve at least part of the debts owed by the *marke*. The 1810-law had driven many commons – that had previously not been taxed – into debts, leaving no other options than to sell the common land to cover those debts. The Royal Decree of 24 June 1837 brought the legislation of 1810 to the attention of the *marken* once more; the final implementation of tax exemption for reclaimed land that was formerly common and uncultivated, as mentioned in the corresponding Law of 1840, may have been decisive for most *marken* for their decision to divide and sell the remainder of the common land the *marke* owned, resulting in the final dissolution of the majority of the *marken* between 1840 and 1859 (Demoed 1987, 65, tab 1; cf. also Van Weeren and De Moor 2012). Most of our case studies, ceased to exist in the course of the nineteenth century.

Although almost all *marks* had disappeared at the end of the nineteenth century, some *marks* still survived, either *de jure* or *de facto*. One of the case studies we used for this paper, the *marke* of Berkum, managed to extend its survival well into the 1990s, after which the remaining assets of the *marke* were used to create a fund for the promotion of specific organizations focusing on the regional heritage. An extraordinary example of survival is shown by the common Wijkerzand: up until today, this common is in use as such. Those who ‘emit smoke from a chimney at Wijk’ still enjoy the right of common pasture on this common; in practice, this means that the revenues of the letting out of this right of pasture are collected and distributed evenly among the commoners of Wijk (Hoppenbrouwers 2002, 108-9; see also Van Weeren and De Moor 2012).

The fact that most of the commons in the Netherlands and all but one in our selection eventually succumbed to the national *marke*-laws does complicate our discussion about the relationship between rule-making and longevity. If these commoners wouldn’t have experienced the pressure to dissolve, would they have carried on in the way they had been for centuries? Could the dissolution of *the marken* also be a consequence of institutional malfunctioning? Would they, if the national laws on *marken* would not have existed, have continued to exist and have proven to be resilient? This remains, with the current state of the debate, still a tricky question. In this paper we will not address that question as such, but start from the premise that a life-span of several hundreds of years deserves an explanation. In the end, examples as the *marke* Berkum or the *marke* Rozengarde could have ceased to exist already after 200 years; but they did not, and managed to survive crises and shocks. The weakness of our dataset rests in a bias towards successful examples, as archival information from cases with a shorter life-span that already have disappeared before the nineteenth century hardly exists. With our analysis we try to find out what characterises long-living institutions in terms of types of regulation and sanctions, as a way to understand how a dynamic institution deals with external change. In this sense, the comparison between the very-long living institutions such as *marke* Berkum with the medium-long-living institutions such as the marks of Raalterwold and Bestmen is as important as the comparison with the shorter-living ones such as Exel.

With this in mind, we can do some basic comparisons between the cases and their longevity. The row entitled “number of occasions of change” in the table underneath refers to the number of years for which we have included regulation (for the exact years for which we have found regulation for each case: see Appendix 1). Some of the cases altered their regulation very frequently, such as the *marke* Rozengarde for which we found 34 occasions of change, within its life span of over 442 years. Please note that in all the tables in this paper in which data are presented per case-study, the sequence of the case-studies is from longest-living to shortest-living, in order to make visual analysis a bit easier.

Table 1: Description of years of origins and dissolution, in decreasing order of years of survival

	Marke Berkum	Marke Rozengaarde	Marke Raalterwoold	Marke Bestmen	Marke Geesteren, Mander, and Vasse	Marke Coevorden	Dunsborger Marke Hattermer	Marke Exel
Year of origin[1]	1300	1417	1445	1458	1498	1545	1553	1616
Year of dissolution	1995	1859	1840	1853	1847	1860	c. 1850	1852
Nr. of years of survival	695	442	395	395	349	315	297	236
Nr. of occasions of changes	37	34	14	17	12	39	8	7
Nr. of years in between regulation changes	19	13	28	23	29	8	37	34
Nr. of individual rules in total	220	264	751	156	332	211	246	371
Nr. of rules per occasion of change	6	8	54	9	28	5	31	53

Although commoners designed their own regulation, without the interference of the local or higher authorities and without consultation of commoners of other commons, we do see some remarkable similarities in the way commoners divided their attention in terms of institutional design. We come to this conclusion on the basis of the figures in the table underneath, but starting from the premise that both rule making and sanctioning are costly affairs, in particular if rules need to be discussed and agreed upon by a whole group. We therefore approach the complete body of rules to be found per common as the “total effort” a group of commoners was prepared to spend on rule-making (or designing sanctions, see further) and the implementation of those rules (and sanctions). So far, there are no other adequate methods available to understand the process of institutional design, hence we propose to analyse this effort on a fairly simple basis: by calculating the percentage of rules that was devoted to a particular objective, as part of the total body of rules designed for the whole life span of the common.

