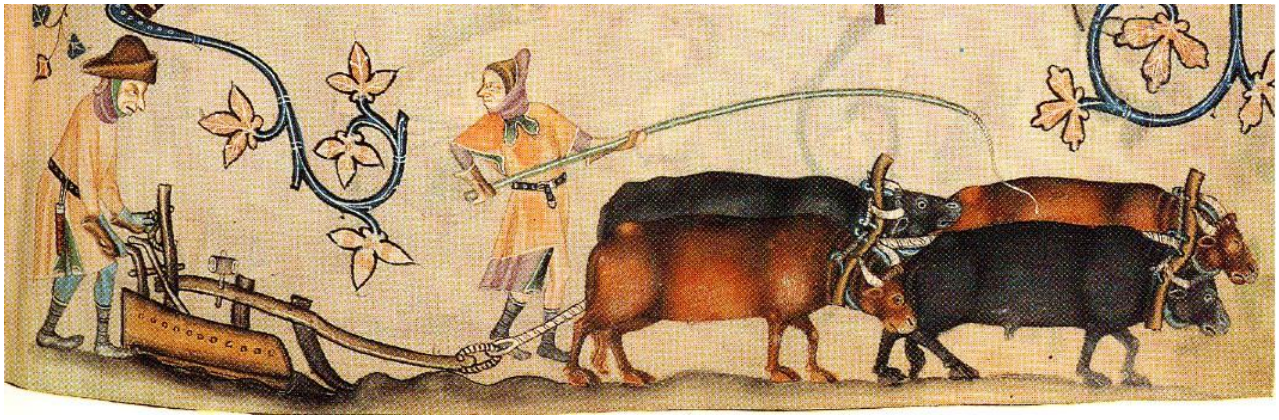
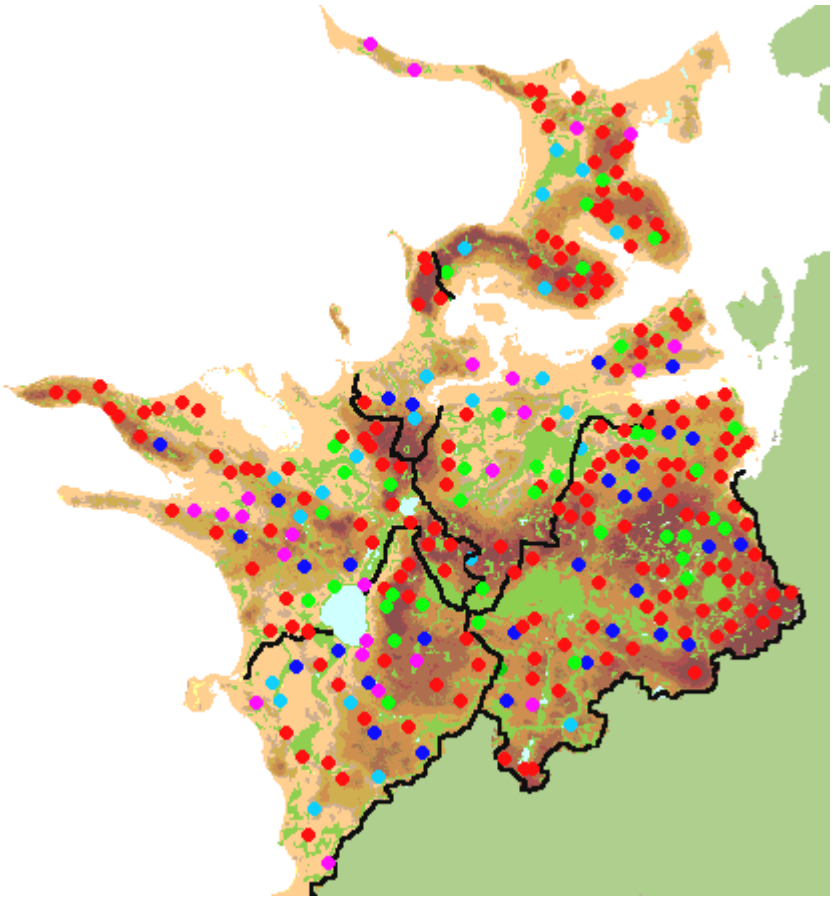
Agriculture and Settlement
in Medieval and Early Modern Zealand

A historical-geographical survey of Danish agriculture and settlement conditions, *c.*1000-1688



Master's thesis by Johnny Grandjean Gøgsig Jakobsen



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Supervisor: Jesper Brandt

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Introduction and summary

This is an abbreviated edition in English of my master's thesis presented to and approved by the Institute of Geography at Roskilde University in the summer of 2004.

The main goal of the present master's thesis is to produce new knowledge on the development of agriculture and settlement structure in Denmark during the period *c.*1000-1688. Studies of historical geography in Denmark earlier than 1688 are traditionally based upon retrospective use of the national Land Register of 1688. In my paper, I try to show that such retrospective studies for an average Danish region can be supplemented by several earlier sources of various kind, which used with an understanding of the nature of the data and their problems, actually can contribute intensively to our understanding of the agricultural and settlement conditions in medieval Denmark. A basic part of my report is therefore to present the potential data sources and evaluate their usefulness for historical-geographical studies, including a presentation of old and new methods to analyse the data. My historical sources can be grouped in four classes. 1. Place-name types of the settlements; 2. Written economical registers of parishes or villages; 3. Church buildings; 4. Structures of parishes and village land units (vills). The presented data sources and methods have been tested on a case study area of NW-Zealand, where it has been my aim to describe the demographical, economical and agricultural situation at different times in the period. In the analyses, the mentioned data has also been compared to the natural-geographical conditions of the studied region. For this purpose, I have pointed out twelve land-type areas with different but representative soil and terrain types.

The analyses begin with the land registers of the 17th century, where I have combined the data of the two registers (1662 and 1688) with the reconstructed areas of the vills (ejerlav) to calculate various relations, analyse the regional distribution of these relations and evaluate their differences between the twelve chosen land-type areas. By doing this, it has been possible to identify areas of different degrees of cultivation, seed density, crop mix, orientation of production (cattle versus grain), and land value. In the following chapters, I have tested earlier sources such as place-name distribution, size of the church buildings, parish structure and settlement pattern within the parishes, and a set of taxations recorded in the Roll of the Bishop of Roskilde (*c.*1300).

In my analyses, I have looked with special interest on the 'thorpe-foundation', that is the foundation of a vast number of new settlements mainly dated to the high medieval period, primarily with the place-name suffix *-thorp*, but in this study also with other suffixes such as *-tved* and *-rød*. It is quite clear, that in NW-Zealand the term thorpe has both been used on hamlets founded close to the old villages (adelbyer) on their land, and on new settlements in hitherto uncultivated wasteland. Also, it is possible to follow how some districts developed more thorpes than others. Differences in soil and terrain, and related differences in production, can explain some of the variations, but as areas with apparently similar conditions would end up with quite different numbers of thorpes, also the aspect of time and perhaps lordship has been suggested as possible influences. Especially in the woodlands, some thorpes have been deserted in the Late Middle Ages, but it has been difficult to find any signs of a general 'Late Medieval Crisis'. On the contrary, several areas within the region show signs of economical and demographical growth during this latter part of the studied period.

Related to this, I have tried to find any correlation between settlement structure and agricultural production on the one side, and natural conditions such as soil types and terrain on the other - also in order to see, if it is possible to identify a general change in the perception of land value. From beginning to end, it was the soils formed on moraine clay that held the highest evaluation, with only small internal variations regarding the exact texture (light, medium or heavy clay). Much more secondary was land (of all soil types) in hilly terrain, and land dominated by sandy soils or wetland. It seems, however, as if all the 'secondary land types' increased in relative value during the Late Middle Ages and early Modern Ages, which can be explained by an increased importance of both rye (sandy soils) and cattle (wetlands), and more clearing of forest (hilly terrain).

Contents:

1. Tradition of historical geography in Southern Scandinavia

The study of historical geography in Europe regarding medieval agriculture and settlement structure has often taken quite different forms reflecting the source situation of each country. In Scandinavia, extant written material from the High Middle Ages is rather scarce. This is especially evident on matters concerning historical geography. Therefore, alternative methods have been developed to an extent that might put us ahead of countries blessed with a richer textual tradition. In the historical-geographical area, archaeology and place-name studies can be pointed to as 'Scandinavian specialities'.

But also on a Scandinavian level, the medieval source situation differs among the countries, resulting in different orientations of the national schools. The scarcity of written material is, for instance, more distinct in Sweden than it is in Denmark, but then the Swedes are in possession of an enviable amount of numerous and detailed cadastral maps from the seventeenth century, where the oldest mapping of Denmark of a similar quality is about 100 to 150 years later. Logically, this has resulted in a historical-geographical tradition in Sweden based upon the use of these maps, which for medieval studies have found use in a retrospective way. However, it is also possible to identify a more general tendency in Swedish historical geography towards a 'cartographical thinking' than what you will find in Denmark. Studies of medieval church building can be used as an example. In Denmark, most of the medieval churches are preserved, usually without any major exterior changes since the late sixteenth century. Danish church-historical scholars have therefore based their studies and theories on the physical church buildings and the variations of these, which combined with socio-historical speculations has led to a lasting dispute on the question: Who built the churches - landlords or (groups of) peasants? In Sweden, the number of preserved medieval churches is considerable smaller than in Denmark, so instead, scholars here - traditionally based in cartography - have looked into parish structures and their possible developing. Of course, both questions have also been taken up by scholars in the respective neighbouring countries, but never with same intensity, and often with a twist towards their own 'national school': In Denmark, the physical size and shape of the churches have been used to determine their place in the parish formation; in Sweden, the seventeenth-century cadastral maps are used to determine whether churches were built on demesnes land or common village land. Just as a number of Swedish retrospective-medieval studies are based on cadastral maps of the seventeenth century, retrospective studies of Danish medieval geography and society are traditionally based on seventeenth-century Land Registers (see chapter 3).

The starting point of historical-geographical tradition in Denmark was the study of place-names, where linguistic elements in settlement names according to place-name scholars can be dated to different periods. Some of the pioneers in place-name-based historical geography in Denmark are Johannes Steenstrup (1894-95) and H.V. Clausen (1916), who were able to identify systematic differences in size (both physical and economical) and geographical distribution of villages with different place-name suffixes. This was used to advance theories on differences in age and reason for foundation of settlements with different name-types, and ever since, place-name material has been a traditional part of Danish settlement studies concerning Iron Age, Viking Age, and the Middle Ages (the principles are used in this survey in chapter 4).

Another important aspect in early South Scandinavian settlement-historical geography has been the strikingly regulated ground-plan of many villages and fields, as they are known from late-eighteenth- and early-nineteenth-century cadastral maps (Lauridsen 1896). The original inspiration came of course from people abroad like August Meitzen, but in Sweden and Denmark it was soon argued that village- and field structures depicted on early modern maps probably could not be attributed further back than the late High Middle Ages (Larsen 1918, Lindgren 1939). Indeed, several studies have indicated an extensive settlement reform in the fourteenth century. The

physical structure of villages also became the main focus of one of the leading historical geographers of Denmark, Frits Hastrup (1964), who classified all Danish villages by their form and internal structure, and based on this he propounded the thesis that medieval villages were subjects to a most consistent spatial regulation, as the breadth of the toft (that enclosed the individual farm within the village site) quite accurately should reflect the farm's share of the village field, and thereby also its basis of assessment.

Next to place-name studies, archaeology has made up one of the most important cornerstones in South Scandinavian settlement-geographical history, as archaeology at a very early time (mid-nineteenth century) was commonly integrated with other disciplines related to landscape and settlement studies, such as history, human geography, and physical geography. Among Danish pioneers was archaeologist Sophus Müller (1904), who studied the connection between ancient road systems, landscape topography, and burial mounds. The works and ideas of Müller were continued by Vilhelm la Cour (1927) and Therkel Mathiassen (e.g. 1959) with studies in a large regional scale, while Gudmund Hatt (e.g. 1938) performed an impressive series of thorough point-studies. All of them agreed that settlement-historical development derived from natural conditions in the physical geography, and - closely related to this - from agronomics. In recent years, point-studies have dominated Danish settlement archaeology of which the most famous example is the excavation of the Jutland village Vorbasse (Hvass 1984), where it has been established, how the actual site of the settlement has moved several times within a limited area up through the Iron Age to the early High Middle Ages. In the 1970s, Erland Porsmose (1977, 1979) and Torben Grøngaard Jeppesen (1979) conducted a series of settlement-historical studies of villages on the island of Funen, in which archaeology took a leading rôle. The Funen project supported the picture from Vorbasse of a break in settlement continuity around the transition from Viking Age to early High Middle Ages (i.e. 1000-1100).

The agricultural side of Danish medieval-historical geography was at an early stage taken up in a broad, synthesizing form by historians Kristian Erslev (1898), Erik Arup (1925), and Aksel E. Christensen (1938), after which the discipline was characterized by the publication of several extensive and informative sources. A such with great importance for subsequent Danish studies in historical settlement and agriculture is a collection of tables edited by Henrik Pedersen (1928), presenting the main economical data of the *Land Register of 1688* (on the level of vills, parishes, and hundreds); both the source and the data is further described (and used) in chapter 3. Among the most important Danish medieval source publications is the *Roll of King Valdemar II* (mid-thirteenth century), which was published, translated, and extensively commentated by Svend Aakjær in three comprehensive volumes in 1926-43. Among other things, the roll contains a unique and most informative taxation list for the villages on the island of Falster (situated south of Zealand) *c*.1250-60. For the studies of medieval-historical geography on Zealand, a highly valuable source is the *Roll of the Bishop of Roskilde* (*c*.1370), published in 1956 by C.A. Christensen; the source is presented and used in this survey's chapter 6. Furthermore, a number of various less extensive rolls and registers from the mid- and late-sixteenth centuries, not least from Zealand, have been published, but perhaps due to their more regional character, they have never received the same attention as the three first-mentioned. The named publishers were, by the way, also the leading scholars of contemporary agricultural-historical studies and debate in Denmark.

The regional perspective in historical geography was quite early introduced in Southern Scandinavia, especially among Scanian scholars (: Scania is the southernmost part of Sweden, and was until 1658 a part of Denmark; both as a Danish and a Swedish province, Scania has always held a special, regional identity). Based on material from the eighteenth century, Åke Campbell (1928) divided the province into three cultural-geographical types of regions called *bygder*: plain-bygd (characterized by nucleated villages, open-field systems, and arable production); wood-bygd (small, dispersed settlements, mainly based on pastural production); and coppice-bygder (a combination of

the two former types). In 1942, this was followed up and improved by a now classical doctor's thesis of Sven Dahl on settlement conditions and historical agronomics in Scania from the sixteenth to the nineteenth century, in which he also included natural-geographical conditions. Regional geography has a long and strong tradition in Sweden, where among others Gunnar Lindgren (1939) at an early point founded a school with his agricultural-historical studies of Falbygden in Western Götaland. After World War II, the interest for regional-historical geography also reached Denmark, e.g. with the studies by Ole Widding (1948) of different types of field-systems on the island of Lolland. Local-scaled studies of great regional value were performed by Carl Rise Hansen and Axel Steensberg of field-systems in several Zealand villages (e.g. Hansen & Steensberg 1951, Steensberg 1968, 1974).

In the second half of the twentieth century, Danish historical geography has produced several thematic works on various topics within the discipline. Poul Meyer (1949) gave a thorough account for historical settlement and agricultural conditions, as these are reflected in preserved rules from old Danish village regulations. A legal-historical perspective, which Annette Hoff (1997) has followed up on with a fruitful use of Danish medieval law material. Erik Ulsig (1968) has given a detailed account for medieval property structures, especially on Zealand, a theme which in these years have been - and still are - object of great attention among Danish scholars; an example of this is Carsten Porskrog Rasmussen's (2003) work on types of manorial structures in early modern Schleswig. A more technical theme has been exhaustively tested and analysed by Gritt Lerche (1994), and thereby generated remarkable new knowledge on development and usage of the plough from ancient times till today. Another thematic expert in recent historical geography in Denmark is Bo Fritzbøger (e.g. 1992), who has specialized in forest history.

The vast of majority of the scholars mentioned above are historians. The 'grand ole men' among geographers in Danish historical geography are the already mentioned Frits Hastrup together with Viggo Hansen. Hansen (1964) conducted a regional analysis of the connection between the development of settlement structure (mainly based on place-name material) and natural conditions in Vendsyssel, Northern Jutland. Scholarly attention was especially given to his including of physical distance as an explanatory parameter in settlement geography, both locally and for the structure of the individual vill. In consonance with old masters like Ricardo and von Thünen, Hansen (1977) pointed to distance between place of production and place of sale as a most influential factor in the growing market economy of the Middle Ages. Inspired by Michael Chisholm (1962) in England, Hansen (1973) too claimed he could find evidence in Denmark for the thesis that the strips of village-field closest to the settlement site generally were higher assessed than others, which he explained by a more intensive tillage of the inner field area in form of manuring, marling, summer ploughing, *etc*. Based on these studies and theses, he estimated a general boundary between the intensively cultivated infield and the more extensively used outfield to set in at about 800-1000 metres from the village site. In a sense, these two leaders of historical geography within Danish geography did each represent one of the two schools of the contemporary shift in international historical geography: while Frits Hastrup employed a rather static-retrospective view and method in his settlement-structural studies, Viggo Hansen's ideas and interpretations were highly based on the new thoughts in historical geography of constant dynamics. Whereas Hansen therefore perhaps is to be considered the most progressive of the two, Hastrup succeeded in creating the settings for an actual historical-geographical environment at Århus University during the 1970s together with American Robert M. Newcomb (1970, 1975, 1979), where the latter among other things should be credited for his work for the introduction of new methods and statistical tests in Danish historical geography.

In post-war Sweden as a whole (i.e. besides the province of Scania), the leading personality in historical geography was David Hannerberg (e.g. 1955, 1971), who developed a series of metrological methods for the study of past settlements and agriculture on a micro level, something

which was to have a huge impact on future orientation in Swedish historical geography. Historical geography in Sweden also became quite inspired by the new 'topographical-genetic' school of German historical geography with its *Siedlungsarchäologie*, and during the 1950-60s emerged a strong Swedish tradition for interdisciplinary projects between archaeology and geography, especially in Stockholm and Lund, involving geographers like Sölve Göransson and Staffan Helmfrid (1962). At first, the interdisciplinarity was mainly individual, and so a matter of one person involving several disciplines in his or her analyses. One of the first examples of interdisciplinary historical geography in Southern Scandinavia involving two or more scholars from different disciplines was implemented in Eastern Götaland in the 1960s, and from the mid-1970s, this idea has been followed up by several major interdisciplinary projects. The perhaps most famous and ambitious of these is the Scanian *Ystad Project*, commenced in 1979 as a joined project among three faculties at Lund University. The Ystad Project has generated a series of publications since the late 1980s, with a main publication in 1991 (Berglund 1991), where a row of both experienced and young scholars based on extensive studies have succeeded in giving a detailed, broad covering, and synthesizing presentation of the historical-geographical development in Southern Scania from the stone age till modern times. In the same period, Danish scholars were involved in the big Pan-Scandinavian *Ødegårdsprojekt*, with focus on traces and consequences in Scandinavian settlement structure of the - at that time highly debated - 'Late Medieval Crisis'. In Denmark, the project resulted in two very informative and inspiring surveys from Hornsherred in Zealand (Gissel 1977) and the island Falster (Gissel 1989), which both - in spite of the name and original idea of the overall project - go far beyond just dealing with derelict farms.

Altogether, the 1970s classify as the grand decennium of historical geography in Southern Scandinavia. The discipline has never since held a similarly visible role in Danish research and education of students, where the historical-geographical tradition for the last generation has been carried on by individuals. As leading Danish personalities of the discipline in recent years, Erland Porsmose and Karl-Erik Frandsen stand out. Through a long series of publications, the archaeologically trained historian Erland Porsmose (e.g. 1977, 1979, 1981, 1987, 1988) has presented an exhaustive overall analysis of settlement and agricultural development on the island of Funen from the Viking Age to the seventeenth century, which can be considered the backbone of today's knowledge and understanding on rural Denmark in this period. In 1983-84, Karl-Erik Frandsen (historian and geographer) performed two 'neo-classical' atlases on the distribution of various types of field-systems in seventeenth-century Denmark, and retrogressive mappings of regional settlement structures, with the exact vill- and parish organization for the entire country in 1682-83 and *c*.1820.

Today, it is fair to speak of a growing renaissance for historical geography in Denmark, even though the term itself is rarely used. Several scholars from all of the potentially related disciplines have for the last 10-15 years generated an extensive amount of transdisciplinary studies within the historical-geographical boundaries. An attemptive status of current Danish historical geography - which far from claims to be complete - could be listed up as follows. One of the few scholars in Denmark, who actually terms himself a 'historical geographer', is human geographer Jørgen Rydén Rømer (e.g. 1976, 2000), who has performed a number of thorough analyses of agricultural and settlement conditions in Jutland in the 1680s, while historical geography of the Faroe Islands is almost synonymous with geographer Rolf Guttesen (e.g. 1992, 1996, 2004). Also, several geologists have recently joined the interdisciplinary field, such as Niels Schrøder (2004), Kristian Dalsgaard (e.g. 1984, 2001), and Mogens Greve (2000); the latter by developing a G.I.S.-model for identifying hidden settlement sites from soil data and a taxation list from 1844. Obvious interdisciplinary partners for the geologists are the archaeologists, where especially Jens Andresen (e.g. 2004), Charlotte Fabech and Jytte Ringtved (2002) have shown great interest in working with scholars, methods, and data from other disciplines. One archaeologist, Helge Nielsen (1979, 2002), even has left the trowel in favour of digging into the written sources of medieval agronomics.

In Denmark, the interdisciplinary field of historical geography has traditionally enjoyed many fruitful visits from historians, and fortunately, this is still the case. Fine examples of this are the agricultural and economical-historical studies of especially Southern Jutland performed by Bjørn Poulsen (e.g. 1997, 2003, 2004), and Per Grau Møller's studies of extant relicts of medieval high-backed ridges (1995) and the development of settlement in different types of landscapes on Funen (2000). In the latest years, tireless Erik Ulsig (2001, 2004) has continued his exhaustive studies of the correlation of late medieval plague and agricultural crisis on the one side with contemporary changes in size of population and land prices on the other. Peter Korsgaard has not only performed interesting analyses based on historical maps on his own (e.g. 1988, 1995), he has also put a great effort in teaching others about the possibilities - and pitfalls - of working with old maps in historical geography (e.g. 2004). Finally, church archaeologists Ebbe Nyborg (1979, 1986) and Jes Wienberg (1993) have compared medieval church building with contemporary demography, economy, and socio-historical conditions.

Scanian tradition for historical geography has in recent years been continued by human geographer Mats Riddersporre (e.g. 1995) and his studies of the province's historical settlement and agriculture, while archaeologist Mats Anglert (e.g. 1995, 2003) through the use of various quantitative methods has presented interesting new theses on Scanian church building and parish organization. Both scholars originate from the interdisciplinary environment at Lund University at the time of the Ystad Project. The main caretaker of historical geography at Lund University today is human geographer Tomas Germundsson, whom together with Peter Schlyter have produced an *Atlas of Scania* (1999), a very fine example of a modern historical-geographical atlas. The leading centre of historical geography in Scandinavia today is, however, situated further north in Stockholm University, where the Institute of Human Geography houses an actual department or centre for *Historical Geography and Landscape Studies*. Among the many capacities related to this centre, one could mention Mats Widgren (e.g. 1997, 2003), Ulf Sporrong (e.g. 1998), Ulf Jansson (e.g. 1998), Kristina Franzén (e.g. 2002), and Johan Berg (e.g. 2003). Located not far from Stockholm, Janken Myrdal (e.g. 1985, 1991, 1999) of the University of Agriculture in Uppsala is one of the leading scholars in agricultural history of medieval and early modern Sweden. In recent years, a promising interdisciplinary centre for agricultural history has been started in Uppsala by Myrdal together with historical geographer Clas Tollin (e.g. 1999) and a crew of talented PhD-students.

In Denmark, the last 10 years has been characterized by a number of interdisciplinary research projects and symposia within the area of historical geography, often with development of the cultural landscape over time as the overall theme (e.g. Etting 1995, Fabech & Ringtved 1999, Dalsgaard & al. 2000, Møller & al. 2002). In this context, a special mentioning should be attributed Per Grau Møller for his great participation in several of the projects, seminars, and other initiatives, which for the last decennium have laid the scene for historical geography in Denmark

Even though historical geography neither institutionally nor as an applied term holds the visible position, which it had in the 1970s, its basic interdisciplinary idea is still very much alive among scholars in present-day Denmark. A promising sign of this is a fine string of on-going or recently finished PhD-theses from various disciplines. As examples can be pointed to the study of Danish 'polder history' by geographer Morten Stenak (2005), and the work of pollen analyst Anne Birgitte Nielsen (2003) on G.I.S.-modelled mapping of vegetational land-cover development based on pollen analyses, while the on-going studies include historians Adam Schacke and Peder Dam (both on manorial organization in early modern Denmark), place-name scholar Birgit Eggert (on distribution of Danish *holt*-settlements), and archaeologist Mette Busch (on medieval and early modern landscape development in coastal areas). Thus, not only in Sweden but in Denmark too, the future of historical geography - at least by doing, if not by name - looks confident for at least one more generation.

2. Presentation of the studied region : North-Western Zealand

Object of the present series of historical-geographical analyses is the north-western part of Zealand, which is the biggest of the Danish isles (figure 2.1). Basically, the region has been selected because it is of a suitable size for the analytical purpose, and it offers a cultural and physical geography which can be regarded as representative for a great part of Eastern Denmark. Still, in matters of historical geography, it has - until now - been a rather overlooked region. And finally, it is my personal home region, which gives me a natural advantage in form of a local insight that I could never achieve for other regions in the available time given for a master's thesis.

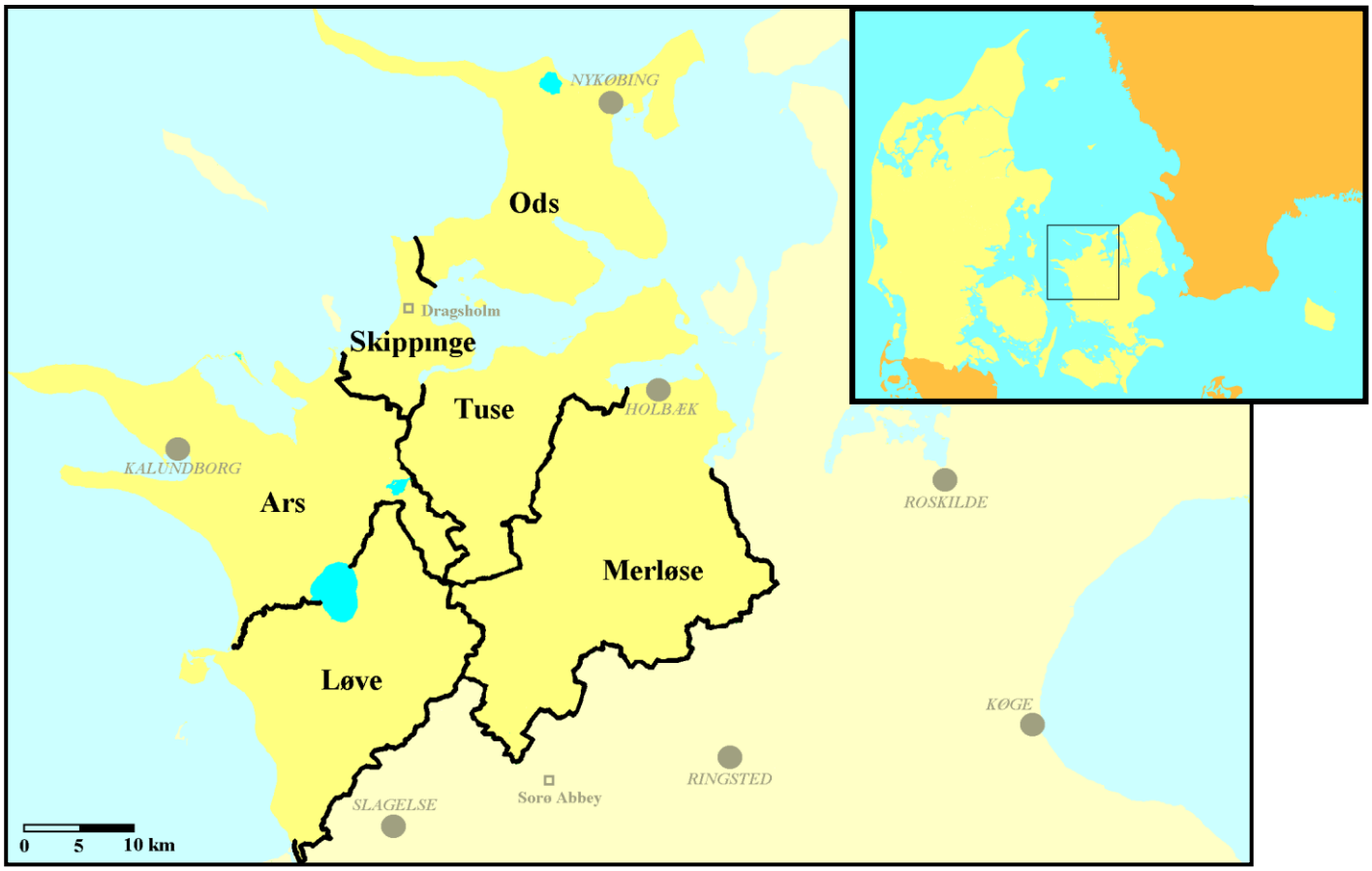


Figure 2.1. Overview map of NW-Zealand with boundaries of the included hundreds, and medieval towns in- and outside the region. The inserted small map of Denmark in the upper right corner shows the location of the analysed region.

The region of North-Western Zealand (henceforth: 'NW-Zealand') is arbitrary in the sense that it cannot claim any physical-geographical or historical identity, which differentiates it from the adjoining parts of Zealand. For a large part it is separated, though, from the neighbouring districts by two major streams, Tude Å to the south and Elverdams Å to the east, together with the inlet Isefjord in the north-east (figure 2.2). Furthermore, the region consists of six medieval 'hundreds' (Danish: *herreder*), administrative and juridical units, each with their own local court (Danish: *ting*). The names of the hundreds in NW-Zealand are Ods, Skippinge, Ars, Tuse, Løve, and Merløse, and even though the hundred units themselves are of no importance in the performed analyses (where the data will be analysed in geographical units of vills, parishes, and specially defined 'land-type areas'), their names will be used continuously throughout the survey in order to help the reader orientate his or her way around the regional descriptions. Also, the boundaries of the hundreds will appear on most of the depicted maps.

My survey of the historical geography of NW-Zealand is purely oriented on the rural districts, where the only focus on the towns is in regard of their influence on the rural hinterland. Indeed, NW-Zealand is primarily a rural region, as the major historical cities of Zealand all were located in the east (the episcopal seat and high medieval capital of Roskilde, the late medieval capital of Copenhagen, and later on the important toll-city of Elsinore). In the north-western region, we have three medieval towns with royal charters: Kalundborg to the west, Holbæk to the east, and Nykøbing to the north. To the immediate south of the region, the medieval town of Slagelse is located. While Slagelse appears to be the oldest urban centre on Western Zealand, known as such from the eleventh century, the oldest town within the north-western region is Kalundborg, which grew up around the perhaps strongest high medieval fortress of the country from the twelfth century; at first a privately owned castle, but later to be a royal stronghold. A royal base of a more modest nature was established in Holbæk in the thirteenth century, which soon became the most important economical centre of the region. Youngest of the medieval towns in NW-Zealand is Nykøbing, which did not begin to take form until the Late Middle Ages, and still by the end of the studied period only was of limited economical and demographical size. Probably far more important was the episcopal castle of Dragsholm in Skippinge hundred, situated strategically on the narrow isthmus connecting Ods hundred to the rest of Zealand. Dragsholm Castle, dated to the early thirteenth century, was not only used as an episcopal seat and military stronghold, it was also to be the centre of an extensive manor, perhaps the most important of the episcopal estate on Zealand.

The major late medieval landowner in NW-Zealand was the Bishop of Roskilde, together with the canons of the Roskilde Chapter. Otherwise, most of the land was owned by local magnates of only limited regional importance. In earlier times, where the sources are scarce, various branches of the royal family and the powerful magnates of the White family seem to have possessed a significant part of the region, but through gifts and grants a great part of these estates came to the Church, mainly represented by the episcopal seat in Roskilde. NW-Zealand is unusual in the way that it has never housed a monastery. Estate wise, the region was not without its monastic influence, though, as three major monasteries were situated to the immediate south of the regional 'boundary', of which especially the Cistercian abbey of Sorø, one of the greatest landowners in medieval Denmark, held a lot of property in the southern and central parts of the region. In 1536, the Lutheran king Frederik III announced the closing of the Catholic Church in Denmark, and by doing this, all ecclesiastical estates became royal property. Some of it was given back to the now Lutheran Church in a more restricted way, while an other extensive part was given or exchanged to the king's supporters in the government, but in NW-Zealand, the majority of the former episcopal land were allocated as entailed estates for the new royal representatives, the *lensmænd*, who governed the region from the royal castles in Kalundborg, Holbæk, and Dragsholm.

The net spatial area (excl. medieval towns, major lakes, fiords, and areas drained in modern times) of the analysed region is 1,664 km².

Physical geography of NW-Zealand and the chosen land-type areas of the survey

During the Ice Age, NW-Zealand was - as the rest of the area later known as Denmark - overflowed by several glacial movements, and the entire region was covered by the so-called 'Late Baltic Iceflow' at the end of the Weichselian Glaciation. During the general retreat of the ice (10,000 BC), several smaller pushes forwards occurred, which have resulted in a number of more or less distinct end-moraine lines in the region. The most impressive of these are the 'Bows of Ods hundred' in the northern part of the region, including the steep hills of Bjergene ('The Mountains', no less) with the regional high point in Vejrhøj ('Weather Hill') at 121 metres above sea level to the north-west of the glacial basin of Lammefjord (figure 2.2). Otherwise, the geology of the region is characterized by a fragmented mixture of stagnant-ice landscapes (hilly terrain with no systematic orientation and with numerous wet hollows), moraine plains (flat or slightly undulating landscape with loamy soils), and meltwater plains (quite flat landscape with sandy soils).

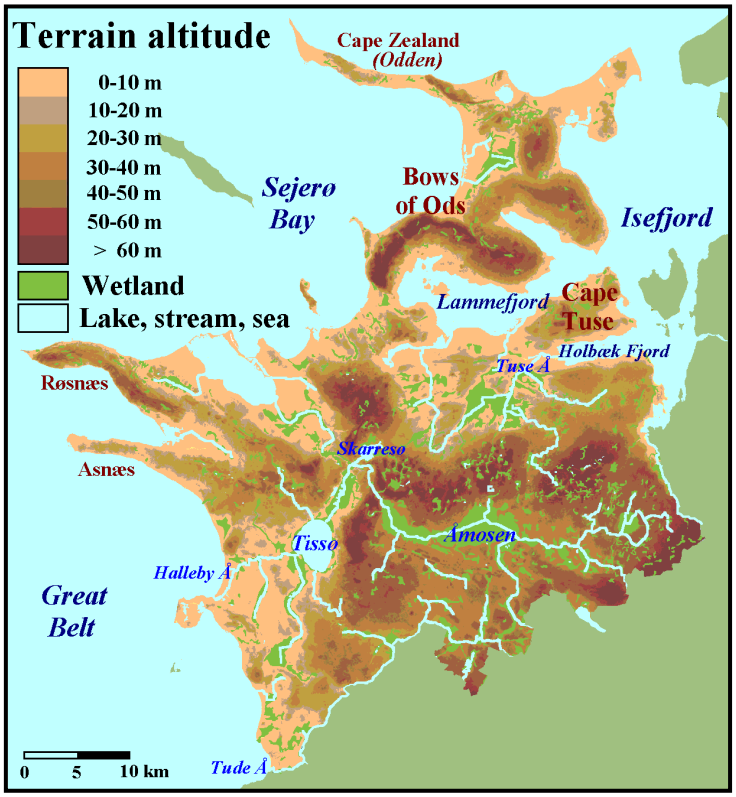


Figure 2.2. Physical-geographical map of NW-Zealand (before the nineteenth-century draining projects) with lakes, streams and wetland areas, as well as the most important landscape names.

As seen on the map in figure 2.2, the hilly terrain is prominent to the north of Lammefjorden, north of Lake Skarresø, and in the central and eastern parts of the region, while large coherent plains are found in the west, and south of the fiords. South of Åmosen, a 'highland plain' is situated in conjunction with a major plateau on the central Zealand. Hydrographically, the region is dominated by the largest coherent wetland area on Zealand, Åmosen ('The Moor along the Stream'), which is geologically based on a glacial meltwater plain in the south-central part of the region, with somewhat limited possibilities of natural draining due to the surrounding terrain. The wetlands do have an outlet through Halleby Å, the biggest stream of the region, which flows through the lakes of Skarresø and Tissø before it reaches the sea in Great Belt. Especially along the upper course of the stream, water has spread to the extensive meadows of Åmosen. A smaller version of the same hydrography is found along Tuse Å with an outlet in Holbæk Fjord south of Cape Tuse. Of general geographical interest it could be noted that the greater part of the Lammefjord has been dammed and drained in the nineteenth and twentieth centuries, which has added 55 km² of dryland to the region; the most extensive damming and draining project in Danish history.

Soil conditions in NW-Zealand are, like the terrain, for a large part formed in the latest Ice Age, where the entire region as mentioned was overflowed several times by glaciers. Hence, the chief part of the region is covered by a moraine bed of mixed debris material (till), which on Zealand consists of 5-25 per cent clay, often of a quite calcareous content, which makes it well-suited for arable agriculture. In addition, the region holds considerable areas of meltwater sand, primarily as deposits on outwash plains, e.g. located on the outer side of the Bows of Ods hundred, on the outer parts of capes Røsnæs and Asnæs, and especially in the areas to the north and south of Åmosen. Of postglacial deposits, the region is slightly marked by shifting sand along the coastline of the Sejerø Bay and the north coast of Ods, but more importantly, there are numerous and often quite considerable areas of freshwater deposits, of which the most extensive are located in the region's central part at Åmosen and around the upper course of Tuse Å, together with several formations alongside the major streams. In the hilly areas of terminal moraines, the soil is often dominated by

sand and gravel, while the stagnant-ice terrain with its mixture of steep hills and 'kettle holes' often is characterized by moraine soils of differing clay content.

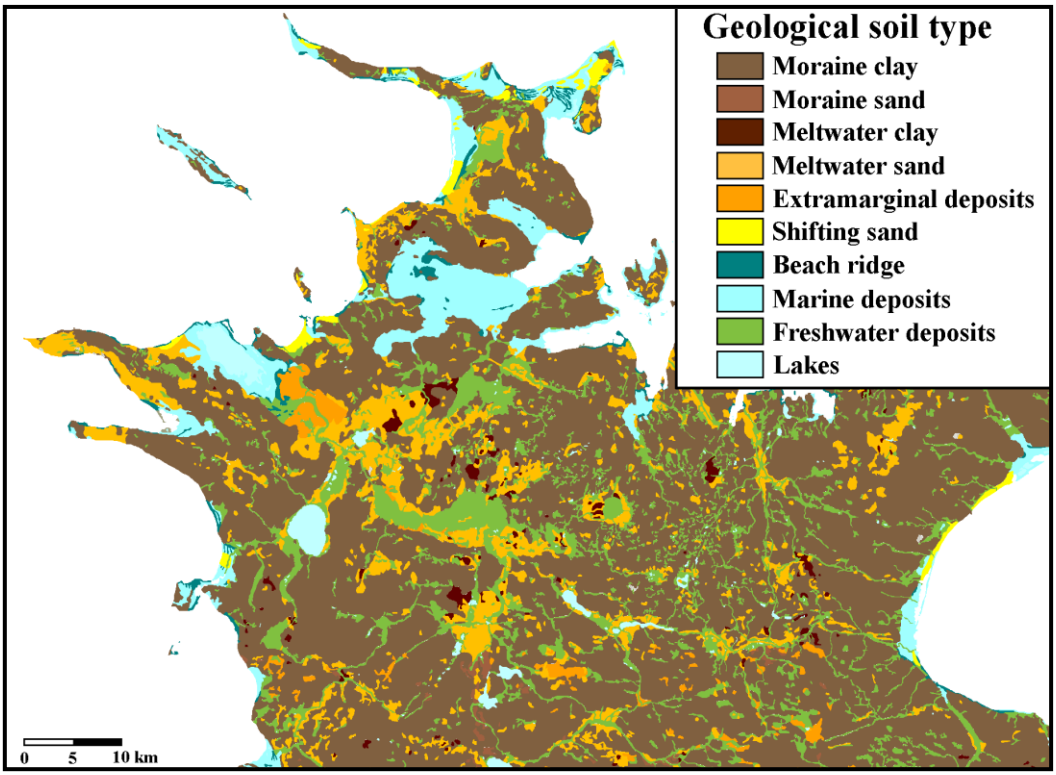


Figure 2.3. Geological soil map (1:200,000) for the north-western and central parts of Zealand.

The geological soil types are, so to speak, the parent material of which the top soils of today have been generated. In Denmark, soil-type classifications have been performed and mapped for both the geological soils and the top soils. While focus of the first classification is on the origin of the soil, the latter is only concerned with the present-day textural condition of the top layer and the content of humus. Naturally, there is a considerable connection between the geological parent soil and the upper soil type, so that meltwater deposits mainly have produced sandy soil types (with small spots of very clayey soils), the moraine bed has produced loamy soil types, and the freshwater deposits in most cases have generated a humus soil. There are, however, also important variations. This is especially evident in the moraine bed areas, where we find three loamy soil types. Most common in NW-Zealand is the soil type 'loam' (with the type code FK4), which can be described as a medium-clayey loam. Elsewhere, especially in the western part of Ars, the moraine bed has generated quite extensive areas of the heavier 'clayey loam' (FK5), while in other places (such as west of Åmosen, in southern Ods, and at Cape Tuse), the top soil has developed into a lighter 'sandy loam' (FK3L).

In order to be able to evaluate any influence from the physical-geographical conditions on the human-geographical development in NW-Zealand in the period 1000-1688, the regional-comparative analyses will be supplemented with a comparative study of twelve specially selected 'land-type areas' from the region (figure 2.4 and table 2.1). Each land-type area is characterized by a rather homogeneous physical geography in regard of terrain and soil conditions. Still, most of the land-type areas will contain minor sub-areas of deviating soil types, and to prevent these from disturbing the average values of the individual land-type areas, only data from those of the vills or parishes within the area, which do indeed comply with the selective specification of the land-type area in question, will be included in the average calculation (e.g. at least 66 per cent of the area within the vill/parish should be classified as soil type FK4). Several of the selected land-type areas have identical physical-geographical conditions (at least according to the selective specifications), and thereby it will be possible to test, if land-type areas within such groups behave fairly alike, or whether for example the location within the region appears to influence. The twelve land-type areas

are selected in such a way that all the primary terrain- and soil types in NW-Zealand (and, hence, in Eastern Denmark as general), are represented. As seen in figure 2.4, where the land-type areas are depicted on a background of the (top-)soil-type distribution, the districts north of Lammefjorden are not represented at all by the land-type areas, which is due to the fact that the terrain- and soil conditions in Ods hundred are so alternating and fragmented that it is almost impossible to find a potential land-type area with homogeneous conditions of sufficient size.

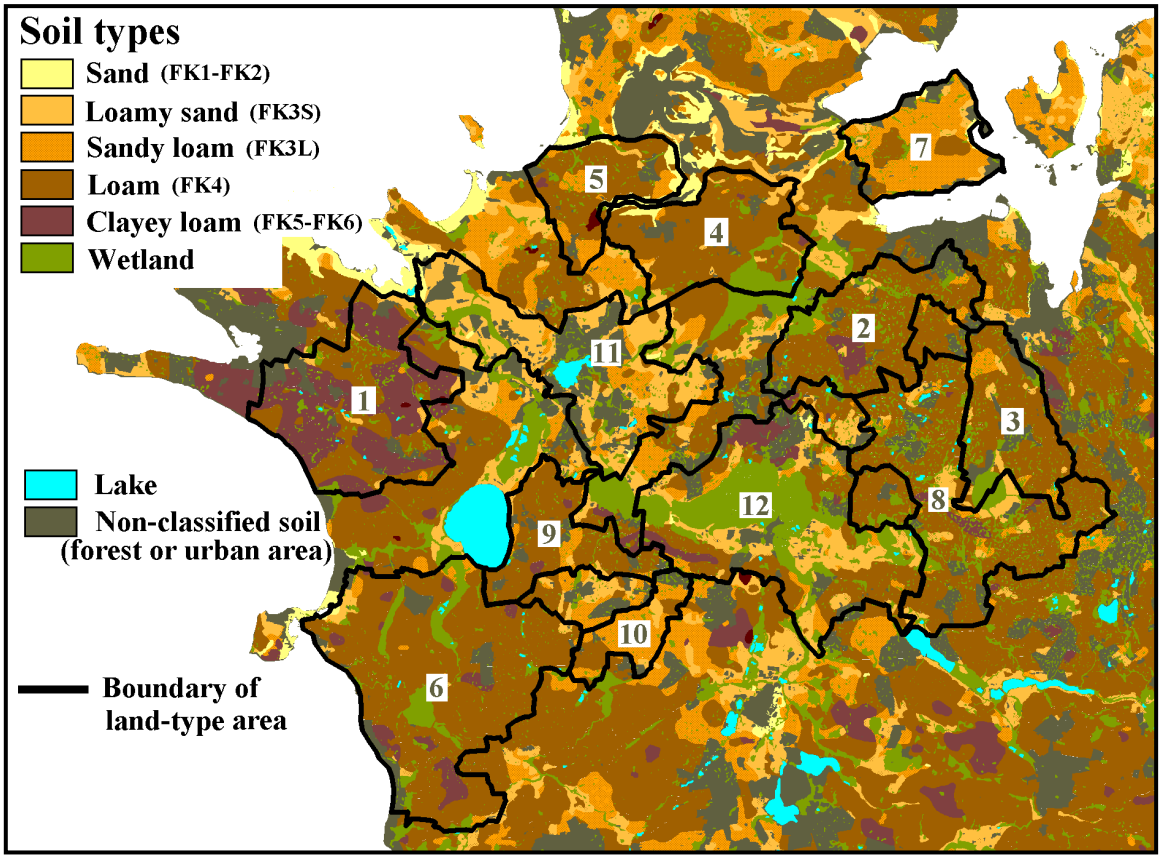


Figure 2.4. Map of soil types in NW-Zealand with focus on the twelve selected land-type areas of the survey. The numbers relate to references in the text and table 2.1. Note, that only analysed units (vills or parishes) within the area, which do comply with the selective land-type-requirements of soil and terrain, are included in the analyses.