Although the commons were all situated in the same area, it is unlikely that commoners from different commons discussed this matter among each other. Still, they seem to share a similar way in which they dealt with commons-issues. It is striking how consistent the distribution of the rules over the goals was (Table 2): on average, nearly half of the rules was dealing with issues of use, while less than five percent (on average) was dealing with regulating access. The rest of the rules dealt with issues of management and quite a substantial part, on average almost thirty-five percent, was related to issues

of governance of the commons. Each case did vary, with some – as the common of Coevorden – spending an exceptionally large part of the “regulatory effort” (eight percent) on distinguishing insiders from outsiders and a bit less on use. But on the whole, the picture is rather similar.

Table 2: Overview of rules per type divided according to their content (access, use, management, and governance structure), per common (*marke*), in percentages of total number of rules.*

Type of rule	Berkum	Rozengarde	Raalterwoold	Bestmen	Geesteren, Mander and Vasse	Coevorden	Dunsborger hattemer marke	Exel	Total	Total N
Access	3	1	7	2	1	8	5	2	4	102
Use	40	35	43	58	40	46	52	54	45	1,154
Management	17	25	19	8	18	17	17	10	17	432
Governance	41	39	31	31	41	29	26	35	34	865
Total	100	100	100	100	100	100	100	100	100	2553

*Due to the rounding off of the percentages the total may appear to end up slightly less than or slightly over 100%.

This analysis of the issues the rules were supposed to regulate suggests that access to the common was not a major point of attention and was on the whole a matter that did not need much attention. Apparently, the use by those who had gained access required far more attention from the rule makers. That most of the attention had to be paid to commoners, and not to potential non-entitled users also becomes clear on the basis of the subdivision per main category of party that was addressed in each rule. On average 83% of all rules specified what the own members could (not) or should (not) do. Contained within this percentage are an average of 40% of rules set up in which a specific subtype of members was referred to, and an average of 36% of these rules for members pertained to officials. No distinction was made between members and non-members in 12% of all cases. Only a very small percentage - on average 4% - of the rules dealt with non-members (see also Appendix 1). When comparing the distribution of types of rules over the cases, there are no real marked differences, except for a larger percentage of the rules about the rights (or the lack thereof) of non-members.

2. Designing sanctions

a. Introduction

Sanctioning was vital – both in the preventive and in the remediating sense – to assure compliance with the rules. In all commons in our database, throughout the period we studied, officials were appointed from among the members in order to monitor the usage of the common’s resources and to sanction misbehaviour whenever needed.¹⁵ They were obliged to keep a close watch on the common, to ensure that all rules were executed properly, and they performed regular inspections. The most common types of monitors were the cattle pounders (*schutters*), the sworn members (*gezworenen, swaeren*) and commissioned members (*gecommitteerde leden*). Strictly speaking impounding animals

¹⁵ Elsewhere it has been noted that gradually external monitors were appointed, who were paid for their efforts. However, no explicit mentioning has been found of third parties being appointed. In general only the names of the appointed monitors were recorded. Therefore, it is possible that some of these persons were external parties (Van Zanden 1999, 133).

was the main task of cattle pounders. Sworn members were mainly involved in inspections, and commissioned members generally executed ad hoc-tasks for the common or tasks that required a more formal representation of the assembly of the *marke*. The tasks these specific types of officers fulfilled varied per common, and over time their functions became more extensive, eventually leading to overlap of their tasks with those originally performed by other officials. In almost all of our case studies the officials received some compensation for their efforts, which was usually part of the proceeds of sanctions.¹⁶ In particular towards the end of the period studied (in the eighteenth century), officials were paid wages for monitoring.

Monitors were appointed or elected at the meeting, often on a rotational basis. In four of the eight case studies accepting the task as a monitor was compulsory. For instance, in *marke* Rozengarde a person refusing an appointment as sworn member would be fined three heren pond – equal to three guilders – and he would be obliged to accept the appointment in the following year.¹⁷ The appointed officials were also obliged to perform their task properly, again at the risk of being fined. In the *marke* of Exel, for instance, the cattle pounders were obliged to sanction all offences without connivance, or they would be fined themselves, having to pay (the value of) half a barrel of beer.¹⁸ Offences committed by officials were punished more severely than offences committed by ordinary commoners (see differentiated sanctions). But monitoring was not only the task of those appointed as monitors. In all of our case studies members that had not been appointed as officers were also required to assist in the monitoring, in the form of social control. Commoners were liable for allowing (or not preventing) other persons to commit offences, or for actively participating in the crime. For instance, in the *marke* Bestmen landlords and tenants who granted access to the common to sheep belonging to a person from outside the common were fined four *kromstaart* – twelve guilders -- for every sheep.¹⁹ In all but one of our cases, the person reporting the offence received part of the proceeds of the sanction as incentive.

The actual execution of the punishment was left up to the persons appointed to monitor the common. They generally fined offenders, impounded and confiscated animals or resources stolen from the common (see further). The chairman of the assembly generally only got involved in executing the sanctions when assets were confiscated or destroyed. Commoners – often also involved in executing sanctions – were allowed to shut in animals and remove illegal constructions from the common.

b. Frequency of sanctioning

Not all types of regulation that were mentioned in the *markeboeken* needed sanctioning. Circa 12 percent of all rules were general rules and appointments. A sanction is rarely attached to these types of rules – in less than 5 percent of all cases. Especially rules on administration, financial matters, and the management system – which make up almost a third of all rules recorded – were often not sanctioned. This is not surprising, as these rules often specified tasks to be performed and procedures to be followed. On average 62 percent of the rules were not accompanied by a sanction, but this varied quite substantially per common. The picture that emerges when comparing the number of sanctioned with the non-sanctioned rules is most interesting: there seems to be a relationship between longevity and sanctioning. On the whole, the commons that survived longest had far more rules that were not accompanied by a sanction than those

¹⁶ Only in *Marke* Berkum no division of the proceeds of sanctions in favour of the officials was made, although the sworn members did receive a wage for inspecting. It is not unreasonable to assume that the regulation on the division of sanctions is lost, rather than to assume that monitors did not receive a part of the fine.

¹⁷ Rozengarde, 1481: Item de to swaren gecoren wort ende des nicht doen en wolde breket iii heren pont ende die sall he ter stunt affdoen daer die marckenrichter vnd erfffg: des begeren, ende dede hie des nicht so salmen hem des andren dages penden vor iiiii heren pont sunder ennighe weer daer tegens tdone ende des naesten jares sall hie die erste wesen.

¹⁸ Exel, 1662: Sijn mede tot schutteren gestelt voor dit jaer Lambert Broeckman, Arent Wilmerinck ende Reijnt Menger, die alle misbruicken sullen sonder conniventie executieren bij poene van een halve tonne biers.

¹⁹ Bestmen 1458: Item zo en sal geen landheer jmand van buiten wharen, anders dan sijnen meijer wie hier boven de den, de breeket aen elk schaep iiiii (4) kromsteerd, ende des gelijkes ende sullen de meijer ook niets als voorschreven is op sulken breuken

that survived a shorter period of time. Only one-third of the rules in Berkum was accompanied by a sanction whereas Exel had a sanction for more than half of their rules. This seems to be a trend across all cases as well, although there are some exceptions to this rule.

Table 3: Percentage of rules accompanied by a sanction, per case study.

	Non-sanctioned	Sanctioned	All	Total N
Berkum	70	30	100	220
Rozengarde	67	33	100	264
Raalterwoold	66	34	100	751
Bestmen	51	49	100	156
Geesteren, Mander, and Vasse	60	40	100	211
Coevorden	69	31	100	334
Dunsborger Hattemer marke	52	48	100	246
Exel	48	52	100	371
Total	62	38	100	2,553

Apparently, more sanctioning does not guarantee a longer institutional life span. But if that is not the key-incentive for good behaviour, in what other way were the commoners then stimulated to follow the rules? In order to find out what really mattered, we start by making a subdivision of the sanctions according to the distinction between sanctions applying to rules concerning access, use, management, and governance, and compare the division of sanctions according to these categories per case, to the division of regulation per category per common. Out of all the analysed sanctions, on average 80 percent was related to a rule on the use of the resources. In principle this should not be a surprise, as we already found that more than half of the rules were about use; but the even greater share of the related sanctions indicates that the rules on use were also the ones most violated, and as Table 4 demonstrates, this was pretty much the same for all the commons.

Table 4: Overview of sanctions per category (use, access, management, governance) per common (in percentages)*

Type of rules	Berkum	Rozengarde	Raalterwoold	Bestmen	Geesteren, Mander, and Vasse	Coevorden	Dunsborger Hattemer marke	Exel	Total
Access	0	2	8	1	1	6	3	1	4
Use	89	67	78	86	78	73	75	87	79
Management	7	14	6	9	14	13	13	6	9
Governance	4	17	8	3	7	8	9	7	8
Total	100	100	100	100	100	100	100	100	100

*Due to the rounding off of the percentages the total may appear to end up slightly less than or slightly over 100%.