Table 2.1. List and short description of the 12 selected land-type areas of NW-Zealand.

Land-type area		Physical- geographical characteristics		
		Terrain	*Soil conditions*	*Net area (ha)*
1	W-Ars	Plain	Moraine clay (till). At least 50% FK5.	7,797
2	NW-Merløse	Plain	Moraine clay (till). At least 66% FK4.	4,128
3	E-Merløse	Plain	Moraine clay (till). At least 66% FK4.	2,745
4	N-Tuse	Plain	Moraine clay (till). At least 66% FK4.	5,228
5	Skippinge	Plain	Moraine clay (till). At least 66% FK4.	3,144
6	W-Løve	Plain	Moraine clay (till). At least 66% FK4.	11,768
7	Cape Tuse	Plain	Moraine clay (till). At least 50% FK3L.	3,881
8	SE-Merløse	Hilly	Moraine clay (till). At least 66% FK4.	5,077
9	E-Løve	Hilly	Moraine clay (till). At least 66% FK4.	3,352
10	E-Løve	Hilly	Moraine clay (till). At least 50% FK3L.	1,559
11	Lake Skarresø	Both plain and hilly	Meltwater sand. At least 50% FK3S.	7,444
12	Åmosen	Plain	Freshwater deposits. At least 33% wetland.	9,983

3. Agriculture in seventeenth-century NW-Zealand

My analyses begin with the traditional, retrospective starting point in Danish medieval geography: the Land Registers of 1662 and 1688. Both land registers were attempts of the state to come up with a fair taxation system for the entire kingdom. The first register of 1662 was based on the rent rolls of the estates. Annual sown acreage and rent, both divided in kinds of crops and rental mixture, were recorded, and based on this, a taxation rate called *hartkorn* was calculated for each farm. For instance, a farm paying an annual rent of 1 pound of barley, 1 pound of rye, 2 barrels and 4 bushels of oats, 1 lamb, 1 goose and 4 chickens, would, if the rent was found to correspond with the sown acreage, be assessed to about 10 barrels of hartkorn. In 1688, this rent-based land register was replaced by a new and quite ambitious registration, as every single farm of the kingdom had its arable acreage (usually split up in numerous furlongs) measured in actual size and evaluated for soil quality. Combined with a more rough estimation ('*à l'advenant*') of the access to pastures and meadows, a new taxation in barrels of hartkorn was carried out for each farm. An average farm with 35 barrels of arable land (19.6 ha) of a normal soil quality in NW-Zealand, would, for instance, be assessed to a taxation of about 7 barrels of hartkorn.

Extent of cultivation (arable percentage 1688)

Based on the two seventeenth-century land registers, I have tried to analyse the contemporary perception of land value on different soil types and terrain types in the region, together with variations in agricultural land use. First, I have looked into the relative extent of cultivation around each village, by comparing the sown acreage recorded in 1688 with the entire vill area (i.e. arable land, pastures and meadows). In NW-Zealand, the average arable percentage is found to 46 per cent, going from an average of 41 per cent in the hundred of Merløse to 54 per cent in Skippinge. On the Danish Isles, which were in general intensively cultivated in 1688, the arable land usually constituted 30-60 per cent of the vills. However, in many regions it is possible to find areas of either a higher or a lower arable percentage. This is also the case in NW-Zealand.

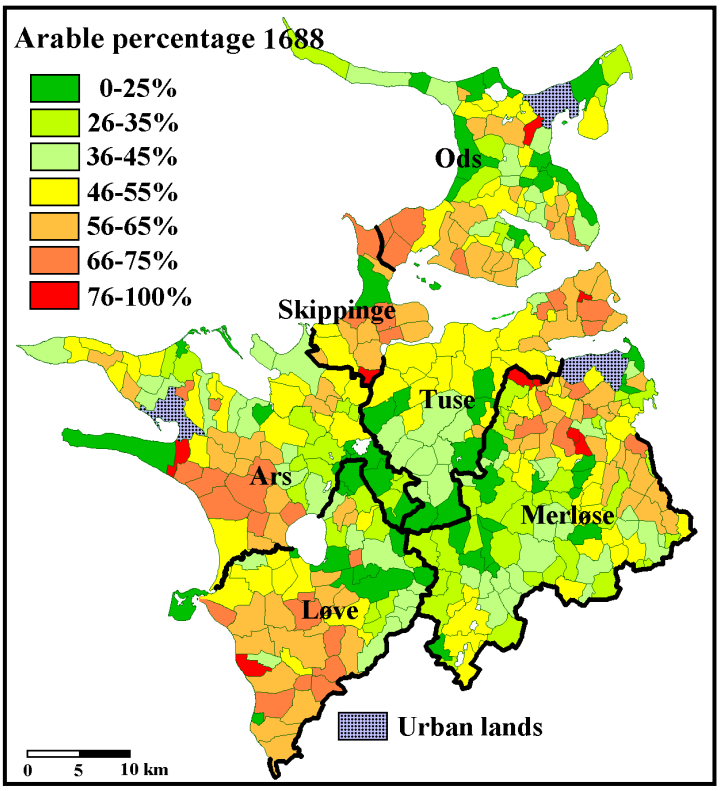


Figure 3.1. Arable percentages in NW-Zealand 1688 calculated as the recorded sown acreage as a percentage of the entire vill area. Urban lands are not included. The bold lines represent boundaries of the medieval hundreds.

As shown in figure 3.1, the highest arable percentages of the region can be found to the south and north of the city of Holbæk, around the inner Lammefjord, and in the western parts of Ars and Løve. In the central part of the region, however, there is a huge area with relatively low arable percentages, which corresponds nicely with the terrain map (figure 2.2), as this is an area of either hilly terrain or widespread wetlands. Also the northern parts of Ods show a limited cultivation; this can partly be explained by some of the poorest soils in the region (very sandy).

By looking at the twelve land-type areas of the survey, a rather distinct correlation between physical geography and the extent of cultivation emerge (figure 3.2). The primary factors of influence seem to be the subsoil (the parent deposit material) and the terrain relief, whereas variations of texture in the top soil show no importance. In all but one of the areas of plain moraine lands (the seven top areas in the figure), the average arable percentages of the vills are found to be as close as 59-61 per cent. For the sole exception, northern Tuse, the average percentage is 50; neither the physical nor the cultural geography offers any obvious explanation for this. In the three areas of hilly moraine land, the average extent of cultivation is somewhat lower; 43-45 per cent on loam, 32 per cent on sandy loam. Even if Denmark in general and the Danish Isles in particular to the rest of the world will appear rather flat, the terrain has proven its influence on historical geography in other studies also. On the island of Funen, for instance, Per Grau Møller has found that in hilly terrain, the arable percentages according to the 1688 land register were quite low, no matter what the soil type (Møller 2000). Moving on to the sandy soils (formed on glacial meltwater sand deposits) around Lake Skarresø, the vills in this area show an arable percentage quite similar to vills of the hilly moraine lands (39 per cent), whereas the wetland-dominated vills around Åmosen on average only had cultivated 29 per cent of their land.

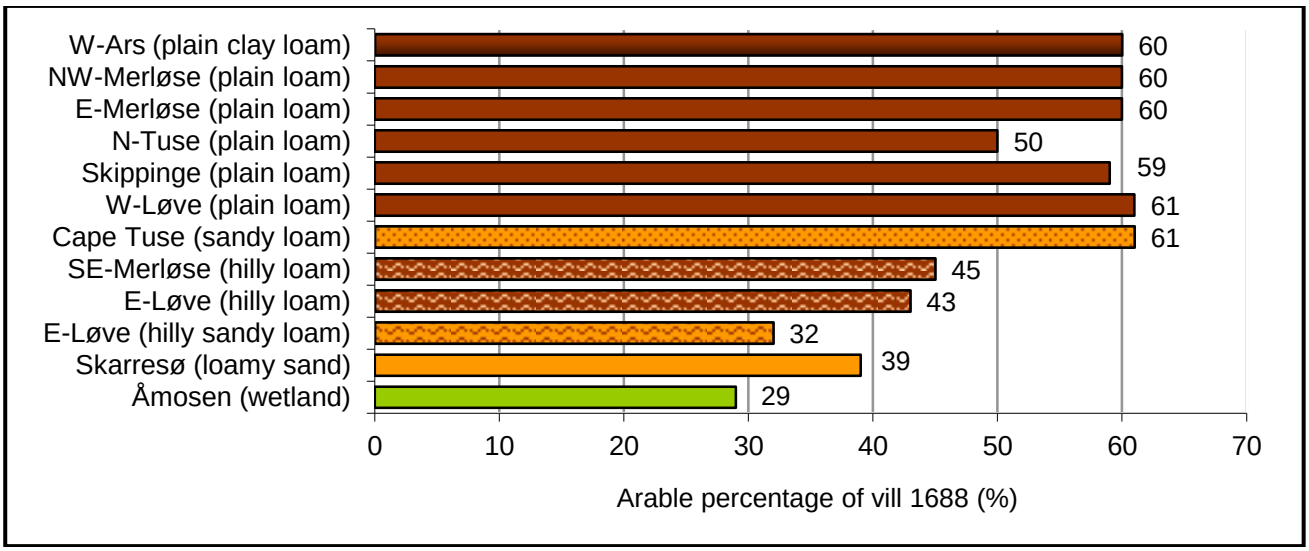


Figure 3.2. Average arable percentages in twelve land-type areas of NW-Zealand in 1688.

Soil and terrain alone, however, cannot explain all variations in the region. For example, the coastal forelands to the west and north, and the northern side of the capes in the Isefjord, had low arable percentages in 1688 regardless of the physical geography. This could indicate, that a weatherly exposed position towards the sea did not inspire to an expanding of the arable. In general, the low extent of cultivation in the coastal forelands of NW-Zealand does not seem to be due to a remote location and hence long transport distances to markets, as some of the less cultivated coastal areas are actually found in the immediate neighbourhood of the cities Kalundborg and Nykøbing. Still, the rather high arable percentages of Cape Tuse should perhaps be seen as a result of its location close to the city of Holbæk.

Land value 1688

By comparing individual vill areas and *hartkorn* taxations, it is possible to calculate a relative expression for perceived land value as an average for the entire vill in 1688. For instance, the vill of Søstrup (Merløse h.) has an area of 321 barrels of land (180 ha) and it was assessed to a total of 45.2 barrels of hartkorn in 1688. Thus, the average land-value rate of the vill is 7.1 barrels of land per barrel of hartkorn (bol/boh); the more barrels of land it takes to equal one barrel of hartkorn, the lower was the perception of the agricultural land value. Such an 'area-proportional land-value rate'-method can be criticised on several points, and for the individual vill, the method should only be used with great caution. The potential of the method lies in the use on a regional scale as in NW-Zealand, where all the land-value rates of the individual vills within the region are considered as a whole (figure 3.3).

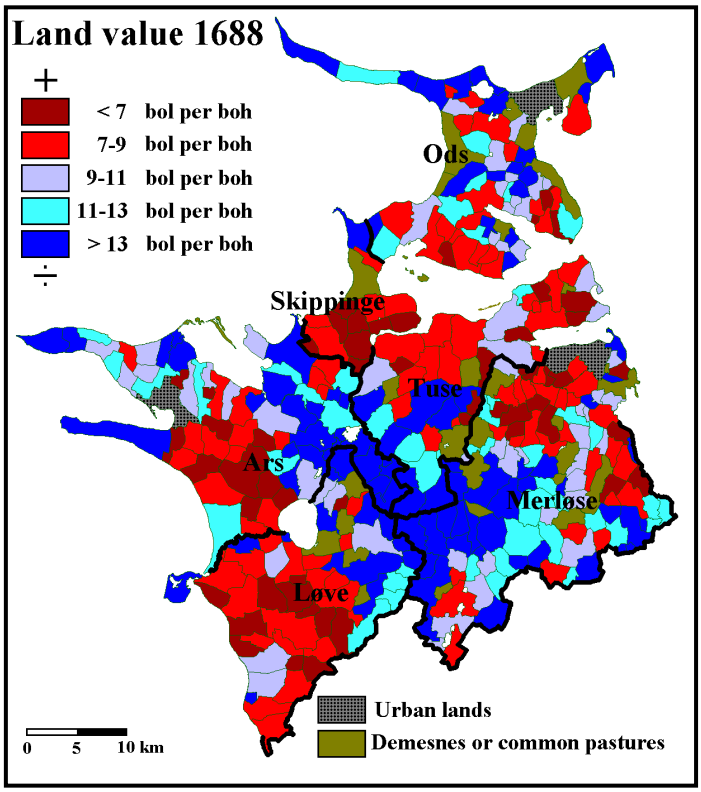


Figure 3.3. Perceived land value in NW-Zealand 1688 calculated as the entire vill area (in barrels of land) compared to the total taxation of the vill (in barrels of hartkorn); low land-value rates indicate a high area-proportional taxation. Urban lands, demesnes and common pastures are not included. The bold lines represent boundaries of the medieval hundreds.

The land-value rates of NW-Zealand in 1688 show a rather polarized distribution. The average rate of the region is 10.0 bol/boh, but the majority of the vills have values of either less than 9.0 (high taxation) or more than 12.0 bol/boh (low taxation). According to this analysis, good farm land in the year 1688 (that is with low land-value rates) was primarily widespread in the northern and the eastern part of Merløse, in northern Tuse, and southern Skippinge, on the south side of the two Isefjord capes in Ods, as well as in western Løve, and south-western Ars. The poorest farm land according to the taxation was concentrated to the central parts of the region, especially around Åmosen and Lake Skarresø, and on the most exposed coastal forelands.

Just as the arable percentages in NW-Zealand 1688 were found to correlate closely with the physical geography, even more so do the vill-based area-proportional land-value rates. Looking at the twelve land-type areas (figure 3.4), it is quite notable, that all five areas of the medium-moraine-soil type (loam) in plain terrain have area-proportional land-value averages inside an interval of 7.1-7.6 bol/boh. Within this interval, also the average land value of the vills on plain clayey loam

(western Ars) is situated, whereas the lighter moraine soils (sandy loam) on Cape Tuse follow a step further down the land-value scale with an average of 8.07 bol/boh. The next level is occupied by the two areas of hilly loam (10-11 bol/boh), whereas the hilly sandy loam of eastern Løve on average was valued as poorly as 14.66 bol/boh. Thus, both in plain and hilly terrain, sandy loam was apparently considered less valuable as loam or clayey loam in 1688; this difference is most evident in hilly terrain. Indeed, the hilly sandy loam of NW-Zealand was on average valued as bad as the pure sand soils around Lake Skarresø (14.78 bol/boh). At the bottom of the scale was - once again - the group of vills around Åmosen, with an average land-value rate as low as 17.26 bol/boh.

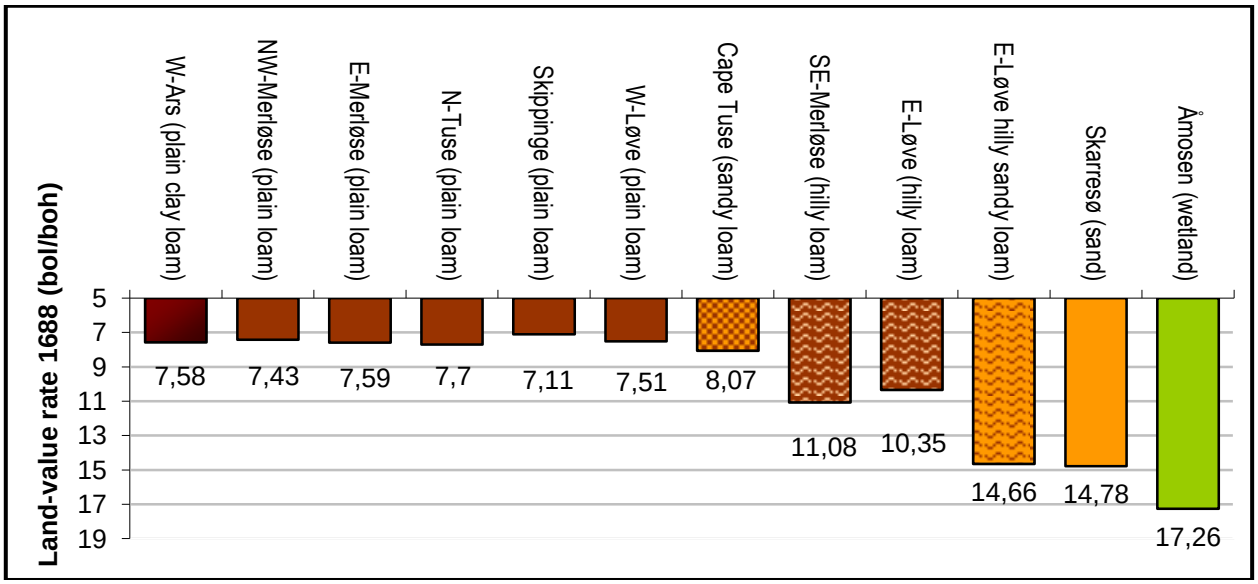


Figure 3.4. Average land-value rates in twelve land-type areas of NW-Zealand 1688. The land value is expressed by an area-proportional rate of barrels of land per barrels of hartkorn (bol/boh). Note, that the actual land value (taxation per land unit) grows with falling land-value rate.

To sum up, the conclusion from this analysis is that the perceived land value in NW-Zealand 1688 differed significantly among moraine soils, sand soils and wetland soils, as it took two barrels of sand-soil land to equal the economical value of one barrel of moraine-soil land, whereas the wetland wills of Åmosen had to come up with almost 2.3 barrels of land to match a barrel of moraine land. On the moraine soils, the terrain played an important influence on the relative land value, as moraine soil in hilly terrain was valued at *c.*70 per cent (loam) or 55 per cent (sandy loam) of similar soils in plain terrain.

A comparison of figures 3.1 and 3.3 will show a similarity, which should not surprise. Vills blessed with high-valued soils suited for cultivation were of course more likely than others to claim a large portion of the vill area for arable use - and vice versa. Alternatively, the appraisers have generally assessed well-cultivated vills higher than they did the less-cultivated vills. Among Danish agricultural-historical scholars, it is the general opinion, that the Land Register of 1688 did in fact systematically underestimate non-cultivated land compared to its actual economical potential, and hence, vills primarily orientated on arable farming were unequally heavily taxed. This claim will be tested later in the chapter. Until then, a closer look at figures 3.1 and 3.3 will show, that the distribution patterns are not completely identical. For instance, the first analysis found almost the same arable percentages in all areas on moraine soil in plain terrain, but the light sandy-loam soil of Cape Tuse was valued distinctly lower than the others. One could say that the farmers of Cape Tuse had cultivated the same relative amount of their vill land as farmers on heavier moraine soils had, but apparently, the sandy-loam soil did not yield quite the same per area unit. The same can be argued even more for the sandy soils of the region, which in 1688 were not cultivated considerably less than were the hilly moraine soils, but still they were clearly considered less productive according to the land evaluation.

Similar studies have recently been performed on a national scale by Peder Dam (2004), who were able to find average land-value rates on the Danish Isles in the area of 10.6-11.1 bol/boh, which differed distinctly from the Jutland peninsula, where the rates went from about 15 bol/boh in the most fertile regions to 50 bol/boh in the West-Jutland moor areas. Indeed, the national differences in land values correlate nicely with the geological division of Denmark in the moraine-dominated isles in the east and the sandy soils of Jutland in the west. However, Dam also found, that vills of identical soil types generally were taxed significantly harder (and so valued higher) on the Isles than they were in Jutland. Especially, the Zealand sand soils were rated remarkably high, which were particularly evident in Eastern Zealand near the major cities. In fact, on Zealand as a whole it was Dam's conclusion, that terrain was more influential on land-value rates than was the soil.

In England, Bruce Campbell (2000) has used a related area-proportional method to establish arable land value on fourteenth-century demesnes. His study would indicate, that medieval land value on English demesnes was by large a product of three factors: land-productivity value, access to manpower, and distance to (or accessibility of) urban markets. Something similar is quite possible for NW-Zealand, as there is a tendency of increasing arable percentages and land value in the immediate neighbourhoods of the cities of Holbæk and Kalundborg, and Dragsholm Castle, which cannot be explained by physical-geographical conditions only. However, such relations have not been tested systematically in the present analyses.

Crop mix 1662

The three major species of grain on seventeenth-century Zealand were barley, rye and oats. In some districts, also buckwheat and dredge (a mixture of barley and oats) held some importance. Wheat had lost its position as primary bread grain in Scandinavian agriculture during an unfavourable change of climate during the Iron Age, and still by the seventeenth century, it did not appear in NW-Zealand rent rolls. Based upon the information of the 1662-Land Register, it is possible to calculate the relative crop-mix combination on the sown acreage of each farm. In figure 3.5-3.7, these numbers have been summed up to parish level to give a clearer picture of the intra-regional tendencies.

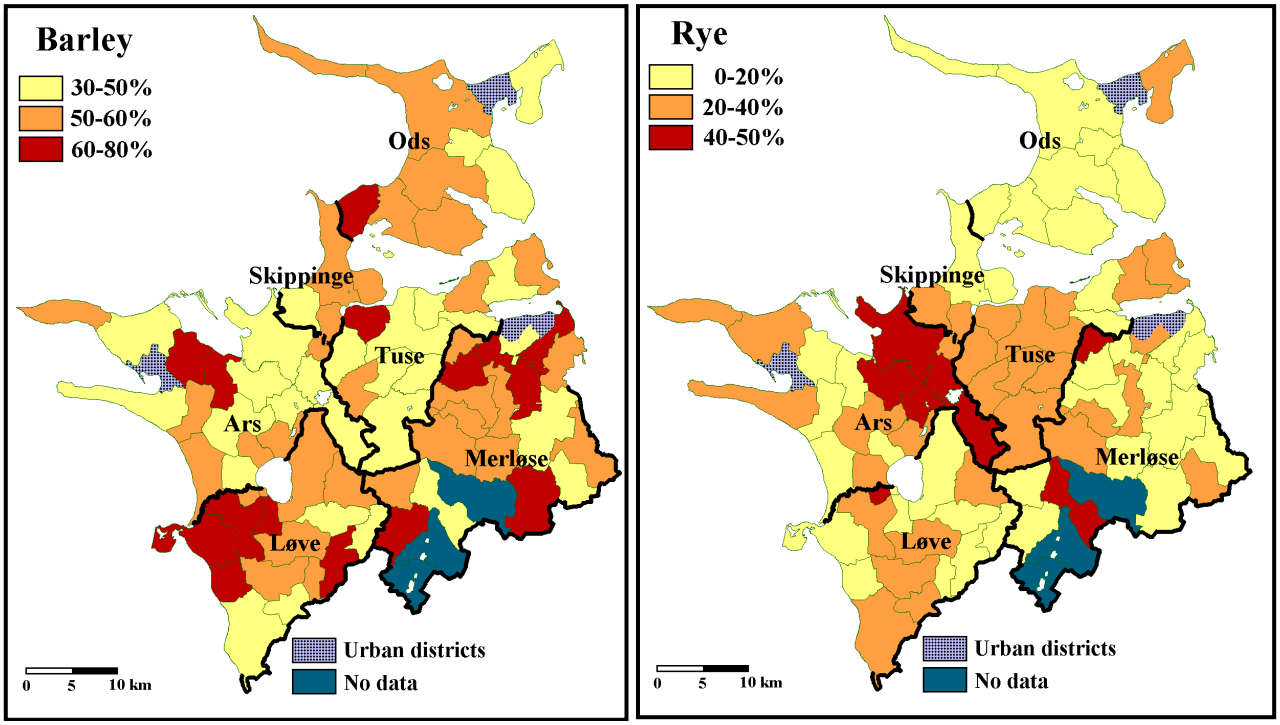


Figure 3.5-3.6. Average percentages of sown acreage used for barley (3.5) and rye (3.6) in the rural parishes of NW-Zealand according to seed and rent data in the Land Register of 1662. The bold lines represent boundaries of the medieval hundreds.