However, if we look at table 5, a clearer pattern emerges. The commoners of the commons on the left hand side – of the ones who with the longest life spans – clearly spent a much larger part of their sanctioning efforts on issues dealing with use than commoners of commons that had a shorter life-span (on the right). The difference between the percentage of rules and that of sanctions on use was exceptionally large in the case of Berkum. This means that abuse of resources in Berkum received more attention than in cases like Exel. On the other hand, the longer living commons apparently needed far less sanctions related to management, and also far less related to governance, both in comparison to the percentage of their “rule-making” effort they had spent. A tentative conclusion that can be drawn is that a good management system requires the design of fewer sanctions as a means of threat and that successful managers spend most of their effort on regulating and sanctioning the use of the resources.

Figure 3: comparison between effort spend on rules and on sanctions, per type of rule, and per case-study.

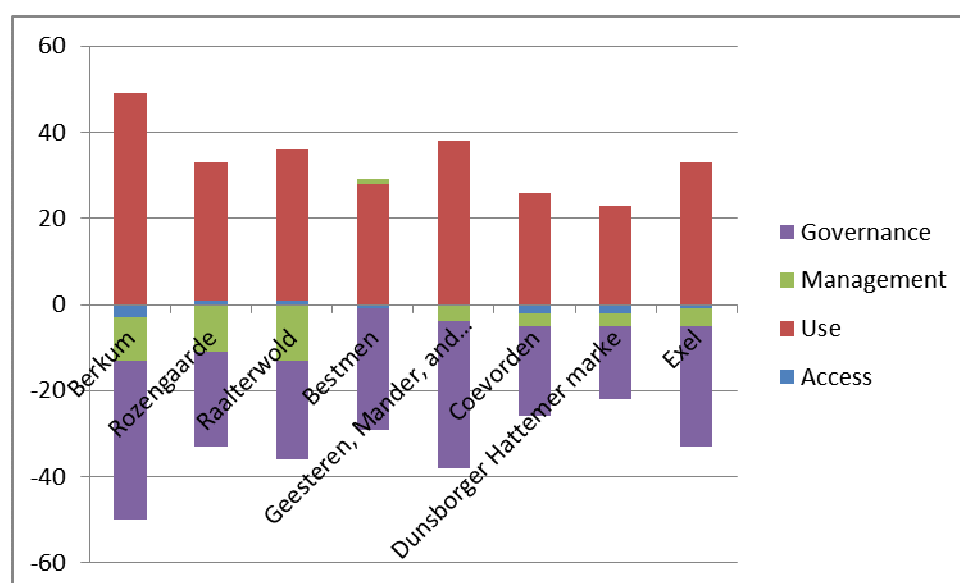


Table 5: Difference (subdivided between cases) between percentage of rules per category and sanctions per category *

Type of rule	Berkum	Rozengarde	Raalterwold	Bestmen	Geesteren, Mander, and Vasse	Coevorden	Dunsborger Hattamer marke	Exel	Total
Access	-3	1	1	-1	0	-2	-2	-1	0
Use	49	32	35	28	38	26	23	33	34
Management	-10	-11	-13	1	-4	-3	-3	-4	-8
Governance	-37	-22	-23	-28	-34	-21	-17	-28	-26

*This (and the rest of the numbers) number is obtained by subtracting the percentages (as representation of the effort spent on rule making) in Table 2 from the figures in the above table. Due to the rounding off of the percentages the total may appear to end up slightly less than or slightly over 100%.

3. Dynamics in rule-making

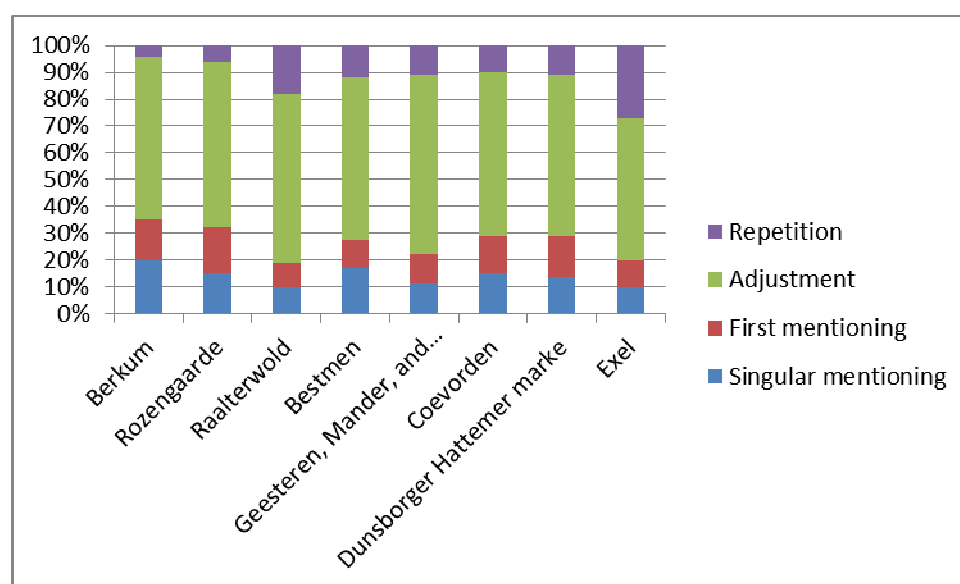
In order to check whether commons were managed dynamically or not, we will take a look at the degree in which rules were adjusted. We designed for categories: some rules were mentioned just once (singular mentioning), other rules appeared for the first time (first mentioning) but were subject to change (adjusted rules) or repetition (repeated rules) later on. Although such a distinction between rules had not been made before in studies about rule change, we believe there are good reasons to study the dynamics of institutions in this way, even though the interpretation of our results is still preliminary.

We interpret an adjustment as an indicator that commoners took changes in their environment into account or realised that the sanction that had been set before was not appropriate (either too high or too low). In our view, a repetition indicates that rules were too frequently trespassed and that a warning was in place; hence the rule was repeated to make sure that everyone was informed about the rule again. Therefore, repetition of regulation is indication of failure of the implementation of the rule, rather than an indication of dynamism.

Adjustment of the rules took up a far larger share of the regulation than repetition. In all types of rules, except for governance rules, about one-quarter of the rules were included as a form of repetition, whereas half of the rules (or nearly half) per type was an adjustment. This can be interpreted in two ways: it can be considered as a positive sign of the commoners' dynamism; those who frequently adjust their rules are really on top of things, and by changing the rules they manage to avoid trouble. A negative interpretation could be that commoners who had to change their rules all the time, were incapable of making rules that lasted, rules that were sufficiently flexible to deal with such changes. The question whether the positive or the negative interpretation is in place can be answered, if we look at the combination of adaptations with repetitions, and with the longevity of the institution.

In order to understand the above results better, we look at the division between singular mentioning, first mentioning, adjustment, and repetition on the level of the case study. The figure underneath gives us some very clear indications on how to consider adjustment and repetition: there was not much variation between the cases in terms of the effort they spent on adjusting the rules (on average 61 percent of the rules were adjustments to previously mentioned rules). However, there is a clear difference in terms of the repetition of the rules that was needed. The longer an institution survived, the lesser its rule-making was devoted to stressing that the regulation has to be respected (via repetition of the rules). Whereas Marke Berkum spent less than five percent of its total rule-making effort on repeating rules, the rules of the commoners of the Marke Exel consisted for about twenty-five percent out of repeating previous regulation. The overall picture is consistent with the conclusion that the need to repeat rules set previously might be a good indicator of the survival potential of an institution.

Figure 4: Sequence of the rules according to case, in percentage of total number of rules per case



4. Conclusions

In our paper, we have systematically analysed the regulations of eight Dutch commons, known as *markegenootschappen* or *marken*. These *marken* were self-governing: the members regulated and sanctioned their own use of the common, and they ensured that all persons to whom these rules and sanctions applied were familiar with the rules and rule changes. The longevity of our case studies varies significantly: marke Berkum was active as a – documented – institution for almost 700 years, while marke Exel only functioned for 236 years. Perhaps these commons would have survived if not for the pressure of the *marken*-laws. In any case, a life span of several hundreds of years deserves an explanation.

We started from the premise that both rule making and sanctioning are costly affairs, in particular because the rules needed to be discussed and agreed upon by the whole group of members. Therefore, we approached the complete body of rules found per common as the “total effort” of a group of commoners. We used this concept as a way to link the rules and accompanying sanctions to the longevity of each of the cases.

All commons in our case study made frequent changes to their regulation system, although some more often than others. There was little difference between the cases in terms of the effort they spent on adjusting the rules – on average 61 percent of the rules were adjustments to previously mentioned rules. This and the continuous effort to adjust their rules most of the cases demonstrated shows that all cases were essentially “dynamic”. But still, their longevity varied substantially. This can be explained by several factors.