Barley was the primary grain of the region at this time, as it was for most of the nation. Not only was it used for malt and producing beer, it was also an important food grain for both porridge and bread; since the Viking Age, it had been the primary substitution for wheat. Thus, barley was grown in every parish of the region (and with few exceptions in every vill), and to judge from accounts of seed and rent, normally around half of the annually sown acreage was used for barley; in most parishes, the barley share lies within 40 to 60 per cent (figure 3.5).

Since almost all arable land on seventeenth-century Zealand to some extent was used for barley, it is perhaps more interesting to look at the distribution of the other main crops. The second most important crop was rye, which gained ground during the Middle Ages as a better bread grain than barley. Even today, rye bread is a basic part of Danish cuisine. As shown in figure 3.6, the 1662-distribution of rye in NW-Zealand is far more systematic than it is for barley. In the eastern Ars, rye actually covered almost half of the sown acreage. On a regional basis, rye constituted around 20 per cent of crop production, and hence also the parishes around Åmosen, in Tuse, and south-western Løve manifest themselves as rye-cultivators above average. Large areas of limited rye-growing can be found in Merløse and especially in Ods.

The part of the arable land in NW-Zealand, which in 1662 was used for neither barley nor rye, was primarily used for oats. Besides oats, buckwheat and dredge were grown with varying weight around the region. All these secondary crops are known to have been used for human food, but their main function on seventeenth-century Zealand were as fodder, especially for horses. The average percentages of arable land sown with secondary crops are shown in figure 3.7. There are some variations in the type of fodder crops used in different parts of the region. Oats had its main importance in eastern Løve, western Ars, and south-eastern Merløse. In Ods, eastern Ars, Tuse, and western Merløse, growing of buckwheat is recorded, while dredge primarily was grown in the hundreds of Ods and Skippinge.

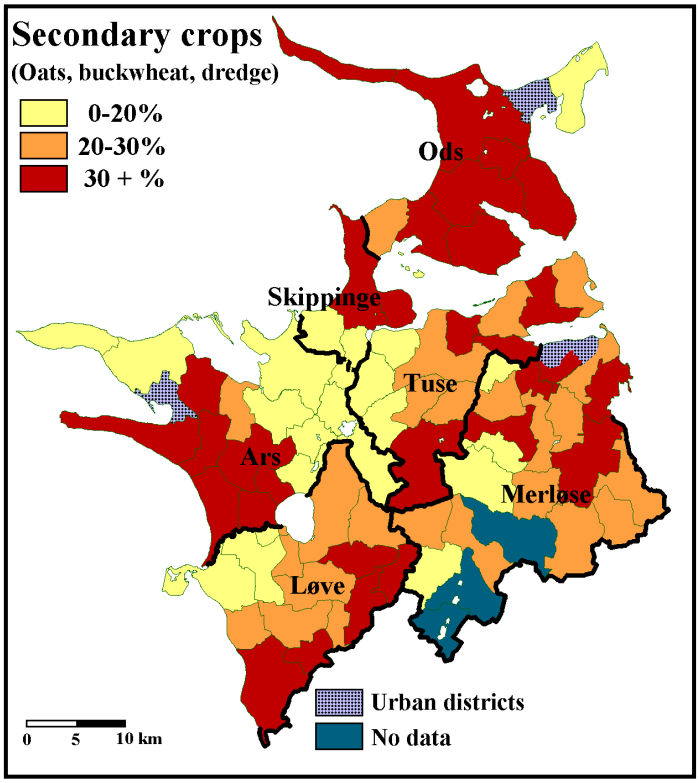


Figure 3.7. Average percentages of sown acreage used for secondary crops (oats, buckwheat and dredge) in the rural parishes of NW-Zealand according to seed and rent data in the Land Register of 1662. The bold lines represent boundaries of the medieval hundreds.

Crop-mix percentages for the 12 land-type areas of the region are calculated in figure 3.8. In the vills on the plain moraine soils, usually around half the arable acreage was sown with barley. In the areas of hilly moraine, the percentage of barley was generally higher than it was for parishes on the plain moraine (around 60 per cent). The barley percentages should for a large part be read in coherence with the alternatives. This will show that variations in barley percentages are followed by almost similar counter-variations in rye percentages. In most areas with plain moraine soil, 20 to 25 per cent of the arable land was used for rye, while in the hilly moraine areas, rye average was down to around 11 per cent.

While the fluctuations of barley and rye almost counterbalanced each other, the average relative share of arable land used for secondary crops kept surprisingly stable (26 to 31 per cent) in almost every area of moraine soil, no matter what the specific texture type or terrain. The main exception is found in Løve, where the barley-dominated western part only had a 22 per cent share of the arable used for oats, while the sandy loam soils in the hilly land of south-eastern Løve saw an oats percentage of no less than 35. Most likely, farmers of the Løve 'highland' have sold a fair part of their oats production to the barley-growing farmers down on the plains.

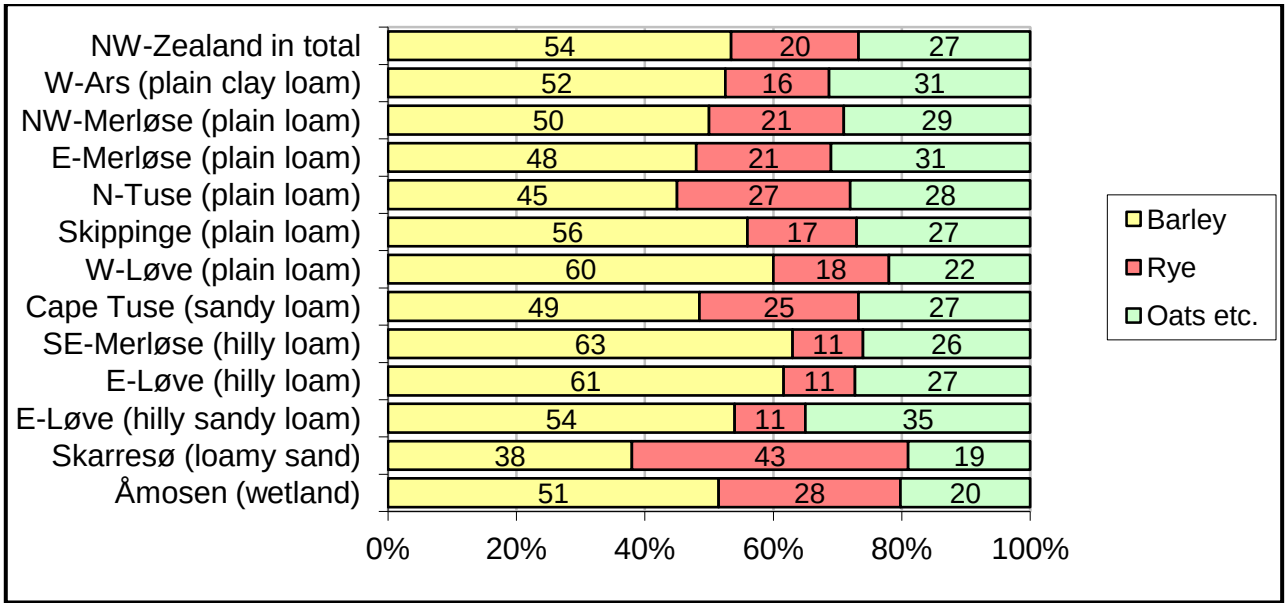


Figure 3.8. Relative crop-mix distribution of the sown acreage in twelve land-type areas of NW-Zealand in 1662.

The major rye-producing district of NW-Zealand in 1662 is located in the big sand-soil-dominated area around Lake Skarresø (eastern Ars and south-western Tuse). Here, we find an average rye percentage of 43 per cent, accompanied by the lowest barley percentage of all the analysed areas (38 per cent). This is in good accordance with agricultural theory, as barley historically performs its lowest yields on sandy soils because of its high dependence of steady water supply, which is often a problem on the easily-dried-out sand. At the same time, Danish rye is known to give some of its best yields on the loamy sand soils of Eastern Denmark. A perhaps more surprising observation is that also the vills around Åmosen apparently grew quite a lot of rye (28 per cent), which has, however, hardly taken place on the humid wetland soils, where rye performs very poorly. The reason for the high percentage should more likely be searched in the large sandy areas in the outskirts of the Åmosen wetlands. In fact, too much soil water has been the major problem in Danish rye production before modern draining techniques were implemented in the nineteenth century. When rye on Zealand also was grown in rather large proportions on the loamy moraine soils, it was according to several contemporary texts more out of necessity than out of profitability; often the yields were deplorably low, but rental obligations and the need for bread made rye an imperative part of the crop mix none the less. This could perhaps be part of the reason that sandy

soils on Zealand in 1688 were valued significantly higher than identical soils in the generally sandy Jutland. Based on these considerations, it is a bit more difficult to explain the low rye percentages in the region's three areas of hilly moraine land. The sloping terrain should in fact be expected to improve rye yields on moraine soils due to the natural drainage, but evidently that was not the case. The high barley-percentages in the two hilly loam areas indicate that the ground cannot have been all that unsuited for grain in general, as secondary crops would then be expected to cover a larger part of the sown acreage. A possible explanation could be that moraine soils in hilly terrain often tend to be more saturated with water than in plain terrain, partly because of dips without outlets, partly due to an observed tendency of moraine to generate more compact soils on high grounds in hilly terrain for reasons still not completely clarified.

Several foreign studies have suggested that crop mix of the past besides physical geography was highly influenced by market-geographical conditions. While the population in the big cities (of which Denmark only held one in this age, namely Copenhagen) lead to a huge demand for bread grain (which for the common people of Denmark meant rye), malt barley often became a profitable crop in the immediate neighbourhood of medium-sized towns and export harbours. Such urban and market-economical influences on rural production have not (yet) been analysed systematically in NW-Zealand, but as a preliminary support for such a connection it can pointed out that as shown in figure 3.5, four of the parishes closest to the town of Holbæk (northern Merløse h.), and the two parishes to the immediate east of Kalundborg (north-western Ars h.), did in fact save a considerable part of their sown acreage (60-70 per cent) for barley.

Seed density 1662-1688

By comparing the annual amount of seed recorded for each village in 1662 to the sown acreage measured in 1688 (adjusted for the fallow within the two- or three-field-system), it should, at least in theory, be possible to calculate the average seed density used in each vill. Now of course, there is a methodical problem in using data from two different land registers with an internal time gap of about 20 years (the actual measuring of the arable fields on Zealand for the 1688-Land Register took place in 1682). However, as it is not very likely that the size of the arable land has changed significantly in this exact period, the time difference is probably the least of the problems in the proposed analysis. Earlier attempts to analyse the 1662-seed data have shown uncertainties as to what the data actually represent, and several studies from NW-Europe have established quite significant variations in seed density even on a regional scale. Not only type of crops and soil conditions, but also local customs seem to be of huge importance. Still, nothing ventured, nothing won, and so an attempt to calculate seed densities for the acreages of NW-Zealand villages and demesnes in 1662-88 has been performed (figure 3.9).

On average, farmers in NW-Zealand used 0.39 barrels of seed per barrel of land (bos/bol) in 1662-88. For most village vills, the seed densities lies within an interval of 0.20-0.70 bos/bol; there is a distinct tendency in the region that seed density is higher than average on demesne acreages than it is on village acreages. The rate level itself is somewhat surprising, as the term 'one barrel of land' in the 1680s actually was defined as the average area sown by one barrel of seed on Zealand at that time. Therefore, one would expect a level closer to 1.00 bos/bol. Identical analyses from the islands of Funen and Falster, however, have shown seed densities of similar levels (Pedersen 1907-08, Frandsen 1983). Here, the suggested explanations have been, that either the amount of seed listed in 1662 was ancient figures from the late sixteenth century, or the amount of seed used in 1662 was abnormally low due to an agricultural crisis derived from war and Swedish occupation in 1657-60. Variations within the interval could also reflect intra-regional differences in crop mix. In Scania, both contemporary texts and later studies show, that rye was sown less dense than barley and oats; especially oats was sown quite dense as to prevent weeds from gaining too much ground (Dahl 1942). Similar tendencies of lower seed densities in areas dominated by cultivation of rye have been found on Funen (Frandsen 1983).

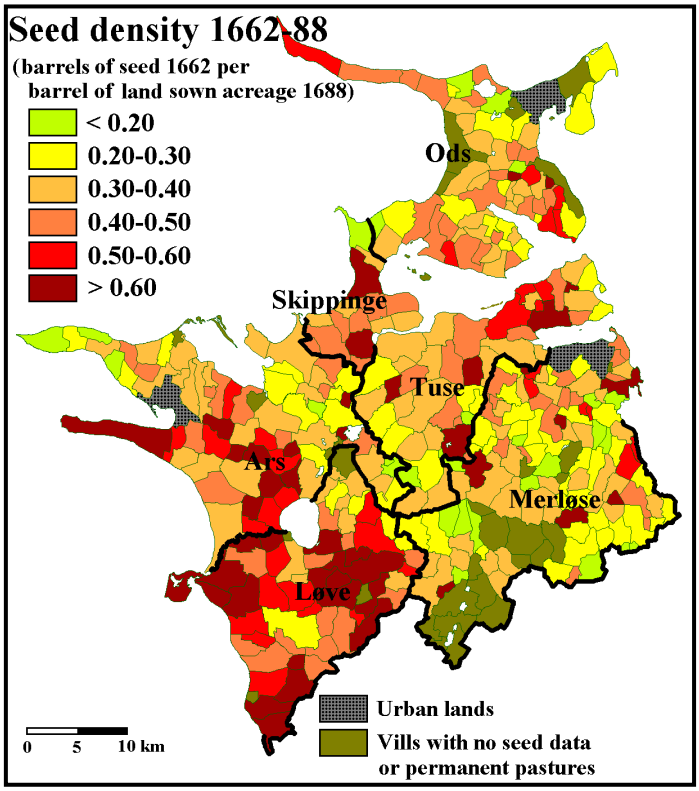


Figure 3.9. Seed density in NW-Zealand 1662-88 calculated as the recorded amount of seed (in barrels of seed 1662) compared to the measured annual sown acreage (in barrels of land 1688). Urban lands, vills with no seed data and permanent pastures are not included. The bold lines represent boundaries of the medieval hundreds.

A comparison of the seventeenth-century seed densities in NW-Zealand (figure 3.9) with the distribution of land-value rates in 1688 (figure 3.3) will show that there is a clear tendency towards higher seed densities on the better valued lands. A link to soil quality also appears, when looking at the twelve land-type areas (figure 3.10), but only between the main soil groups of wetland, sand and moraine. Within the moraine-soil groups, the averages seem to point in all directions.

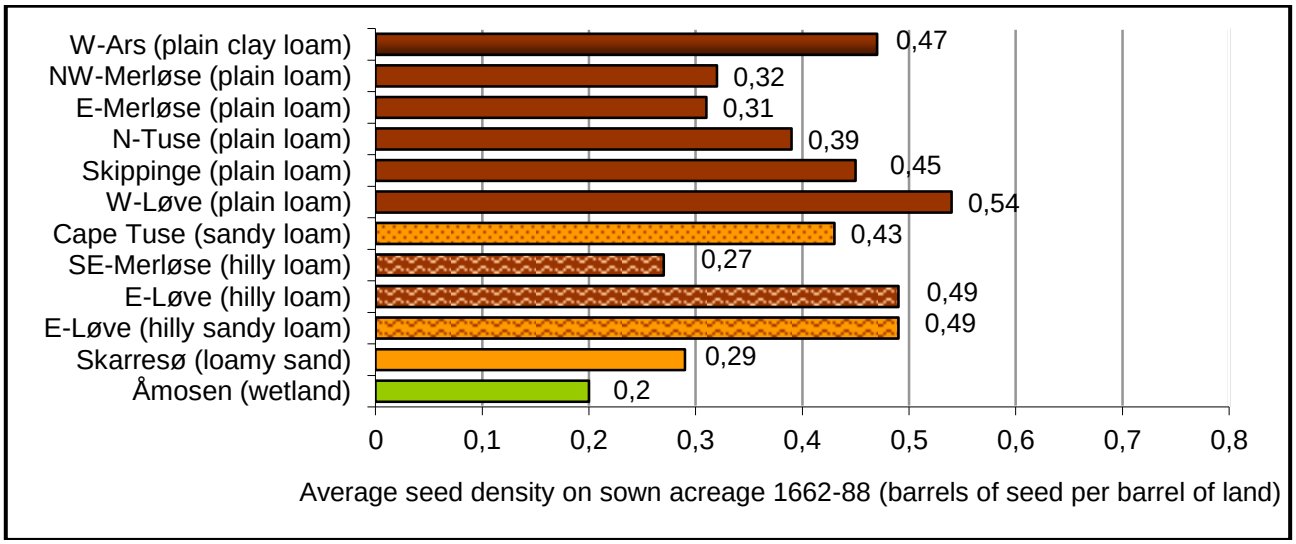


Figure 3.10. Average seed densities in twelve land-type areas of NW-Zealand in 1662-88.

By second look, there is, however, a quite distinct pattern also on the moraine soils of the region regarding seventeenth-century seed density: The densities are generally higher in the western areas than in the eastern - no matter what the soil type and terrain type, and even on equally well-valued land. No obvious explanation for this uneven distribution springs to mind. Surely, the sandy rye-

dominated land around Lake Skarresø does have a seed density in the low end of the scale (0.29 bos/bol), and so it could support the findings from Funen and Scania of a low seed density for rye, but it is no lower than the densities found in the barley- and oats-dominated areas of Merløse (0.27-0.32 bos/bol). The perhaps strongest indication for a relation between crop mix and seed density is found in the hilly areas of eastern Løve, where oats could be part of the reason for the quite high densities. Could it then be that farming traditions altered so much between east and west within this relatively small region?

Being partly based in physical geography, I would, however, like to find a more physical and measurable factor of explanation, and such a factor does indeed emerge, when looking more closely at the soil map. Being quite alike on soil-type distribution in general, the predominantly loamy soils of Merløse are, as shown in figure 3.11 (right), covered with numerous tiny green dots, indicating the presence of small spots of wetland scattered all over the area - in hilly terrain as well as in plain. Similar green dots can also be found in the western hundred of Løve (figure 3.11 left), but in far smaller numbers. Supplementary analyses confirm a general tendency in the entire region towards lower seed densities in areas with a high proportion of small wetland spots; the soil map records such spots down to a size of approximately 50 m², but it is most likely that several even smaller spots have existed in real life in the same areas - in the seventeenth century, that is, as field draining has cleared off most of them today. The reason for this difference is geo-morphological. For some reason, the plain moraine landscape of Merløse is a bit more 'bumpy' or undulating than the plains of the west, and together with the thick moraine beds below the top soil, water apparently tend to 'get caught' for longer periods in many of these 'moraine-terrain troughs'. The findings correlate with studies from Funen, which show that in some vills only two thirds of the annual sown acreage were actually sown in the 1680s, the rest being left for grazing because of pure soil quality due to water, stones, clay, sand, *etc*. (Porsmose 1991). It is interesting, though, that this rather distinct physical-geographical difference between the eastern and western land-type areas of NW-Zealand only emerges when looking at seed density, and not at all appears when looking at arable percentages or land value.

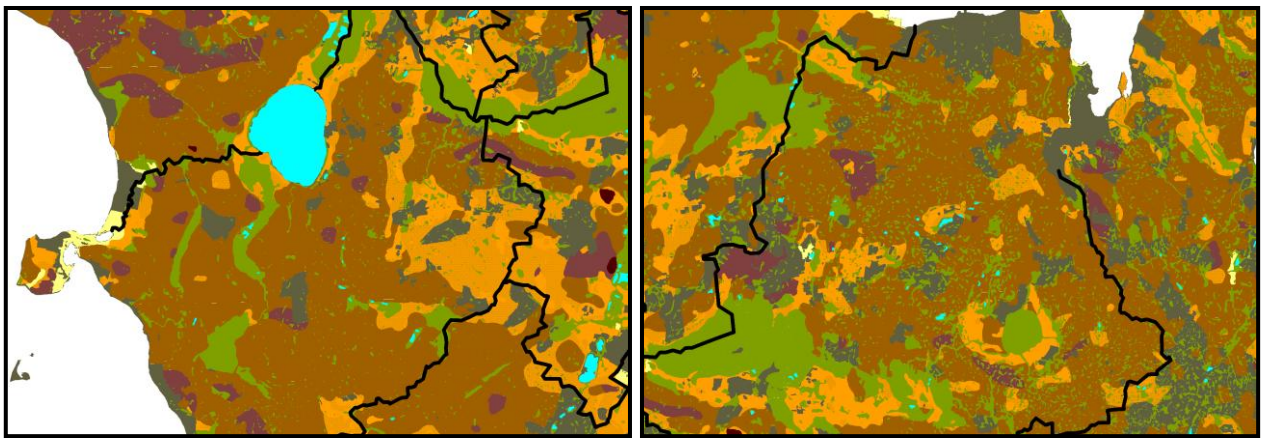


Figure 3.11. Soil maps of the main parts of Løve hundred (left) and Merløse hundred (right). Brown colours show loamy soils, orange colours sandy soils, light-green colour wetland soils; the dark-green colour indicates areas with no record of soil type (mainly cities or forests). The black lines represent boundaries of the medieval hundreds.

Production mix (arable versus pastural) 1662

As claimed in the opening analysis, the percentage of the vill area used for arable land can be seen as an indicator of orientation in the rural production on arable and/or pastural production. Another and more direct approach to analyse production-mix variations is based on the Land Register of 1662. In this register, the actual rent for each village farm and its distribution on the different kinds of payment is documented. In some villages, mainly where all village farms were owned by the

same landlord, the farms could be equalized to exactly the same size with the exact same rent. An example of this from the region is the village of Butterup (Butterup parish, Merløse h.), where all 12 farms were owned by the neighbouring manor, all of them had an arable acreage rated to take 4 barrels of seed, and all of them paid a rent of 16 bushels of barley, 15 bushels of rye, 3 bushels of oats, 1 lamb, and 2 chickens. In most villages of NW-Zealand, the picture was, however, more alternating. For some villages it is even possible to find that while one farm was to pay practically all its rent in grain (barley and rye), another farm in the same village mainly paid its rent with butter or fodder. Such differences are usually related to manorial ownership, as different manors could have different preferences for mix of payment. Also, variations in manorial ownership could lead to different levels of rent in the same village. The most common finding is, however, that the farms of the individual village had a reasonable similar correlation between rent and amount of seed (i.e. arable land), as well as a quite homogeneous rent-payment mix. Therefore, the total rent of the village does give a good indication of the conditions for the individual farms, and as the average village rent-mixes also paint a rather systematic picture on the regional scale, it seems fair to presume, that the rent-mix-distribution to a large extent also represents the actual production. It should be emphasized, though, that the actual percentages of various kinds in the tenancy payments are not claimed to equal the actual percentages in the production mix. A grain percentage of 75, for instance, does not mean that exactly 75 per cent of the gross production value came from grain. The figures should only be used as relative indicators of the orientation in the rural production.