First of all, it appears that sanctioning was not a decisive factor in the longevity of these commons. Rather the contrary seemed to be the case: cases that lived longer had a lesser need to come up with sanctions for the rules they had. Secondly, it seems that most of their rule-making effort went to designing the governance structure of the institution well. This also links nicely to the earlier made conclusion that longer-living institutions made changes to their regulation more frequently but less rules per occasion were changed. There is also a clear difference in terms of the repetition of the rules that was needed: longer-living institutions needed to repeat less, but concentrated on adjusting the rules.

Taken all these analysis results together one might tentatively claim that the secret of a long-living institution seems to be hidden in making sure that -instead of threatening people with sanctions- people meet frequently so that they “internalise” the new rules and adjustments easily. Whenever commoners wanted to change the rules, they had to convene and approve of the changes. If this is done frequently, commoners will also be more frequently confronted with their moral duty to behave towards others, than if they meet only once in a while. We thus assume that high levels of participation thus may have been more important for the longevity of the institution than sanctioning.

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Appendix 1: Overview of features of the 8 cases

	Marke Berkum	Marke Rozengarde	Marke Raalterwoold	Marke Bestmen	Marke Geesteren, Mander, and Vasse	Marke Coevorden	Dunsborger Hattermer Marke	Marke of Exel
Year origin	1300	1417	1445	1458	1498	1545	1553	1616
Year dissolution	1995	1859	1840	1853	1847	1860	1 st half of 19 th century	1852
Evolution size	<ul style="list-style-type: none"> • 1630: lands of Broeck and Ooyte were divided among the owners of, in total, 838.5 shares. • 1653: Berckmerbergen and Nemelervelden as well as the Berckmervelden near Dambrugge were divided among the owners of 390.5 shares. • 1819: division of the <i>marke</i> of Berkum into a southern and a northern part, each part to be regarded as an individual entity. • From the middle of the 19th century up until 1994, some parts still remained as being common land. 	<ul style="list-style-type: none"> • Throughout the centuries land from the common has been reclaimed and enclosed. In 1664 and 1764 lists were constructed of reclaimed land that had to be bought from the common. • In the eighteenth century the Rode Hart at Ancum was sold. • In the fifteenth century the <i>marke</i> contained almost 4800 ha. • There were 77 shares in 1417 of which 76 were still known in 1866. 	<ul style="list-style-type: none"> • Between 1445 and 1600, part of the original <i>marke</i> of Raalterwoold was split off and became the <i>marke</i> Luttenberg, this split off was not recognized by the <i>marke</i> Raalterwoold until 1722. • Number of users did increase slightly: in the 16th century 53.5 shares over 67 farms, in 1840 55.5 shares over 71 farms 	<ul style="list-style-type: none"> • A few individual plots were sold in the late eighteenth century • The <i>marke</i> contained 231 ha. at divisions in 1853 • There were 9 shares in 1458 and 9 ¼ shares at the final division. 	<ul style="list-style-type: none"> • Throughout the centuries plots of common land were sold. • The forest called Werent was cut over the centuries and made place for heath land • 1847: Division of 883 ha. common land and dividing Geesteren, Mander and Vasse in three separate <i>marks</i>. • 1851: Division <i>marke</i> Geesteren, 2676 ha. • 1857: Division <i>marke</i> Mander • 1871: Division <i>marke</i> Vasse, 794 ha. 	<ul style="list-style-type: none"> • Parts of the <i>marke</i> were sold in 1509, 1575, 1590 and 1616. • An almost final division took place in 1650-51 in which the Fen at Steenwijk Moer, the fens south of the Coevorder Saatveenen, Holwart, Grote Loo, Kleine Loo, Matmegoor, Groenlanden east of Coevorden next to Daler Ossehaar, the undivided fens and broek next to Schoonebeeker Moer, Weyerswolt and adjacent fen, the Grote Coevorder Mars and the Kleine Scher were divided. • The Mars, consisting of 292 ha. was the last part of the common and 	<ul style="list-style-type: none"> • Common of this <i>marke</i> decreased in size during first half of 19th century 	<ul style="list-style-type: none"> • Stayed the same