In 1662, the average tenant in NW-Zealand paid 81 per cent of his rent in grain (43 per cent barley, 15 per cent rye, and 23 per cent oats). The remaining 19 per cent was paid in animals, fodder and butter. As a supplement to the grain rent, most farms gave a few lambs or poultry, which do, however, seem to have had a rather insignificant economical importance. In vills with meadows, pastures or forests, fodder or feeding could cover a more significant part of the rent, but the by far most important rental type of the region in 1662 besides grain was butter. Not all farms paid any butter at all, in fact, most farms did not, but for those who did, the butter rent usually constituted a third or more of the total rent.

The distribution of village rent-mixes in NW-Zealand 1662 is shown in figure 3.12 as the percentage of the total rent (assessed in the standard term *barrels of hartkorn*), which was based on payments in grain (i.e. barley, rye, and oats). As the map should show, grain payments constituted more than two thirds of the total rent in most of the village vills of the region. Especially in the western part of the region, rent was almost exclusively paid in grain. The lowest grain-shares, on the other hand, are found in the central and the south-eastern districts of the region around Åmosen and to the south of Lake Skarresø, as well as the north-eastern part of Ods.

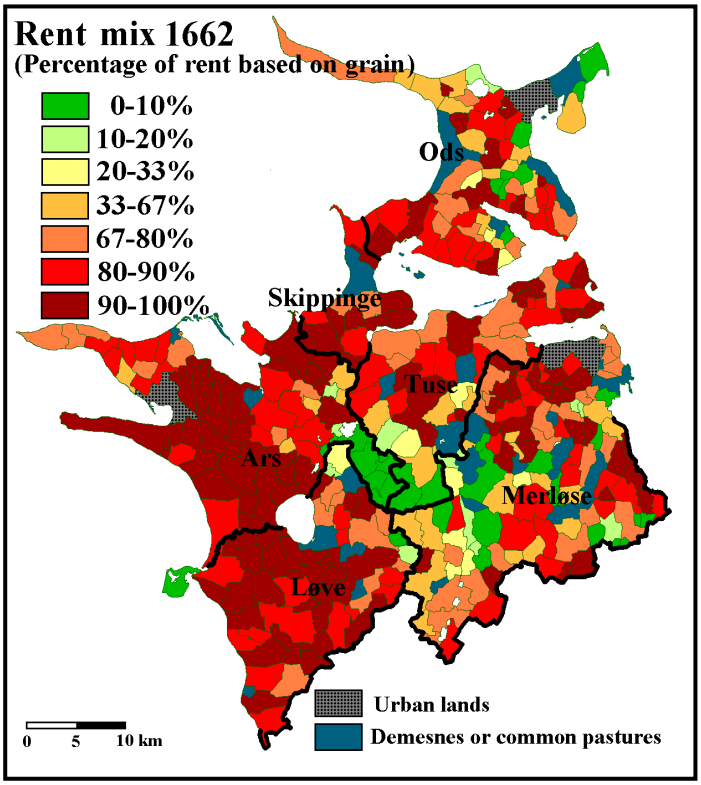


Figure 3.12. Rent mix in NW-Zealand 1662 shown as the percentage of rent paid in grain. Urban lands, demesnes and permanent pastures are not included. The bold lines represent boundaries of the medieval hundreds.

Looking at the twelve land-type areas of the analyses (figure 3.13), it is clear that the rental obligations of the tenants in the plain moraine areas mainly were based on grain. This tendency does, however, become less evident, moving from west towards east. In the easternmost area of the group (E-Merløse), the grain percentage is as low as in the hilly moraine areas. Probably, the variations among the plain moraine areas have to do with the alternative possibilities of production. In NW-Zealand, the primary alternative to grain was fodder and butter. For a village to obtain any significant production of pastural orientation, it was necessary to have substantial access to either meadows or forests. Therefore, when the vills of the westernmost moraine areas along the coast paid less than 10 per cent of their rent in non-grain products, it does not necessarily only reflect how well-suited their soils were for arable use, it could also reflect a lack of alternatives; 'The Plain', which the region along the western coast was called, was the most deforested district of Western Zealand by the end of the Middle Ages. In the eastern districts of the region, the situation was quite another, and so the mere 78 per cent grain-share of the rent in the area of eastern Merløse should probably not be taken as a prove that this eastern moraine plain was significantly less qualified for arable than was the western moraine plain of say western Løve, as much as the vills of the rather late deforested eastern districts had much better access to both meadows and forests. Likewise, many vills situated along the coast of the Isefjord (and some parts of the Sejerø Bay) have enjoyed good access to coastal meadows.

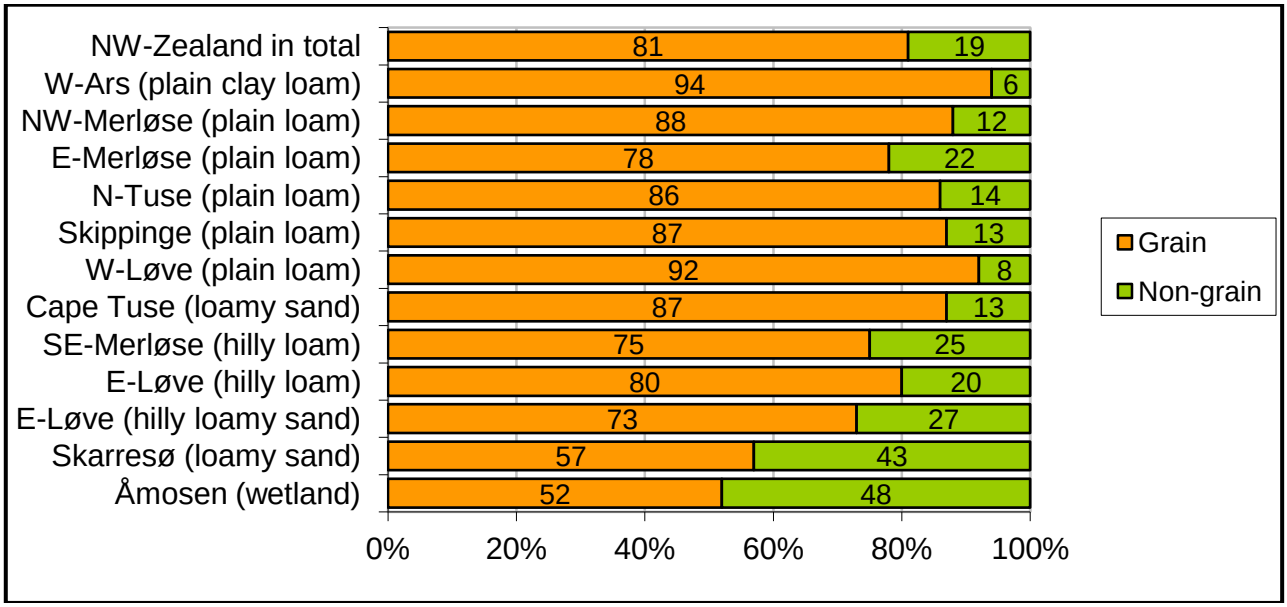


Figure 3.13. Relative distribution of main rental kinds (grain or non-grain) in twelve land-type areas of NW-Zealand in 1662.

It is, however, outside the moraine areas that the non-arable payments really played an important part in the rent of 1662. Here, there is not much difference to be found between the sand-soil area of Lake Skarresø, dominated by woodland and pastures, and the vills of the Åmosen area with rich access to wet meadows; 43 and 48 per cent non-arable rental payments respectively. In both areas, the main alternative payment was given in butter (32-36 per cent), while fodder and animals constituted about half the non-arable payments in the hilly moraine areas (and the plain E-Merløse area); in the remaining (plain) moraine areas, almost no butter was paid in rent at all (figure 3.14).

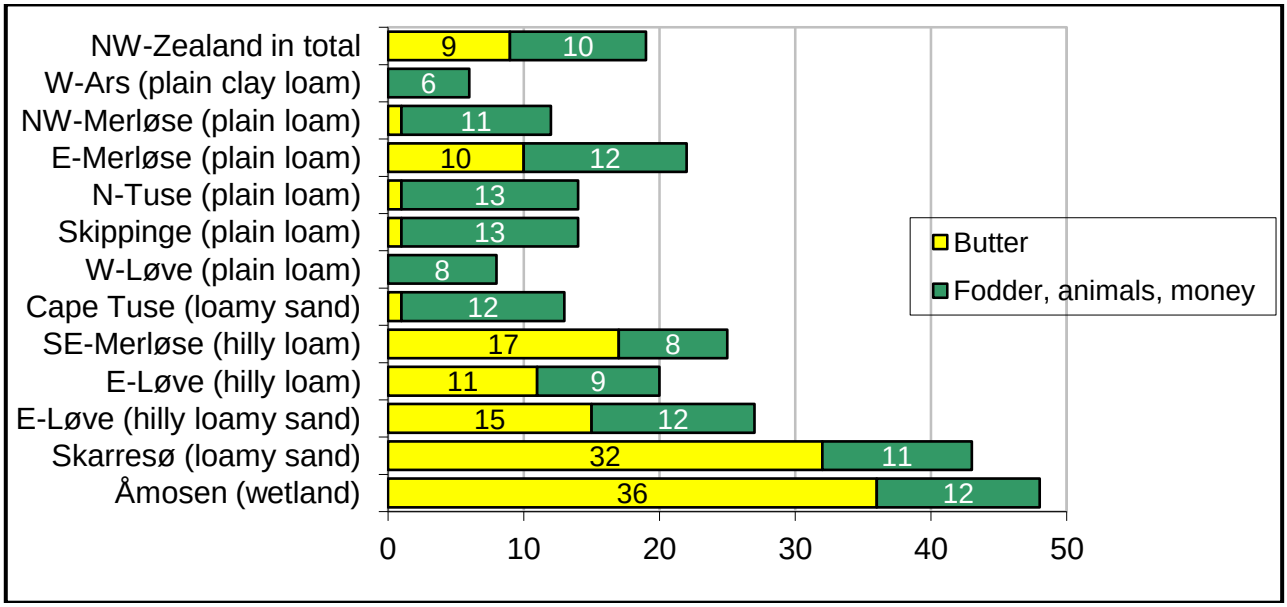


Figure 3.14. Relative distribution of non-grain rental kinds in twelve land-type areas of NW-Zealand in 1662 (all numbers are in per cent).

In Danish agricultural history, it has been argued that the Land Register of 1688 was over-focused on taxation of the arable land, while the non-arable production was somewhat undervalued. By looking into the calculation lists, which the final hartkorn taxation was based upon, is the possible to calculate the actual weight of arable, meadows, pastures and woods in the 1688-taxation. This is, unfortunately, quite a time-consuming task, which I have not performed for NW-Zealand. It is, however, done for the island of Funen (Porsmose 1981) and for Ulfborg hundred in NW-Jutland (Rømer 2000). These studies show that the non-arable lands only constituted 6 per cent of the total hartkorn on Funen, while it contributed with 20 per cent in Ulfborg. It is quite interesting to note, therefore, that while the geographical and agricultural- historical conditions of NW-Zealand without doubt are closer to the conditions of Funen than of the NW-Jutland district, the average share of non-grain rental payment in NW-Zealand 1662 was 19 per cent - and hence much closer to the 1688-figures of NW-Jutland. This could indicate that the traditional claim of an undervaluing of non-arable production in the 1688-Land Register is not at all unjust.

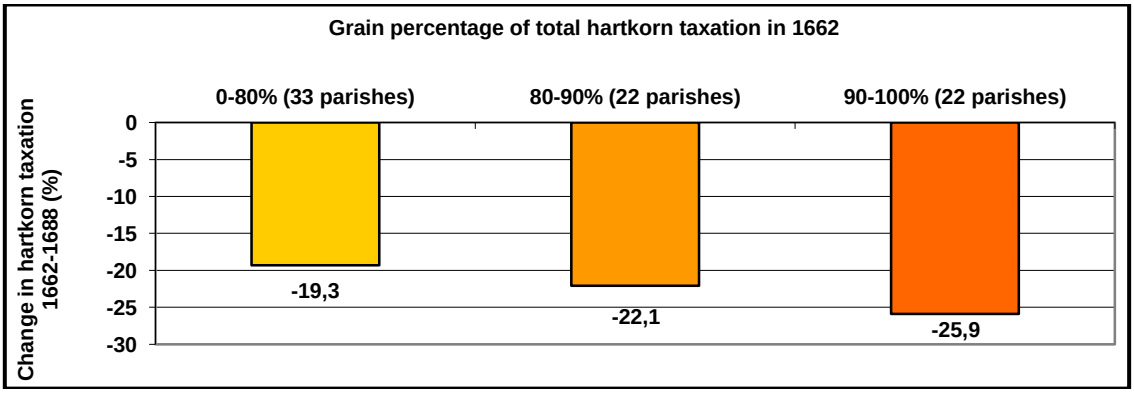


Figure 3.15. Relative change in hartkorn taxation from the Land Register of 1662 to the Land Register of 1688 (as percentage of the 1662-hartkorn) for all parishes in NW-Zealand divided into three groups based on the grain-rental percentage of the hartkorn taxation in 1662.

I have, however, tried to test the thesis in NW-Zealand, by looking at the actual difference of taxations in the two land registers, and how they differ when compared to rent-mix distributions of 1662 (figure 3.15). To my surprise, this analysis clearly shows that parishes paying a large part of their rent in grain in 1662 tended to experience a relative large drop in taxation level compared to parishes more based on non-arable production. The test says nothing about whether the non-arable

lands were valued fairly in 1688 compared to their productivity or not, but it certainly does indicate, that they did not get off any ‘easier’ in 1688 than they did in the Land Register of 1662.

Of course, also non-physical-geographical conditions should be taken into consideration when looking at variations in the historical rural production. As pointed out by Bruce Campbell, the non-arable production often held a bigger commercial importance than did arable due to weight and transportability compared to unit price. In this light, butter and meat for instance were much more suited for long-distance trade, while the commercial importance of barley, rye and oats usually was quite local. Regardless the geography, in many remote areas it would therefore be more payable to produce butter than grain. Thus, this could be part of the reason, why butter production on Zealand especially was dominating around Åmosen in the remote and central parts of the island.

4. Settlement in medieval and early modern NW-Zealand

Since the late nineteenth century, Danish settlement history has traditionally taken its starting point in place-name studies - especially when dealing with Iron Age and medieval settlement structure. Based on philological elements in the names of the settlements, combined with studies of place-name types used in Scandinavian settlements in Normandy and England, place-name scholars have been able to class several name types with different periods. Even though the exact length of such periods is disputed, and probably also differs regionally throughout Scandinavia, it is the general opinion that Danish settlements with place-name suffixes *-inge*, *-lev*, *-løse*, *-sted* and *-hēm* primarily were founded during the Iron Age (more exactly from *c*.200-800). From the period, which in Denmark is referred to as Viking Age (*c*.800-1050), name-suffix types as *-by* and *-tofte* are common. Special interest must be given the suffix type *-torp* (which in present-day Danish usually has changed to *-drup*, *-rup* or *-strup*), which is the most common place-name type in both Denmark and Sweden (Gammeltoft & Jørgensen 2002). Periodically, the suffix has been used on new settlements from *c*.800 to 1500, but in Denmark, especially the period *c*.1000-1300 appears as the 'grand age of thorpes', where it primarily has been used on new hamlets established near old villages, and on new settlements in former wasteland. In addition, name suffixes *-tved* and *-with* seem to go back to Iron Age and early High Middle Ages, while the etymologically familiar name-types *-holt* and *-rød* appear to be somewhat later (*c*.1100-1500). The etymology of all four (*-tved*, *-with*, *-holt* and *-rød*) indicates that the settlements are established in relation to clearance of forest.

Based on the place-name material from NW-Zealand (that is all preserved references to named settlements from the Middle Ages and the seventeenth century), a general picture of the settlement development in the region *c*.800-1350 can be drawn as in figures 4.1-4.3. Certainly, other settlements than the ones marked on the map have existed at the times in question, but for a general idea, the picture given is probably not at all bad.

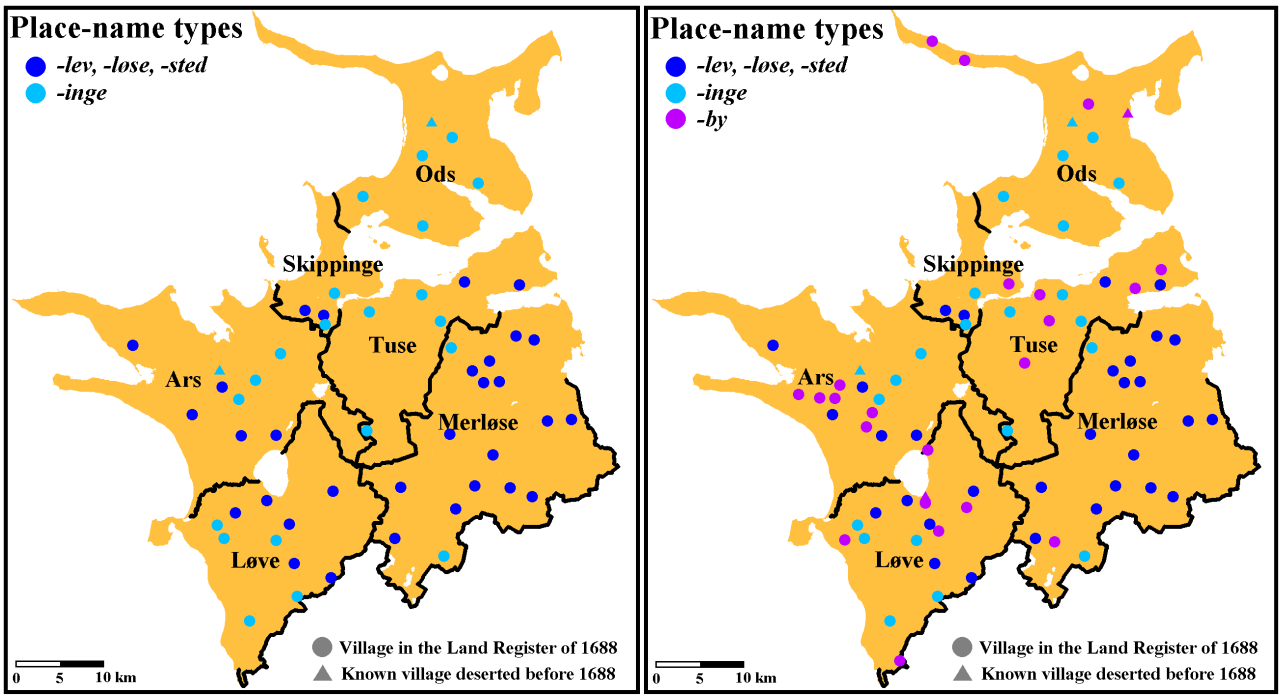


Figure 4.1-4.2. Left: Settlements in NW-Zealand by the end of the Iron Age (c.800) represented by known villages with Iron Age name-types. Right: Settlements in NW-Zealand by the end of the Viking Age (c.1000) represented by known villages with Iron Age name-types and the Viking Age name-type -by. The bold lines represent boundaries of the medieval hundreds.

Figure 4.1 represents the situation by the beginning of the Viking Age (*c*.800). Cultural centres of the Iron Age concentrate in the central parts of the western hundreds (Ars and Løve), along the southern coast of the Lammefjord, and in the northern Merløse. Especially the western plain of the region along the Great Belt coast indicates early settling and deforestation. Also the remaining parts of Merløse and the central part of Ods were populated in the Iron Age, but less densely and with several woodlands in between the settlements. Sparsely settled areas, supposedly dominated by forest, can be identified in the central part of the region (eastern Løve and southern Tuse) and as an approximately 5 kilometres broad belt along a great part of the coastline. Relative sparsely populated areas also occur in the central and eastern parts of Merløse.

The founding of *by*-settlements during the Viking Age (*c*.800-1000) has for a large part taken form as a movement from already populated areas towards the coastline (figure 4.2). This is especially evident in northern Ods and on the south side of the Lammefjord. Moreover, an early colonization-movement can be followed towards the central woodland areas of the region, like eastern Løve and central Tuse.

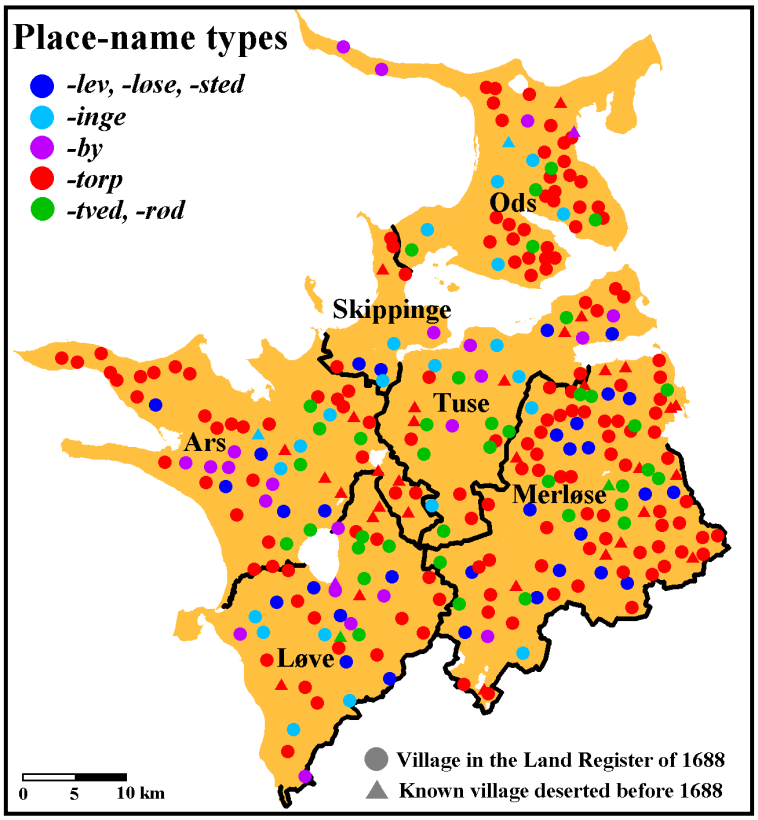


Figure 4.3. Settlements in NW-Zealand by the end of the High Middle Ages (c.1350) represented by known villages with the name-types -lev, -løse, -sted, -inge, and -by, together with -torp and wood-names. The bold lines represent boundaries of the medieval hundreds.

During the High and Late Middle Ages, most of the region was settled with a large number of thorpes and clearance villages (figure 4.3). New settlements were founded in both the old habitated areas and in the woodlands. While villages with the clearance-indicating place-name suffixes *-tved* and *-rød* mainly are concentrated to the central parts of the region, *torp*-villages are scattered all over the region, including the coastal zones. *-Torp* is by far the most dominant name-type in NW-Zealand, as it constitutes 45 per cent of the entire medieval and early modern place-name material. While the region's *tved*- and *rød*-settlements for a large part can be classified as clearance of former woodland, the *torp*-suffix seems to have been used for both new outlying hamlets close to the old villages and for colonial clearance settlements.