						was dissolved in 1860.		
User types	<ul style="list-style-type: none"> Caretaking farmers on behalf of inheritants of Berkum No peasant farmers mentioned! 	<ul style="list-style-type: none"> Members of the <i>marke</i> Caretaking farmers Tenant farmers Neighbours 	<ul style="list-style-type: none"> Inhabitants of hamlets of Tije, Boethele, Raan, Luttenberg Inhabitants of (church)village of Raalte (limited access) Owners of farms surrounding common land of Raalterwoold Peasant farmers Inhabitants of adjacent <i>marks</i>, for as far as they had obtained <i>paalbuurrecht</i> (customary right of inhabitants of adjacent <i>marks</i> to use part of the <i>marke</i> along the common boundaries, in case this use was essential for taking care of their own animals) 	<ul style="list-style-type: none"> Members of the <i>marke</i> Landlords Caretaking farmers Peasant farmers Tenant farmers Neighbours 	<ul style="list-style-type: none"> Members of the <i>marke</i> Assessors Landlords Tenant farmers Peasant farmers Neighbours 	<ul style="list-style-type: none"> Owners of Solsteden Owners of Coevorder Forest Citizens of Coevorden 	<ul style="list-style-type: none"> Members of the <i>marke</i> Peasant farmers Specific inhabitants of lands of <i>marke</i> Ruurlo adjacent to <i>marke</i> (under strict conditions and limited in number) Caretaking farmers Tenant farmers 	<ul style="list-style-type: none"> Lord of Ampsen Owners of farms surrounding Ekselse Enk Peasant farmers
Resource types	<ul style="list-style-type: none"> Hay Arable land 	<ul style="list-style-type: none"> Fossile trees Grass Hay Sods Wood Arable land 	<ul style="list-style-type: none"> Peat & Topsoil peat Sods Hay Heath Arable land 	<ul style="list-style-type: none"> Peat Drifting sands Heath Sods Wood Acorns Clay Loam 	<ul style="list-style-type: none"> Peat Grass Hay Heath Sods Wood Arable land 	<ul style="list-style-type: none"> Peat Sods Wood Arable land 	<ul style="list-style-type: none"> Peat Top-peat Drifting Sand Sods Bushes Wood Arable land 	<ul style="list-style-type: none"> Peat Sods
Rules applying to	<ul style="list-style-type: none"> Everybody or unspecified: 49 (21.8 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 28 (10.3 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 115 (14.9 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 28 (5.4 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 6 (1.8 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 32 (14.2 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 48 (18.4 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 75 (19.2 %)

	<ul style="list-style-type: none"> Members: 172 (76.4 %) Non-Members: 4 (1.8 %) 	<ul style="list-style-type: none"> Members: 238 (87.8 %) Non-members: 5 (1.8 %) 	<ul style="list-style-type: none"> Members: 609 (78.8 %) Non-Members: 49 (6.3 %) 	<ul style="list-style-type: none"> Members: 153 (91.6 %) Non-members: 5 (3.5 %) 	<ul style="list-style-type: none"> Members: 320 (94.4 %) Non-members: 13 (3.8 %) 	<ul style="list-style-type: none"> Members: 186 (82.3 %) Non-members: 8 (3.5 %) 	<ul style="list-style-type: none"> Members: 201 (77.0 %) Non-members: 12 (4.6 %) 	<ul style="list-style-type: none"> Members: 308 (79.0 %) Non-members: 7 (1.8 %)
Sanctions applying to	<ul style="list-style-type: none"> Everybody or unspecified: 39 (54.9 %) Members: 31 (43.7 %) Non-members: 1 (1.4 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 8 (8.7 %) Members: 82 (89.1 %) Non-Members: 2 (2.2 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 63 (22.8 %) Members: 166 (60.1 %) Non-members: 47 (17.0 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 4 (4.6 %) Members: 71 (80.7%) Non-Members: 13 (14.81%) 	<ul style="list-style-type: none"> Everybody or unspecified: 0 Members: 97 (90.7 %) Non-Members: 10 (9.4 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 26 (26.3 %) Members: 70 (70.7 %) Non-Members: 3 (3.0 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 33 (24.4 %) Members: 89 (65.9 %) Non-Members: 13 (9.6 %) 	<ul style="list-style-type: none"> Everybody or unspecified: 67 (31.9 %) Members: 138 (65.7 %) Non-members: 5 (2.4 %)
Animal types	<ul style="list-style-type: none"> Sheep Cows Pigs Geese Horses Fishing rights 	<ul style="list-style-type: none"> Cows Geese Horses Pigs Sheep Ravens 	<ul style="list-style-type: none"> Sheep Cows Pigs Geese Horses 	<ul style="list-style-type: none"> Cows Geese Horses Pigs Sheep Bees 	<ul style="list-style-type: none"> Cows Horses Pigs Sheep Goats 	<ul style="list-style-type: none"> Cows Geese Horses Pigs Sheep 	<ul style="list-style-type: none"> Horses Pigs Sheep Bees 	<ul style="list-style-type: none"> Sheep Cows Pigs Geese No horses
Regulations available over years; years mentioned with hyphens means that regulations are available over every year within the period	1300; 1492; 1571; 1602-04; 1606; 1608-11; 1631-32; 1647; 1649; 1651; 1656; 1692; 1725; 1763; 1766; 1772; 1777; 1819; 1830	1480-81; 1543; 1548-49;1556-58;1560-61; 1564-66;1571-72; 1601; 1698; 1700; 1759-60; 1762-64;1767	1445; 1541; 1560; 1604-05; 1608-11; 1614-16; 1618; 1620; 1623; 1625; 1627-28; 1631; 1633; 1635-36; 1639-40; 1642-45; 1647; 1649-50; 1653; 1654-55; 1657; 1660; 1662; 1664; 1670; 1676; 1681; 1686; 1696; 1704-05; 1707; 1710; 1713-14; 1719; 1725; 1731; 1738; 1755; 1758; 1760-61; 1763-64; 1767; 1770; 1775; 1789; 1791; 1793-94; 1797-98; 1800; 1802; 1804-06; 1809-16; 1819; 1924; 1927; 1829; 1831-32; 1834-35; 1839-43	1458; 1529; 1537; 1634; 1649; 1656; 1661-62; 1670; 1681; 1687; 1725;1747; 1770-71; 1783; 1786; 1790; 1793; 1797; 1804; 1808-09; 1817; 1827; 1842	1498; 1509; 1533; 1546-49; 1551-57; 1559-65; 1569-72; 1574; 1576; 1582; 1600; 1603; 1605; 1610-11; 1615; 1618; 1650; 1733; 1740-42; 1744; 1749; 1751;1753-54; 1758; 1760-61; 1767;1769; 1770-72	1545;1579;1582; 1586; 1617; 1649; 1695; 1774	1553; 1558; 1576-77; 1608-09; 1612; 1616-17; 1619; 1621-22; 1637; 1640; 1642-43; 1677; 1683-84; 1686-88; 1690-92; 1694-97; 1699; 1701; 1703-04; 1708; 1711; 1719; 1721-23; 1726-29; 1731-32; 1735-37; 1739; 1741; 1745; 1747-48; 1752-54; 1766-67; 1769-70; 1772; 1775; 1785; 1789; 1792; 1800-01	1616; 1618; 1628; 1634; 1636; 1642-43; 1645; 1647; 1650; 1656; 1659-63; 1667; 1671; 1677-79; 1681; 1684; 1686; 1691; 1695; 1697; 1700; 1703-04; 1706-07; 1714; 1734; 1737; 1740-41; 1745; 1747; 1749; 1751-52; 1768; 1772; 1810-11; 1829; 1835-37