In 1688, the region counted 355 villages, but from older sources, another 40 medieval villages can be accounted for (table 4.1). Most of these villages are known to have been deserted in either the Late Middle Ages to give room for expanding cities, or they were dissolved in the sixteenth or seventeenth centuries, as their lands were given to expanding demesnes. A third group of deserted medieval villages are concentrated to hilly woodlands with often rather sandy soils. It is striking, by the way, that 32 of the 40 deserted villages are of the place-name type *-torp*.

Table 4.1. The distribution of all known medieval and early modern villages in NW-Zealand on place-name types.

Place-name types	Number of villages in the region	Percentage of the total number of villages	Number of known villages deserted before 1688
- lev	12	3%	0
- løse	18	5%	0
- sted	1	0%	0
- inge	23	6%	2
- bjerg and - høj	17	4%	0
other terrain-names	29	7%	1
- by	24	6%	2
- torp	179	45%	32
- tved and -rød	30	8%	2
other wood-suffixes	9	2%	0
Others	53	13%	1
In total	395	100%	40

I have tried to look for any variations in the soil-geographical conditions around the villages of different place-name types (figure 4.4). Of course, working with an area of this size, the average figures of the whole region must cover quite a variety of tendencies, but as the analysis has been repeated for smaller sub-areas of more homogeneous soil- and place-name conditions, some of the findings seem to be more than a coincidence.

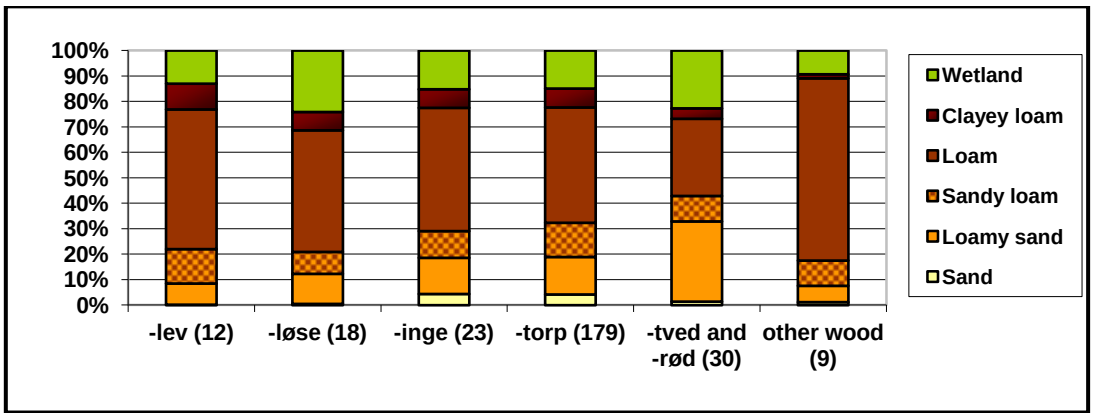


Figure 4.4. Average relative distribution of soil types in the vills of various place-name types in NW-Zealand. The numbers in brackets state the number of vills in each group.

First of all, it can be noted, that villages of the Iron Age name-types *-lev*, *-løse* and *-sted* are distinctly concentrated to the plain moraine areas, especially where the soil type is loam. The *løse*-vills often also have good availability of wetland. The remaining old name-type *-inge* has generally quite different soil conditions, first of all more sandy. For the large group of *torp*-vills, the soils are on average more sandy than around the older settlements (except for the *inge*-villages, which are actually quite identical to the *torp*-average), and this tendency is not just a result of the many colonial *torp*-settlements in the woodlands and along the coastline, as also the thorpes founded around old villages often find themselves with more sandy soils than their potential 'mother

villages'. The perhaps most significant finding of the analysis is the difference of soil distribution in vills belonging to settlements with wood-indicating place-name types. While the most sandy soil distribution is found for vills with *tved*- and *rød*-names, the loamiest distribution belongs to the group of remaining wood-names. Perhaps this indicate that *-tved* and *-rød* represent some of the earliest forest clearances, where it was preferred to clear woodlands with the most light soils, because the forest here was less dense and the virgin land easier to plough. Therefore, the least sandy woodlands were left for the later generations - and their stronger ploughs?

Another interesting aspect about the thorpes is that it is quite clear how thorpe settling too has influenced on the old villages in the neighbourhood. This can be seen, when looking at the size of the villages in the seventeenth-century land registers. In figure 4.5, the settlement structure of NW-Zealand according to the Land Register of 1662 is shown. In areas with only a limited amount of *torp*-settlements (such as Tuse and Skippinge), the old villages are significantly larger in number of farms than in more '*torp*-dense' areas (as NW-Merløse). The thorpes themselves, just as the old villages, vary quite considerably in size within the region, but almost everywhere, they are smaller than the neighbouring old villages. This means that a more dense settlement (in number of villages) does not necessarily indicate a similar higher overall population, as the village density also reflects whether the people of the area have chosen to concentrate the settlement in large units or to spread it in several smaller units.

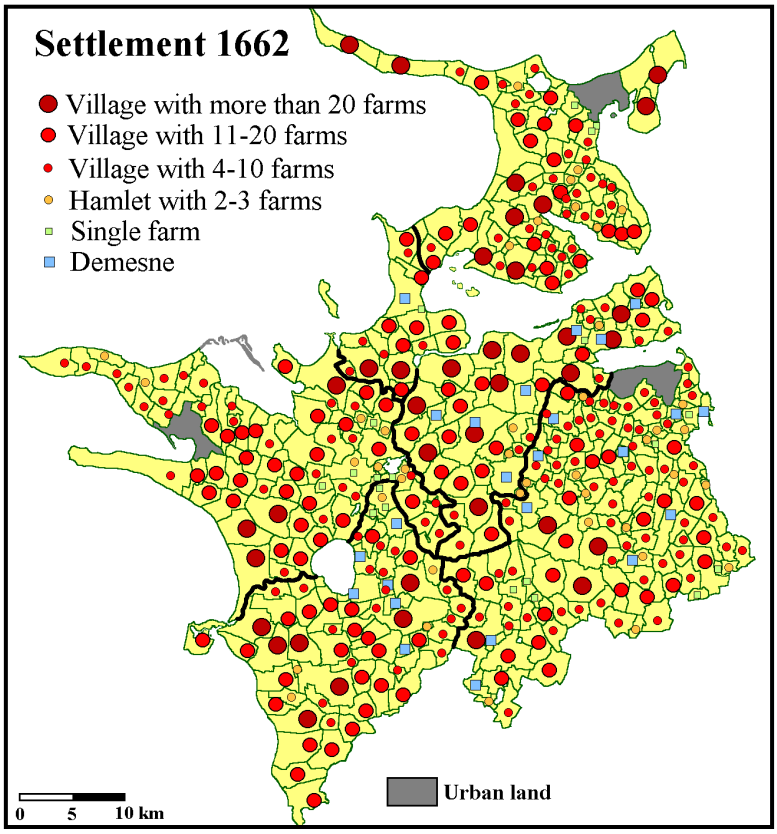
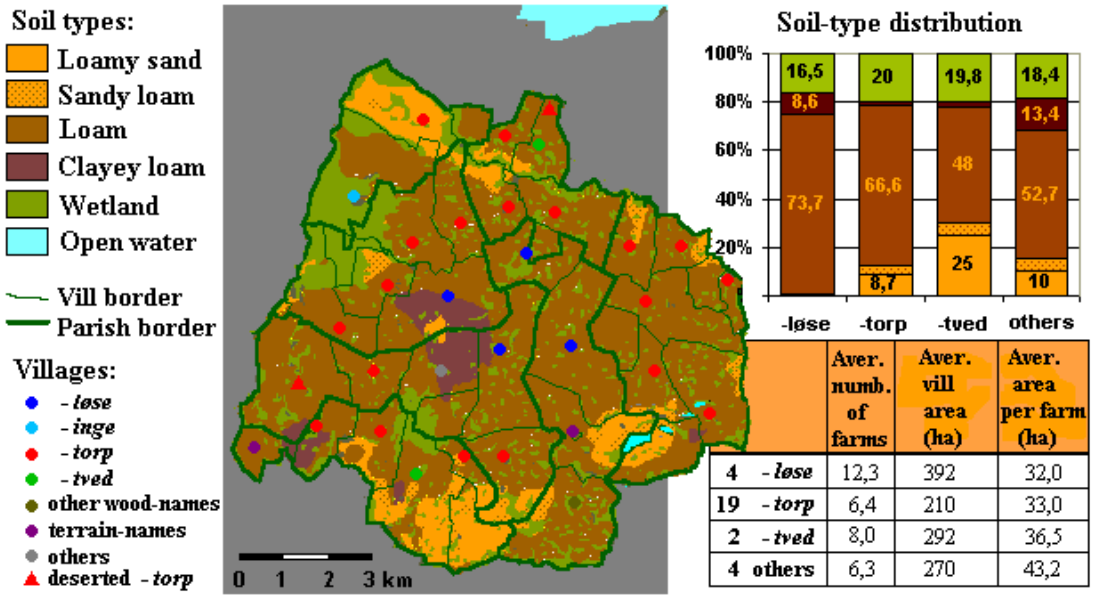


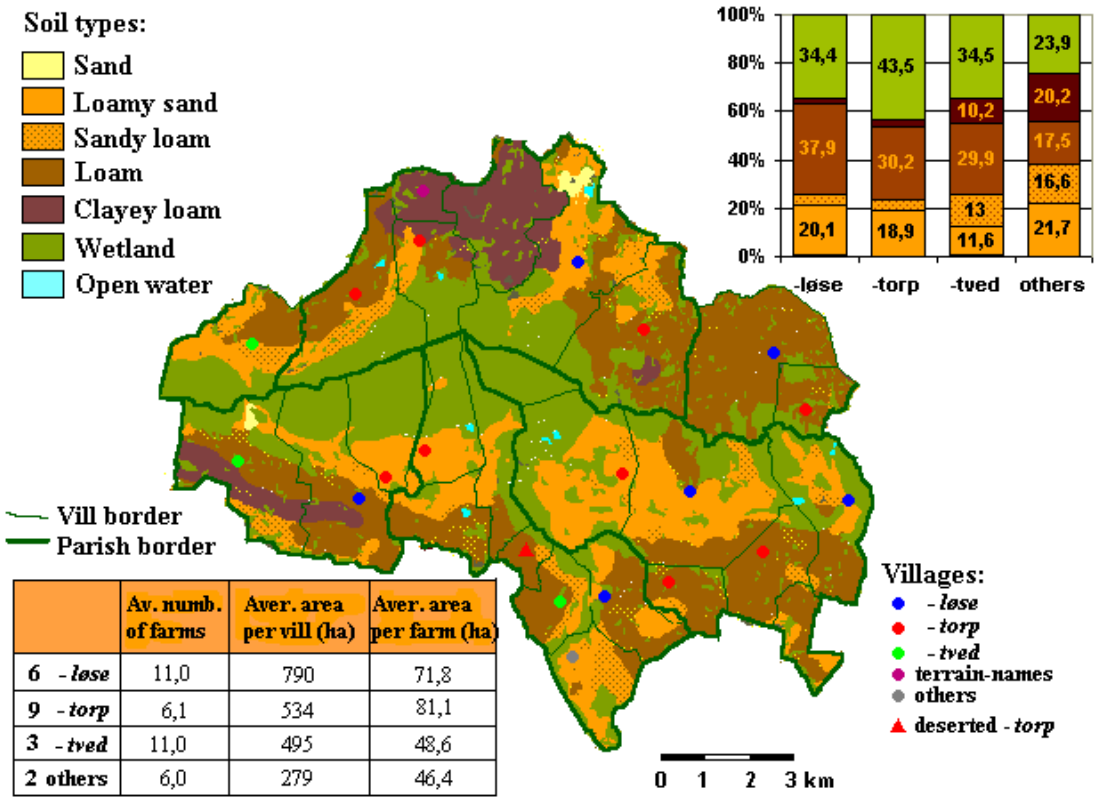
Figure 4.5. Settlements in NW-Zealand classified by the number of farms recorded in the Land Register of 1662. The thin lines represent boundaries of the vills, the bold lines show the boundaries of the medieval hundreds.

The regional differences of NW-Zealand *torp*-settling can only be partly explained from my studies. There is a distinct tendency that the old villages of the primary cultivated areas well-suited for arable agriculture, like NW-Merløse (figure 4.6), did establish more thorpes than did the old villages of, for instance, Åmosen (figure 4.7): 5 thorpes per old village in NW-Merløse versus 2 thorpes in Åmosen, which can be explained by differences in agricultural orientation; the more oriented on husbandry, the less need for decentral farming units (:thorpes).



	Aver. numb. of farms	Aver. vill area (ha)	Aver. area per farm (ha)
4 - *løse*	12,3	392	32,0
19 - *torp*	6,4	210	33,0
2 - *tved*	8,0	292	36,5
4 others	6,3	270	43,2

Figure 4.6. Medieval settlement structure and soil-type distribution in NW-Merløse. Villages deserted before 1688 are not included in the calculations.



	Av. numb. of farms	Aver. area per vill (ha)	Aver. area per farm (ha)
6 - *løse*	11,0	790	71,8
9 - *torp*	6,1	534	81,1
3 - *tved*	11,0	495	48,6
2 others	6,0	279	46,4

Figure 4.7. Medieval settlement structure and soil-type distribution in the Åmosen area. Villages deserted before 1688 are not included in the calculations.

However, this does not explain why thorpes are so relatively few in northern Tuse and Skippinge, which geographically are areas quite alike NW-Merløse. Another curious finding is that while *torp*-settlements have been used rather frequent in the clearance of woodlands in eastern Merløse, on the capes around Lammefjord, and on Cape Røsnæs (NW-Ars), they are quite rare in the woodlands of south-western Ars and the central Tuse. In both cases, the explanation might be that *torp*-settling - both as decentralisation and colonization - represents a certain period, where the trend for some reason favoured decentral settlement, while other periods have supported the larger central settlement units. An obvious reason for such trendily shifts is changes in the political climate, where

times of war and plundering probably called for centralisation more than decentralisation, but also different manorial policies may play an important role. In Germany, for example, several wasteland areas given to Benedictine abbeys or episcopal seats were colonized with lay settlers under initiative from the new ecclesiastical owners (Mayhew 1973, 45-46). Cistercian monasteries, on the other hand, were notorious for clearing not only wasteland, but also already existing settlements on their new lands, which they wanted to cultivate themselves from large *grangia* units (Lekai 1977, 299; Donkin 1978, 104-107). In NW-Zealand, especially lands owned by the bishop of Roskilde (ownership mainly known from the early fourteenth century) show a richness of *torp*-settlements in both arable and woodland areas above average. Several of these thorpes even bear the names of known bishops (such as *Eskilstrup*). Also, the generally *torp*-lacking woodland area of southern Tuse and the southernmost part of Merløse were, as it happens, dominated by the Cistercian abbey of Sorø (a few kilometres south of the region, cf. figure 2.1). However, whether the Zealand bishops indeed should be seen as the 'founding fathers' of many of the region's thorpes, and the Sorø Cistercians as 'thorpe-deserters', is still left to be verified.

5. Churches and parish structures in medieval NW-Zealand

Christianity was introduced in Denmark by the beginning of the Viking Age, and by the end of this period (*c.*1050), the Danish people can be considered reasonably Christianised. From this time on and for the next two centuries, an ecclesiastical structure of dioceses, churches, parishes, and tithes fell into place, alongside the coming of various monastic orders. In the present chapter, the ecclesiastical material from NW-Zealand will be analysed for information on the economical and demographical situation of the region during the High Middle Ages.

Age and stone material of the medieval rural churches of NW-Zealand

The first churches in Denmark were raised in the beginning of the ninth century, but the major period of Danish church raising was 1050-1250. The earliest phases of Danish church building is still rather uncertain, and even though relicts of several wooden churches have been found under later stone buildings, the general picture of the ecclesiastical Denmark is - except for a division in dioceses from around 1060 - quite blurry until the beginning of the twelfth century. By then, it became standard to build churches of stone in the local parishes, as the parish system itself was introduced at the same time; for a large part, the still existing parish structure was completed in the period 1150-1250.

In NW-Zealand, 77 rural parishes were established in the High Middle Ages. To judge from the building material and the architectural style, the majority of these (80 per cent) had stone churches built in the twelfth century, which mean they are classified as High Romanesque. 12 per cent of the parish churches are classified as Late Romanesque (1200-1250), and the remaining 8 per cent as Early Gothic (1250-1350). As seen in figure 5.1, the two younger groups of churches are especially concentrated in the coastal areas and in an horizontal belt going through the northern-central part of the region.

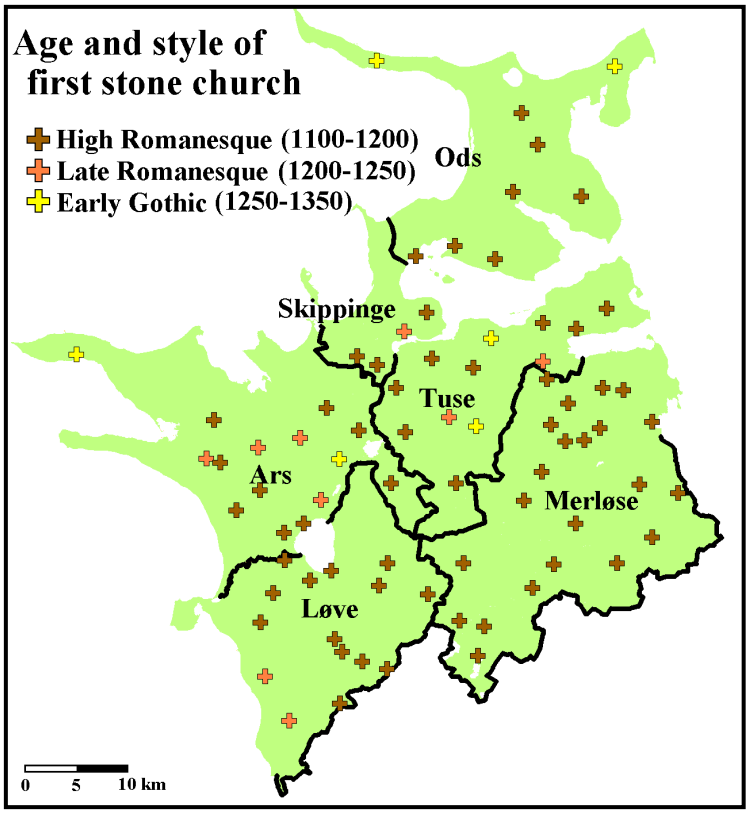


Figure 5.1. Geographical distribution of rural parish churches in medieval NW-Zealand with indication of age and architectural style of oldest stone church. The bold lines represent boundaries of the medieval hundreds.

Now, it should be noted that remnants of wooden churches have been found under all three age-groups of stone churches, so the distribution in figure 5.1 can only with certainty show when a stone church was build, and so perhaps replacing a wooden predecessor. Areas dominated by late stone-churches can thus be considered either a bit later habitated, or financially weaker than the rest of the region, at the time when it became popular to build church houses out of stone.

Danish parish churches from the High Romanesque period are mainly built from either granite boulders or ashlars - or, most commonly, in a combination of the two. In NW-Zealand, the boulders were usually used in their original form or cleaved in two, while granite ashlars only were carved for corners and the more complex parts of the building. Often, however, ashlars were carved in local quarries from a more handy material, like sand stone or lime stone. In this region, the most popular ashlar material was a calcareous tufa called *frådsten* (~ "foamstone"). The photograph in figure 5.2 is of one of the most famous Romanesque churches in Denmark, Tveje Merløse (in Merløse h.), mainly known because of its twin towers, but it is also interesting from a 'stone perspective', as it is almost evenly built from the two dominating Romanesque stone-types of the region, granite boulders and 'foamstone'-ashlars, but in a quite peculiar and rather illustrative way: apse, chancel, and the lower half of the nave are built in boulders, while the upper half of the nave and the towers are built in ashlars of calcareous tufa. The reason for this shift is unknown, but as the 'foamstone' without doubt was the more prestigious material of the two, it could appear that the building owner halfway in the project suddenly had struck gold; perhaps in a political sense, as the great landlord of the area, Absalon Hvide, became bishop of Zealand in 1158, which could appear to have been the key to the foamstone-quarries. This is, however, mere speculation. From the end of the twelfth century, bricks were introduced in the most prestigious church-building projects, and bricks completely took over in all levels of church building from the Early Gothic period onwards.

Figure 5.2. The twelfth-century church of Tveje Merløse (Merløse h.), famous for its twin towers, but also quite remarkable because of its peculiar shift in stone material; the oldest parts (apse, chancel, and lower nave) are made of granite boulders, the younger parts (upper nave and towers) are made of calcareous tufa ("foamstone"). As it happens, the situation is completely the opposite in the neighbouring and contemporary church of Nørre Jernløse; here the apse, chancel, and lower nave are made of foamstone, the rest of the church is in granite boulders. In both cases, the reason for the shifts is unknown.

Sizes of parishes and churches in high medieval NW-Zealand

In Scandinavia, there is a certain tradition for spatial studies of the medieval parish structure. By looking at the actual shape and size of the parishes on a regional scale, in Sweden and Norway this has led to the identification of various layers of primary, secondary and tertiary parishes, where it is believed that younger parish territories have been parcelled out from older ones. In Denmark, similar attempts have generally found it very difficult to identify an early layer of primary churches and parishes, as the establishing of later parishes in the twelfth and thirteenth century seems to have reformed any former structure beyond recognition.

Spatial studies of the medieval parish structure in Denmark have more been a matter of the regional differences in parish sizes. On a national scale, it is quite distinct to see how parish sizes differ with the general variations in population density. In densely populated areas, medieval parishes are relatively small compared to parishes in sparsely inhabited areas, which is of course no surprise, as it will take a larger area to muster enough tithe payers to finance a church and a vicar in remote areas. Also, as the tithe was not a fixed, but an income-dependent payment, areas of relative high agricultural output needed fewer tithe payers per parish than what was necessary in less fortunate areas; this tendency has been confirmed by Mats Anglert (1995) for the medieval parishes of Scania. Here, it was also Anglert's finding that areas with a large number of medieval demesnes often had particularly small parishes, which could indicate that besides demographical and economical concerns, a political factor might have influenced the parish-forming structure, as local landlords might have seen an interest in putting pressure on the bishop as to raise their particular chapel into a parish church - and therefore allow for more and smaller parishes than the economy and demography actually justified.

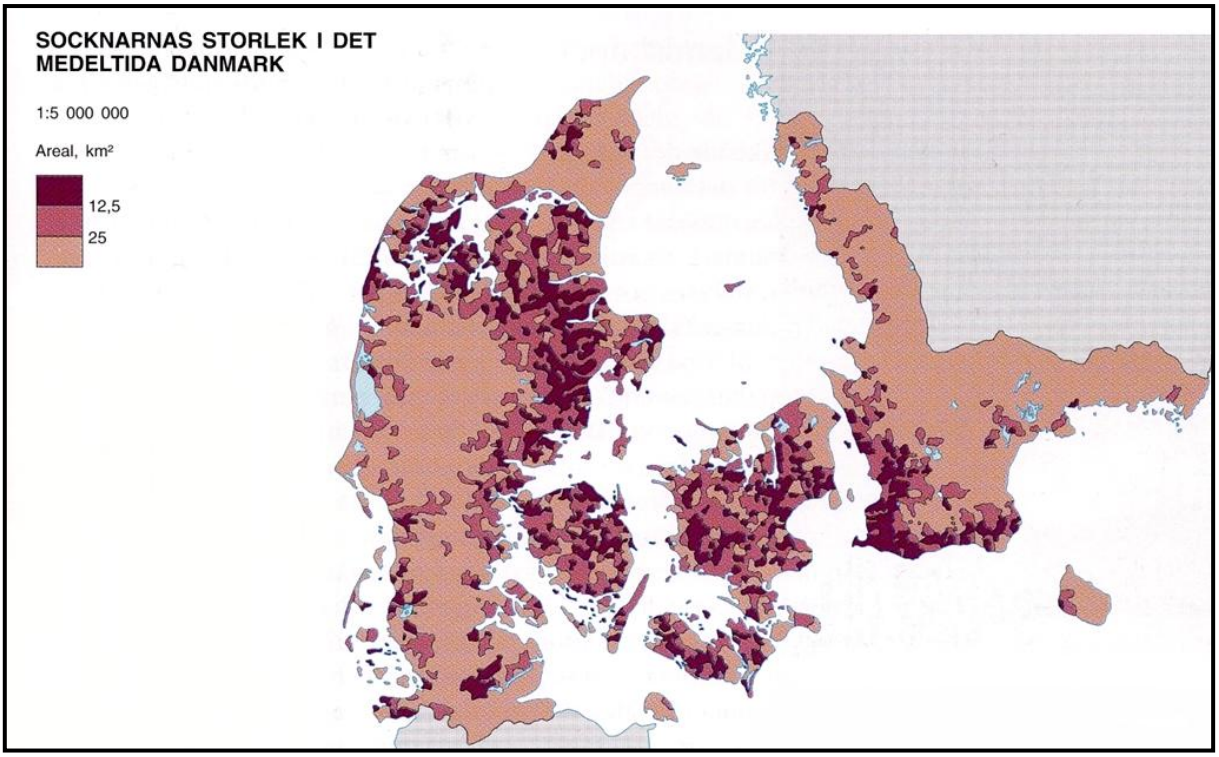


Figure 5.3. National differences of parish size in medieval Denmark; the dark colours indicate the smallest parishes (less than 12.5 km²). (Germundsson & Schlyter 1999, p. 65)

Figure 5.3 shows a simplified map of the variations in the size of parishes in medieval Denmark. The map shows quite clear, how the smaller parishes and hence the (potentially) more densely populated areas are to be found on the central isles, in north-eastern Jutland, and in the western and southern Scania. For a large part, this picture corresponds with the geological map, as this is also the regions with the most fertile soils. The interdependence is especially evident in Scania and on

the islands of Zealand and Funen, where the areas of larger parishes coincide rather accurate with less fertile soils. In Jutland, on the other hand, the coherence is much less outspoken, as moraine soils of south-eastern Jutland and marine clay areas along the south-western coastline theoretically should allow for much smaller parishes than what is found, while the soils of the north-easternmost part of the 'small-parish'-Jutland are actually not all that fertile. The latter combination is perhaps part of the reason why this area in particular saw several late medieval church-closings, a phenomenon quite unknown to late medieval Zealand.

When working with spatial studies of parishes in medieval Denmark, it should be pointed out that the oldest maps showing the actual boundaries of Danish parishes are generally from the late eighteenth century, but from the written sources, it is possible to track the early modern parish structure back to the middle of the thirteenth century. Of course, there will occur local exceptions of intervening changes, which - when known - can be incorporated into a reconstructed parish map of the High Middle Ages, as for NW-Zealand in figure 5.4. And from this, the corresponding parish sizes have been calculated in G.I.S.

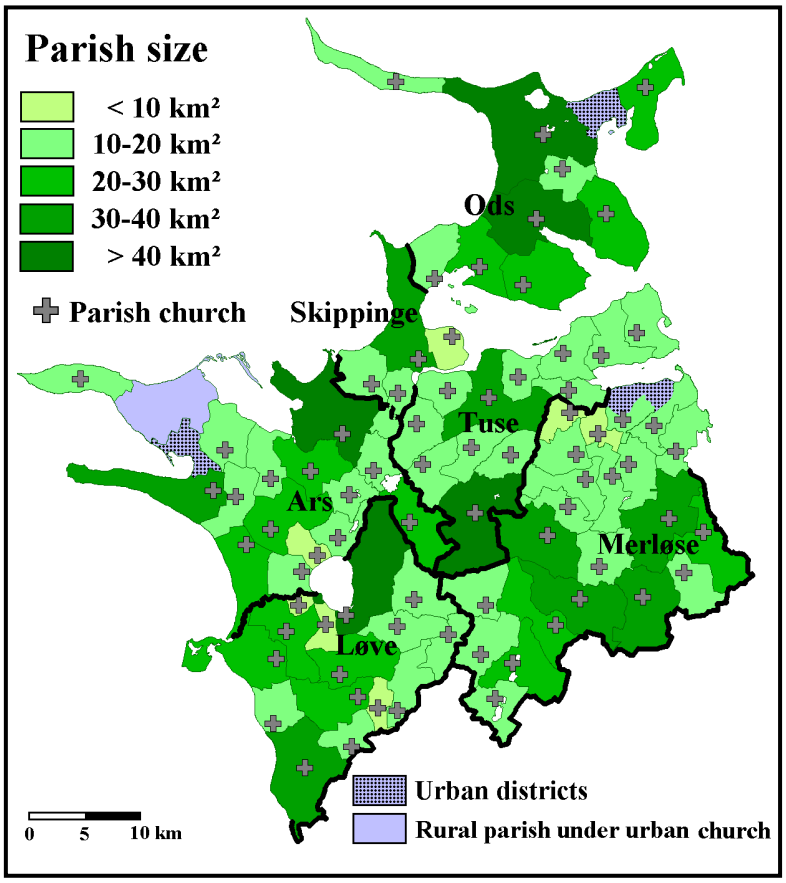


Figure 5.4. Map of high medieval parish structure of NW-Zealand with colour indication of parish size. The bold lines represent boundaries of the medieval hundreds.

The reconstructed medieval parish-sizes of NW-Zealand vary from 4.9 to 62.8 km², with the majority (74 per cent) of the parishes within an interval of 10-30 km². As seen in figure 5.4, there is a tendency of 'clustering' in the sense that the individual parish is often situated among other parishes of more or less the same size, but within the whole of the region, parish size differs significantly and rather systematically. By comparing parish-size distribution with the previous analyses and interpretations of the cultural-geographical history of the region, it is fair to say that areas dominated by small parishes for a large part coincide with areas with signs of early habitation and cultivation; for example north-western Merløse and southern Skippinge. In the other end of the scale, we find some of the region's largest parishes in areas with several signs of late colonization (such as Ods and south-eastern Merløse) or of permanent limited settlement and cultivation (such as

Åmosen in the central and south-eastern part of the region). These findings are in accordance with the theoretical expectations mentioned above, but - of course - one should only use such rules with a good deal of caution. For instance, 'The Plains' in the western parts of Ars and Løve are expected to be settled long before the woodland areas in the eastern parts of the same hundreds, but still the parish sizes are considerably bigger in the west than they are in the east. Moreover, by including the age of the stone churches, it becomes evident that parishes with late church raising (Late Romanesque or Early Gothic) tend to have smaller areas than other parishes in the neighbourhood.

A complementary method in the search for relative demographical differences between parishes of earlier times is by measuring the inside area of the part of the church building, which is supposed to house the parishioners, namely the nave. Admittedly, it is quite uncertain exactly how the parish churches were used in the Middle Ages, and there are different opinions on whether it is at all reasonable to see floor spaces of the naves as relative indicators of the number of medieval parishioners. Attempts of such regional-comparative analyses of Romanesque nave sizes from Western Jutland and Scania have, however, showed rather promising results (Nyborg 1986 and Anglert 1995), and by comparing the results of a similar analysis performed on NW-Zealand with all the other historical-geographical analyses of the region, problems and possibilities of the method can be further evaluated.

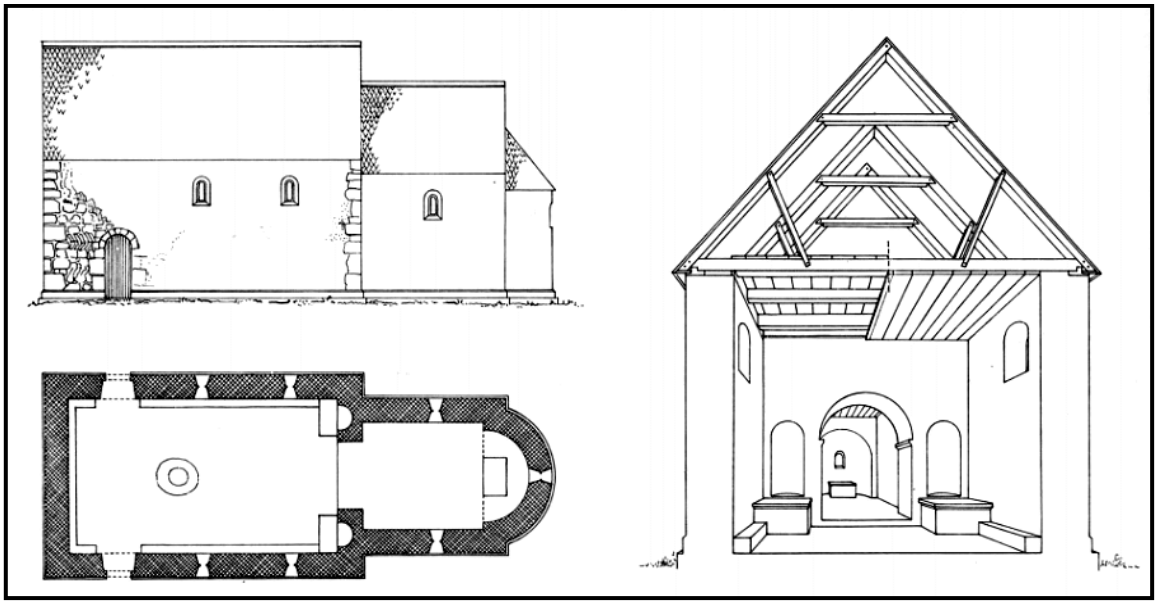


Figure 5.5. Schematic model of typical Romanesque village church in high medieval Zealand. A model as the one in the low left corner has been reconstructed and drawn for all Zealand parish churches with exact measures and indication of different building periods, which is published in the work "Danmarks Kirker" (: Churches of Denmark). Based on this, the inner nave size of all the high medieval parish churches of the region has been estimated for the present analysis.

The average inner nave area of the 71 Romanesque parish churches of NW-Zealand is 73 m². This average represents a considerable spread, as the smallest church had a nave of just 29 m², while the largest nave of the region was about 6½ times bigger (188 m²). For 93 per cent of the churches, however, the nave area lies within an interval of 40-110 m², which is quite similar to the findings from Scania. In the distribution map of figure 5.6, the Romanesque churches of NW-Zealand are divided into three groups according to the size of the nave.

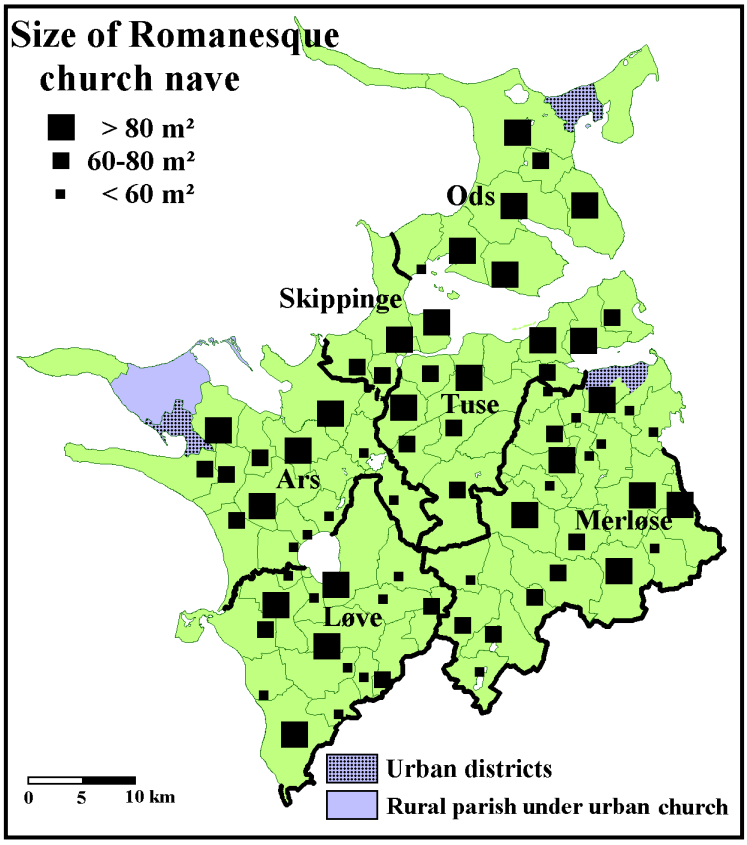


Figure 5.6. Churches in NW-Zealand classified from the inner area of the Romanesque nave. The thin lines show the boundaries of the medieval parishes, the bold lines represent boundaries of the medieval hundreds. Parishes with no church symbol did not have a stone church in the Romanesque period (1050-1250).

Geographically, several tendencies can be observed. Small churches are especially found in the northern Merløse, and in the central districts around Åmosen and the lakes. There are probably two different reasons for this. Northern Merløse (especially the north-western part) holds several signs of early settlement and dense population in the parish-forming period, which has led to short distances between the churches (small parishes) and relative few tithe payers per church due to better economy for the individual farmer on average. The small and medium-sized churches in the central districts are, however, probably more a result of relative sparse population in the High Middle Ages; many of them are situated rather a long way from neighbouring churches. Areas with scattered big churches are in this region especially found in Ods and along the coastline, which could indicate that these districts were quite recently colonized in the twelfth century, when most of the Romanesque churches were built, but already held a considerable population in their often rather large parishes. For all the scattered churches in NW-Zealand, no matter what the size, there is a tendency that they in general appear somewhat younger than the more densely distributed churches. Finally, a group of very big churches (with naves above 100 m²) are spread all over the region, and are also found in areas with otherwise densely packed small churches. Perhaps they represent an early layer of baptismal churches originally covering large areas as a public supplement to the many small private chapels; when later on more public churches were raised and the parish structure was reformed, these old 'minsters' came to appear disproportionably big.

For the parishes in NW-Zealand with Romanesque churches, there is a distinct correlation between the size of the parish and the inner area of the Romanesque church nave: Big churches are mainly found in large parishes, small churches in small parishes. This correlation is perhaps not all that surprising, but it does constitute a problem for an attempt of using such parochial area data in a historical-demographical context like this. If the size of the church nave generally differs in accordance with the size of the parish, none of the two parameters is by themselves much useful as

indicators of the relative population density of the region. The correlation of the data-sets speaks against the possibility, that each church or each parish from the beginning has served a (more or less) identical number of people. Thus, a small church in a small parish can in fact reflect exactly the same population density as a big church in a big parish. However, this analytical problem can be solved by holding both parameters up against each other in the analysis. If the inner area of the Romanesque parish church, as believed among most Scandinavian scholars, does indeed reflect the size of the contemporary parish population, it should theoretically be possible to obtain a relative expression for population density in the twelfth century by dividing the size of the Romanesque church nave with the total area of the high medieval parish.

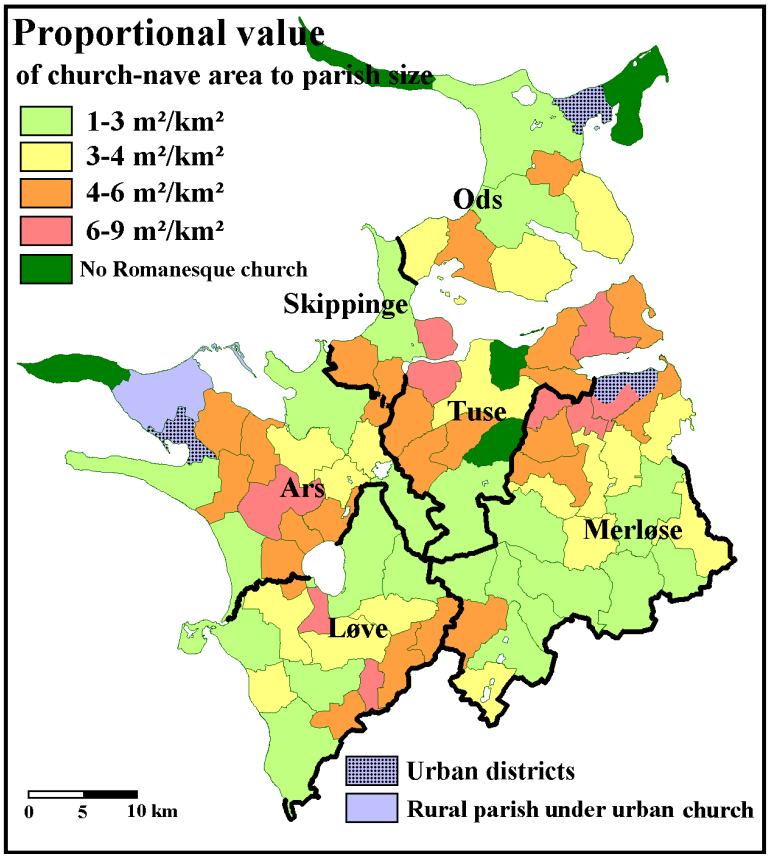
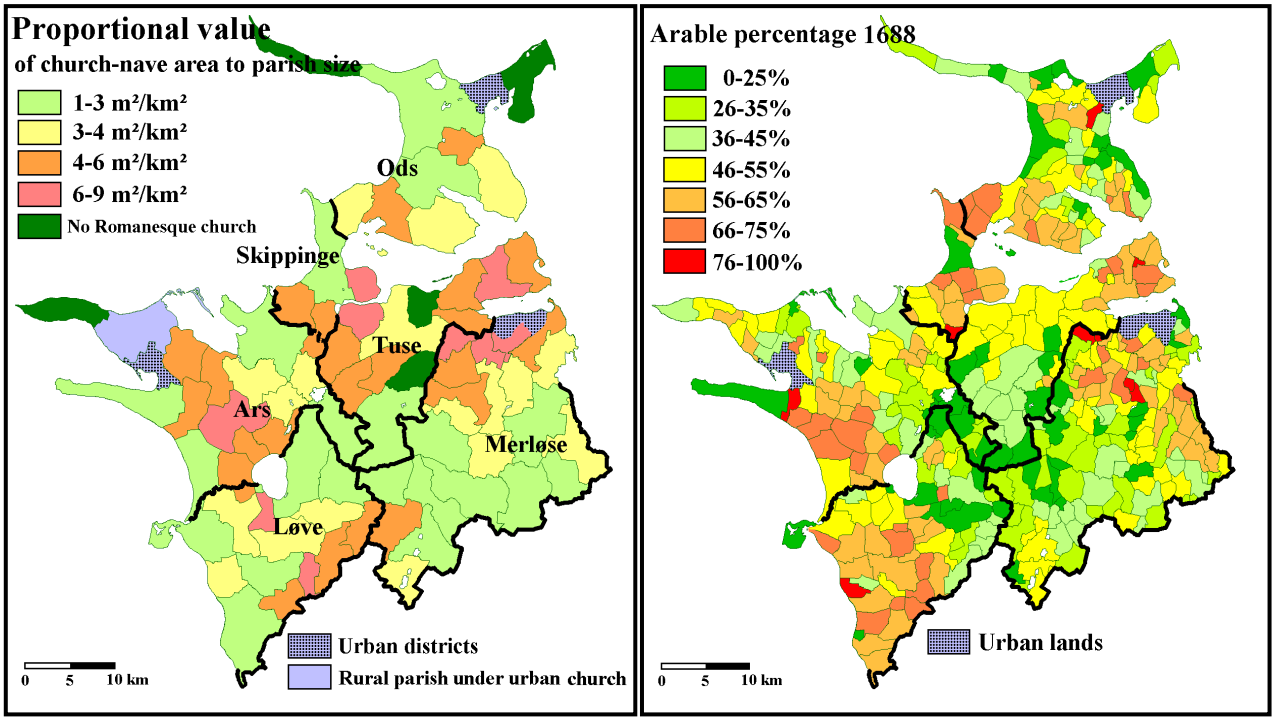


Figure 5.7. High medieval parishes in NW-Zealand classified from the proportion between the Romanesque church nave and the total area of the parish (m² per km²). The bold lines represent boundaries of the medieval hundreds. Parishes coloured in dark green did not have a stone church in the Romanesque period (1050-1250).

Such an attempt has been performed in figure 5.7, where an area-proportional value is calculated for each parish as the proportional between Romanesque nave size and parish size. The individual proportional values do not say much on their own, but by grouping them into classes and mapping their overall distribution for the entire region as in figure 5.7, a picture appears that might indeed give a rather plausible idea of the region's high medieval demography. Assuming that the concept of the method is valid, the most densely populated districts of twelfth-century NW-Zealand are to be found around the inner shores of Holbæk Fjord (north-western Merløse) and Lammefjord (north-western Tuse and southern Skippinge), whereas especially the southern and the central parts of the region, the west-coastal districts, and Ods hundred still at this time were rather sparsely habitated. Such a use and interpretation of the available data does not at all seem unreasonable when comparing the distribution map of figure 5.7 with other of the regional analyses performed in the survey, for instance the extent of cultivation (arable percentages) of 1688 (figure 3.1). The main difference between the theoretically calculated population density of the High Middle Ages and the first indisputable quantitative expression of cultivation is found along the Great-Belt coastline

(sparsely populated in the twelfth century, intensively cultivated in the seventeenth century), which is quite interesting, as both the place-name material and the dating of the stone churches too indicate a somewhat later (perhaps thirteenth-century) settlement in these coastal districts. As it happens, the same coastal districts are also the most predominant zones for late medieval enlargements of church naves. A comparison of the two maps could, on the other hand, also suggest an intervening demographical decline in south-eastern Løve and north-western Tuse.



Comparison of figure 5.7 indicating regional differences in population density in twelfth-century NW-Zealand (as expressed by the proportional value of church nave area to parish size), and figure 3.1 showing regional differences in extent of cultivation (arable percentages) as recorded in the Land Register of 1688.

Churches, villages and seigniorial seats

When the high medieval stone churches of Denmark were built, their sites were not chosen by random. On a very local scale, the churches in NW-Zealand were often - but certainly not always - raised at the most elevated and visible spot in the terrain. However, before such physical-geographical matters were considered, parameters of a more socio-economical type seem to have been the decisive factor in selecting the overall position of the church on a larger geographical scale. In NW-Zealand, the most important influencing factor on the geographical location of parish churches appears to be the contemporary settlement, as practically all rural parish churches of the region were built in - or very close to - villages.

38 per cent of the 77 medieval parish churches of NW-Zealand are situated in (or at) villages with Iron Age place-name types (*-inge*, *-lev*, *-løse* and *-sted*). Also names in *-bjerg* ('hill') and *-by* are well represented among the region's church villages. However, the most common name type for church villages in NW-Zealand (as for the rest of the island) is *-torp* with 16 cases in the region (21 per cent of all church villages). Since *-torp* also is the most common name type of the region in general, the predominance among church villages is perhaps not all that surprising, but while *torp*-settlements in general are distributed quite evenly all over the region, *torp*-churches are especially predominant in Merløse, as this hundred alone holds 7 of the 16 cases.