Appendix 2: screenshot of the forms used to analyse the data.

Screenshot of main table form for the description of each case

Screenshot of the form to enter the rules in their original format and, linked to that, to analyse each individual rule comprised in the original rules

Screenshot of the form (and subforms) to analyse the sanctions connected to each rule

Appendix 3: description of the types of rules that were considered as access rules, use rules, management rules and rules related to the governance structure.

INDIVIDUAL RULES > CATEGORY OF RULE

Access	Regulations specifying who was entitled to use the marke, either implicitly or explicitly excluding all other persons
	Regulations specifying the conditions for being admitted as entitled user
	Regulations forcing those not entitled to correct their unjustified use (e.g., the obligation to remove their animals from the lands of the marke)
	Regulations prohibiting the use of resources by non-members who are using 'strawmen'
	Regulations prescribing former members to leave the marke or the common land
	Regulations prohibiting non-members to gain any profit from resources of the marke (e.e., the prohibition to export any resource or to sale these resources outside of the marke)
Use	Regulations prohibiting specific use or action to all, regardless whether being a member or not
	Regulations providing specifications on the way to use resources to those being entitled to use these resources
	Regulations prescribing obligations concerning fysical action (e.g., maintenance of drainage system, maintaining fields properly, coevring up lands)
	Regulations granting permission to specified members
Management	Regulations granting general management permissions to the benefit of the members as a whole (e.g., the permission to sell land to the benefit of the marke)
	Regulations specifying obligations concerning non-physical action (e.g., being present at meeting, notifying superiors)
	Regulations regarding financial obligations for members
	Regulations based on 'higher' regulations, sometimes originating from ancient times (e.g., exemption from taxes for 'havezaten')
	Regulations about procedures of meetings
Governance structure	Regulations with a direct link to the management structure of the marke (e.g., the frequency of meetings, the way regulations were notified to the public)

	Regulations determining who should execute sanctions and/or in which way
	Regulations regarding appointment of officials
	Regulations specifying the tasks of officials within the marke
	Regulations regarding the authorization of officials to act on behalf of the marke