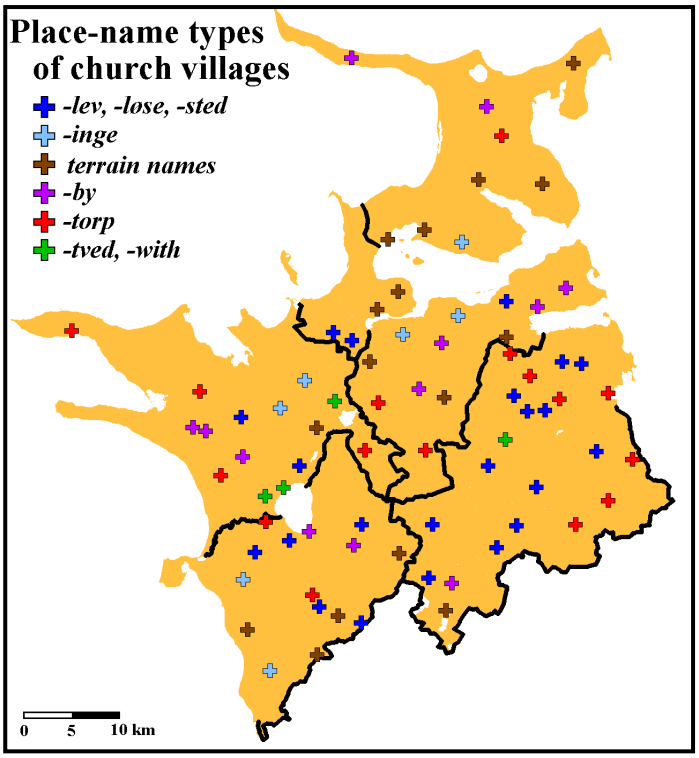


Figure 5.8. Geographical distribution of rural parish churches in medieval NW-Zealand with indication of the place-name type of the church village. The bold lines represent boundaries of the medieval hundreds.

There is a distinct variation in the proportion of church villages among the name-types (figure 5.9). In NW-Zealand, especially old villages with names in *-lev* and *-løse* have attracted a lot of church raising, as about 70 per cent of all the *lev*- and *løse*-settlements of the region also became church villages. In districts without these Iron Age name types, the churches tend to follow the first colonial settlements from either Viking Age (such as *-by* with a church proportion of 50 per cent) or early High Middle Ages (such as *-torp* and *-tved* with each *c*.10 per cent). The *torp*-churches of the region are, however, not only to be regarded as a colonial phenomenon, since several of the *torp*-settlements founded as outlying hamlets in between older parent villages in the early cultivated districts too became domicile for parish churches. Contrary to other Iron Age name types, villages in *-inge* appears rather neglected as to church building with a proportion of a mere 30 per cent, and quite often *inge*-villages were passed in favour of contemporary or younger settlements in the neighbourhood. This could indicate that by the time raising of parish churches was in its prime, the same could not be said for *inge*-settlements, which by the twelfth century as a whole seem to have experienced a less fortunate socioeconomical development than *lev*- and *løse*-settlements. It should be noted that the 'church proportions' of the place-name types in NW-Zealand are quite similar to the situation found on the rest of Zealand and the neighbouring island of Funen.

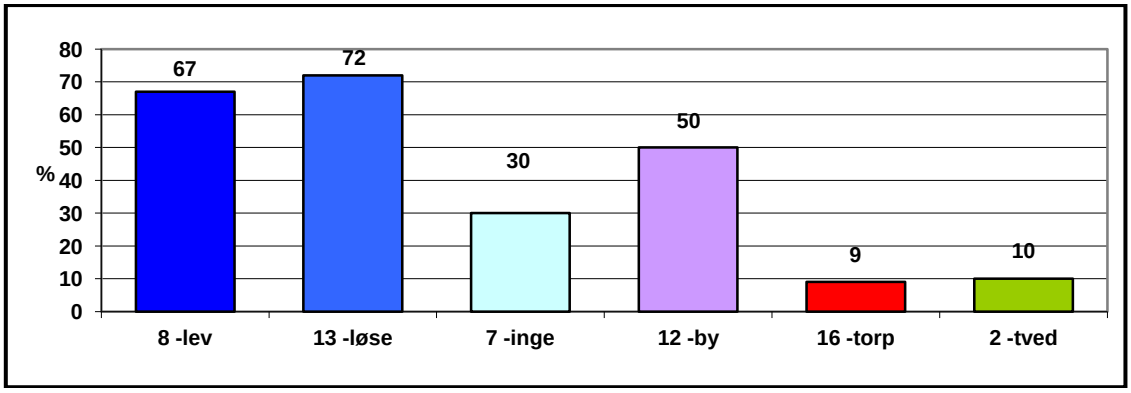


Figure 5.9. 'Church proportion' (i.e. proportion of church villages to all villages) for the primary place-name types in NW-Zealand. The number of churches for each name type is stated at the base of the columns, the church proportion (as a percentage) above the columns.

On the matter of distribution and location of medieval churches, several historians have suggested the domiciles of local magnates to be of great importance. This presumption is based on a widespread assumption among Danish historians of today, that the majority of medieval parish churches - at least on Zealand - were raised by the nobility. To test this thesis, I have compared the distribution of rural parish churches with the location of known high medieval magnates in NW-Zealand. For this analysis, seigniorial seats are defined as places referred to in the written sources from the twelfth to the fourteenth century (i.e. 1100-1399) as demesnes (*curiæ principalis*) or as homes of a major landlord or a knight; in a few cases, archaeological findings of small fortified castles of a high medieval character (but without any written references) have been included as well. Based on this, I have identified 99 high medieval seigniorial seats in NW-Zealand (figure 5.10). 30 of these were allocated in church villages, which means that only 39 per cent of the region's 77 parish churches were raised in the immediate proximity of a known seigniorial seat. The correlation between churches and magnates differ quite a bit among the hundreds, where 50 per cent of the magnates in Tuse lived in a church village, whereas the same only applied for 14 per cent of the magnates in Ods.

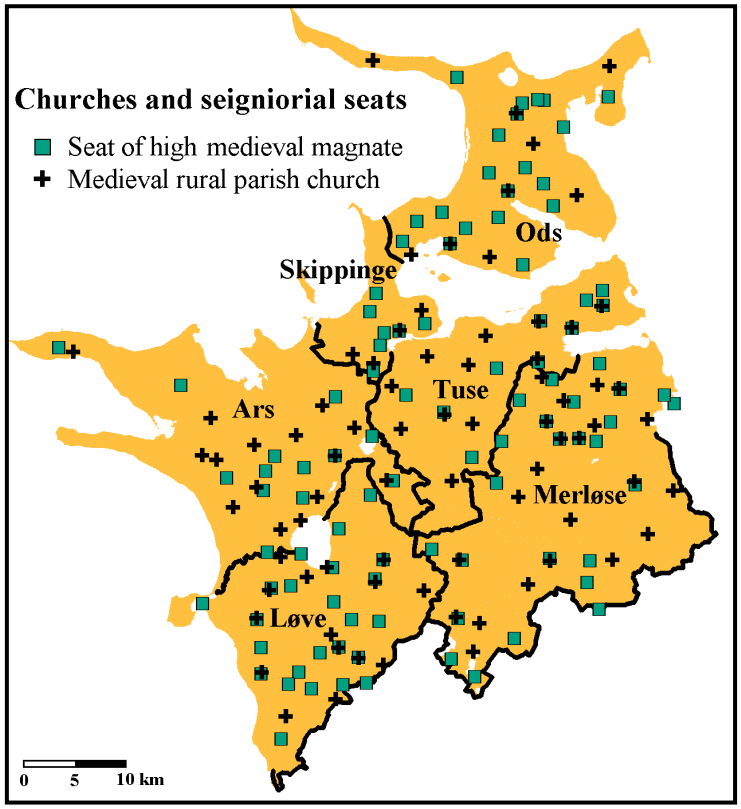


Figure 5.10. Geographical distribution of medieval parish churches and known seigniorial seats in the High Middle Ages in NW-Zealand. The bold lines represent boundaries of the medieval hundreds.

In regard to the classical debate in Danish history on the question of "who built the churches?", it is interesting that no distinct correlation between the distribution of parish churches and high medieval seigniorial seats can be found in NW-Zealand, where almost two thirds of the churches were raised in villages without any known magnate in the High Middle Ages. Of course, this does not necessarily mean that the churches were not built on the initiative and financial support of local magnates, but at least the analysis suggests that the idea of landlords only building parish churches on their private tofts probably could do with some sort of revision. However, as it will be shown in the following analyses, the seigniorial seats and their occupants of NW-Zealand still appear to have held an important influence in various ways upon the raising of churches and the establishing of parochial territories.

Internal-parochial settlement structure

Another aspect regarding medieval churches and parishes worthwhile looking at in a historical-geographical study like this, is the actual location of the church within the internal settlement structure of the parish. Usually, the parish held other settlements than the church village itself. In NW-Zealand, only four parishes did not have any known high medieval settlements besides the church village. On average, the rural parishes of the region held 4.7 medieval villages, with 71 per cent of the parishes within an interval of 3-7 villages per parish, where the high numbers especially are found in the northern and the easternmost parts of the region.

As earlier established, a significantly higher proportion of the villages with Iron Age name-types has become church villages than what is found for villages of younger name types. However, to judge from the place-name material of NW-Zealand in combination with the medieval parochial structure, it was not always the oldest village of the parish, which was selected parochial centre. In 12 of the 77 rural parishes of NW-Zealand, it is possible to identify villages with name types indicating a higher age than the related church village. In all cases, the parish-naming village is in *-by*, *-torp* or *-with* (from Viking Age or early High Middle Ages), while the in total 13 'passed-over' older villages have names in *-lev*, *-løse* and *-inge*. As 8 of these are *inge*-villages, this particular name type once again stands out in a negative way compared to Iron Age name types in general.

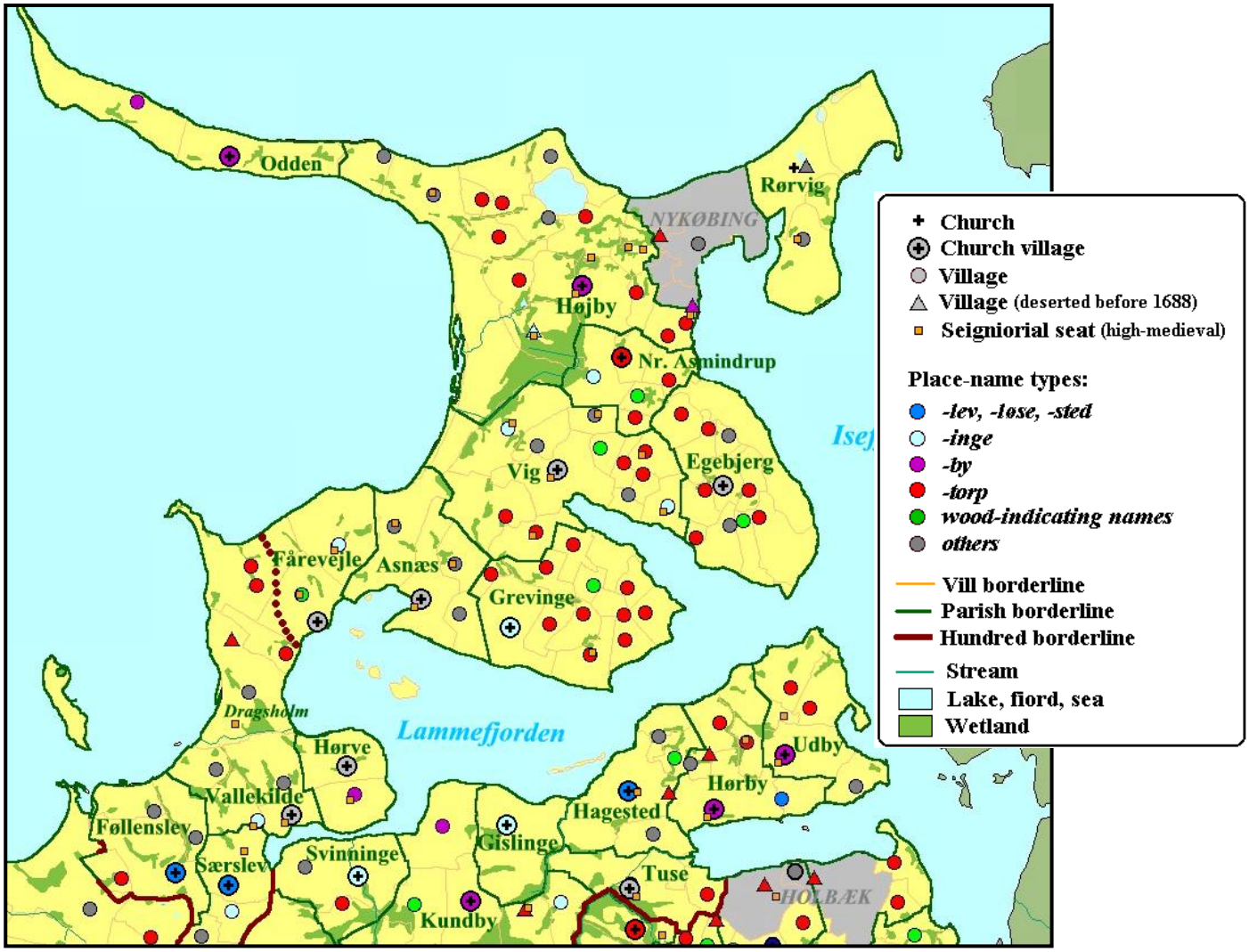


Figure 5.11. Medieval parish- and settlement map for the northern parts of NW-Zealand (Ods, Skippinge, and Tuse hundreds with Cape Tuse).

By comparing medieval church raising with the overall settlement structure within the parish, an interesting tool is achieved for historical-geographical analyses of high medieval demography on a local scale. This spatial method is based on the geographical location of the church within the parish area. In most parishes, the boundaries have been chosen in such a way that the church is situated quite centrally, but for some parishes, the churches appear to be situated unjustly biased compared to the distribution of the settlements, which they are supposed to serve. Examples of both cases can be seen in figure 5.11, where the churches of Egebjerg and Vig are quite centrally situated in their related parishes, whereas, for example, the parishes of Vallekilde and Grevinge have remarkably decentralized situated churches.

In total, 41 of the 77 rural parishes of the region can be said to have centrally-placed parish churches, both as to the spatial-geographical extent of the parish and to the belonging settlement within it. For several of the parishes in this group with only 2 or 3 villages, it can, however, be argued, that the church is not all that centrally situated, but in all these cases, a hypothetical moving of the church to any other of the settlements within the parish would not improve on this (for example Asnæs parish (figure 5.11)). In the remaining 36 parishes with 'decentrally-situated church villages', the decentral allocation only in a very few cases can be explained by the existence of a (known) high medieval magnate living in the church village. In some areas, it is possible to identify whole groups of such 'decentral church villages', and in most cases there is a certain degree of systematism in the orientation of the decentrality. An example of this from north-western Merløse is shown in figure 5.12, where it is quite distinctive, how the four churches (of the high-lighted parishes) are closely gathered, almost as farms in a nucleated village, with their belonging 'fields' (i.e. parishes) stretching out into later cultivated and inhabited areas. Note, however, that not all four (blue-coloured) *løse*-villages have become church villages.

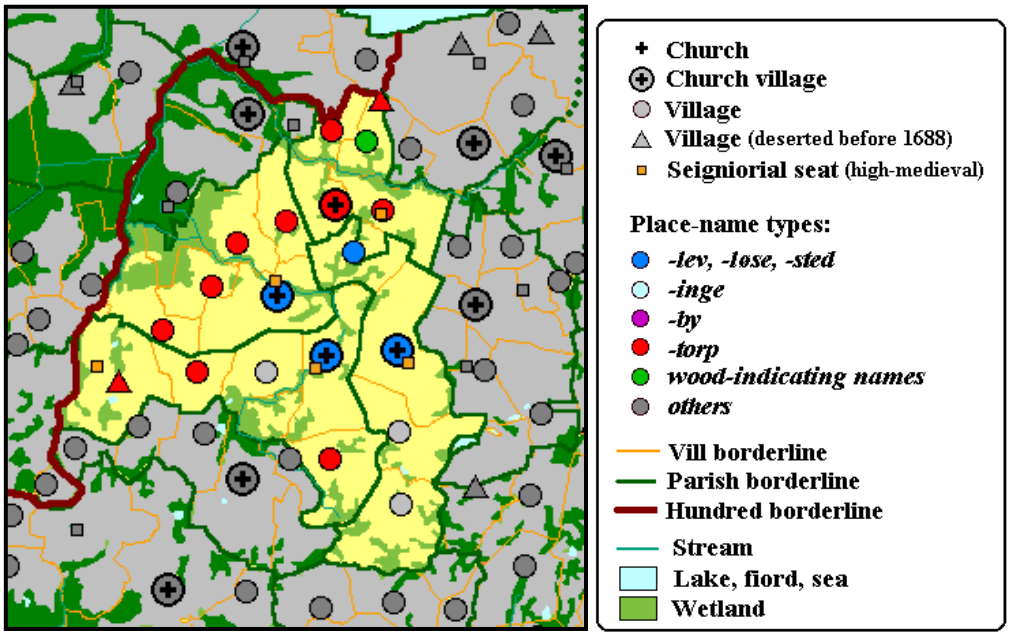


Figure 5.12. Medieval parish- and settlement map for the north-western part of Merløse hundred, with high-light on the four parishes mentioned in the text (: Nothern Jernløse, Southern Jernløse, Kvanløse and Søstrup).

The example shown in figure 5.12 is by far the most striking of its kind in the region, but less distinctive cases of 'church-clusters' are also to be found elsewhere in NW-Zealand, especially in Løve hundred south of Lake Tissø. In this hundred, it is also possible to identify two or three 'church-belts', with parish churches lying in an almost straight row in the western and southern parts of the hundred, most likely to indicate the course of contemporary arterial roads (figure 5.13).

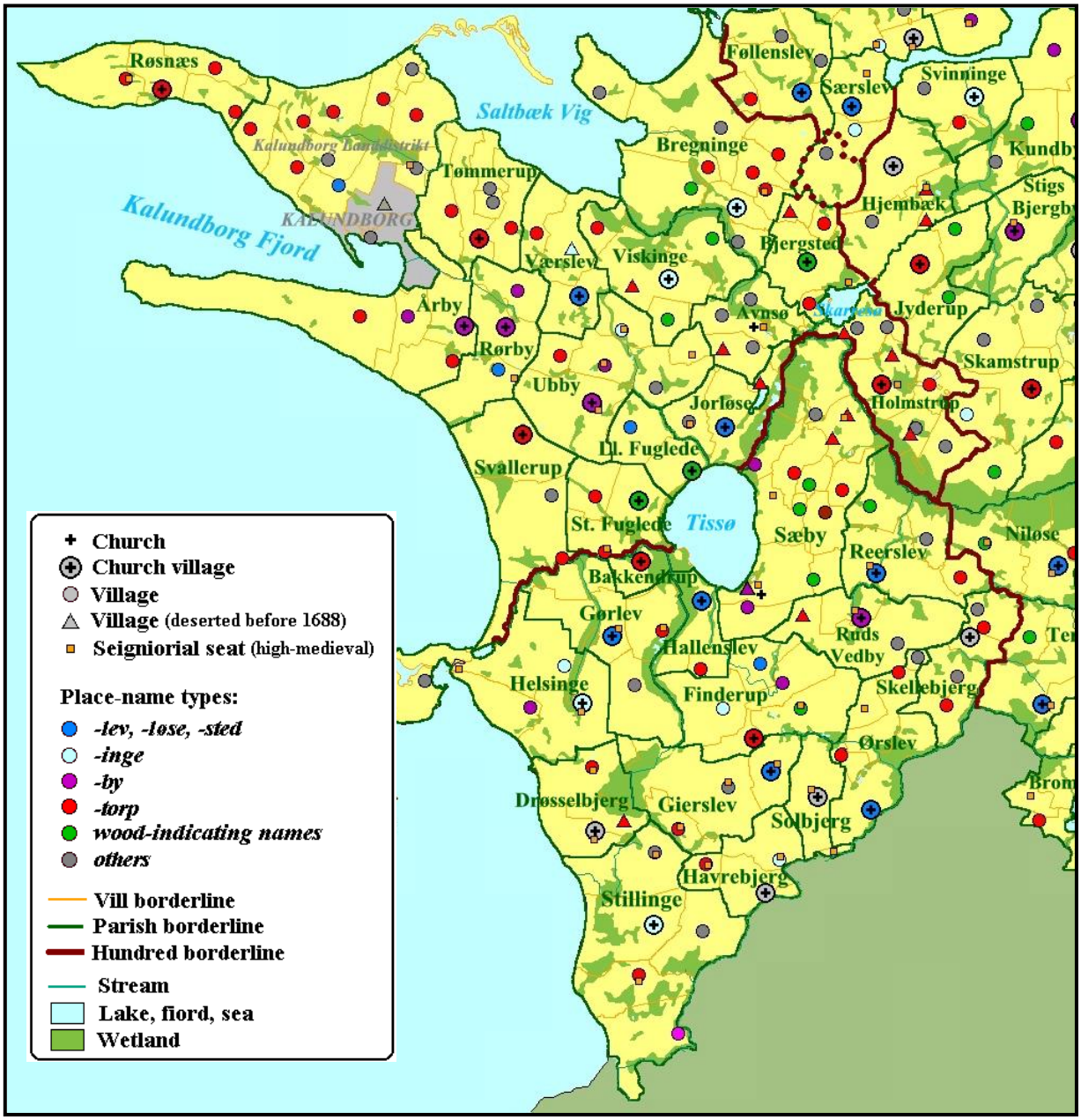


Figure 5.13. Medieval parish- and settlement map for the western parts of NW-Zealand (Ars and Løve hundreds).

Further studies of the decentrally-situated parish churches indicate that their geographically-biased location were not necessarily equivalently unfair when looking at the parochial demography at the time of the parish establishing. The remote (and hence the in fact truly decentral) areas of the parish with the longest distance to the church, very often bear several marks of late cultivation and habitation, indicating that they only held a very sparse - if indeed any - population at the time when the parochial borderlines fell into place (i.e. the thirteenth century at the latest). For instance, a very distinct and systematic decentrality of parish churches can be identified along the coastlines, where the churches usually appear to be placed as far inland as possible. Examples of this are the churches in Føllenslev and Vallekilde parishes in the upper left corner of the map in figure 5.14. Another illustrative example are the two outermost churches on Cape Tuse, Hørby and Udby (in the upper right corner of the same map), where the church villages almost seem to 'curl up' the boundaries in order to be situated further inland than their parish territory actually justifies. The observation of such a 'coast-derived decentrality' for many of the region's church villages agree with a traditional view among Danish historians and historical geographers that a belt of coastal woods (*c*.1-2 km broad) was left along the coastline of the Danish Isles as a protecting shield for the coastal

hinterland until the thirteenth century; a hypothesis, which, although never actually proven, also is supported by the place-name studies of the coastal settlement structure in NW-Zealand.

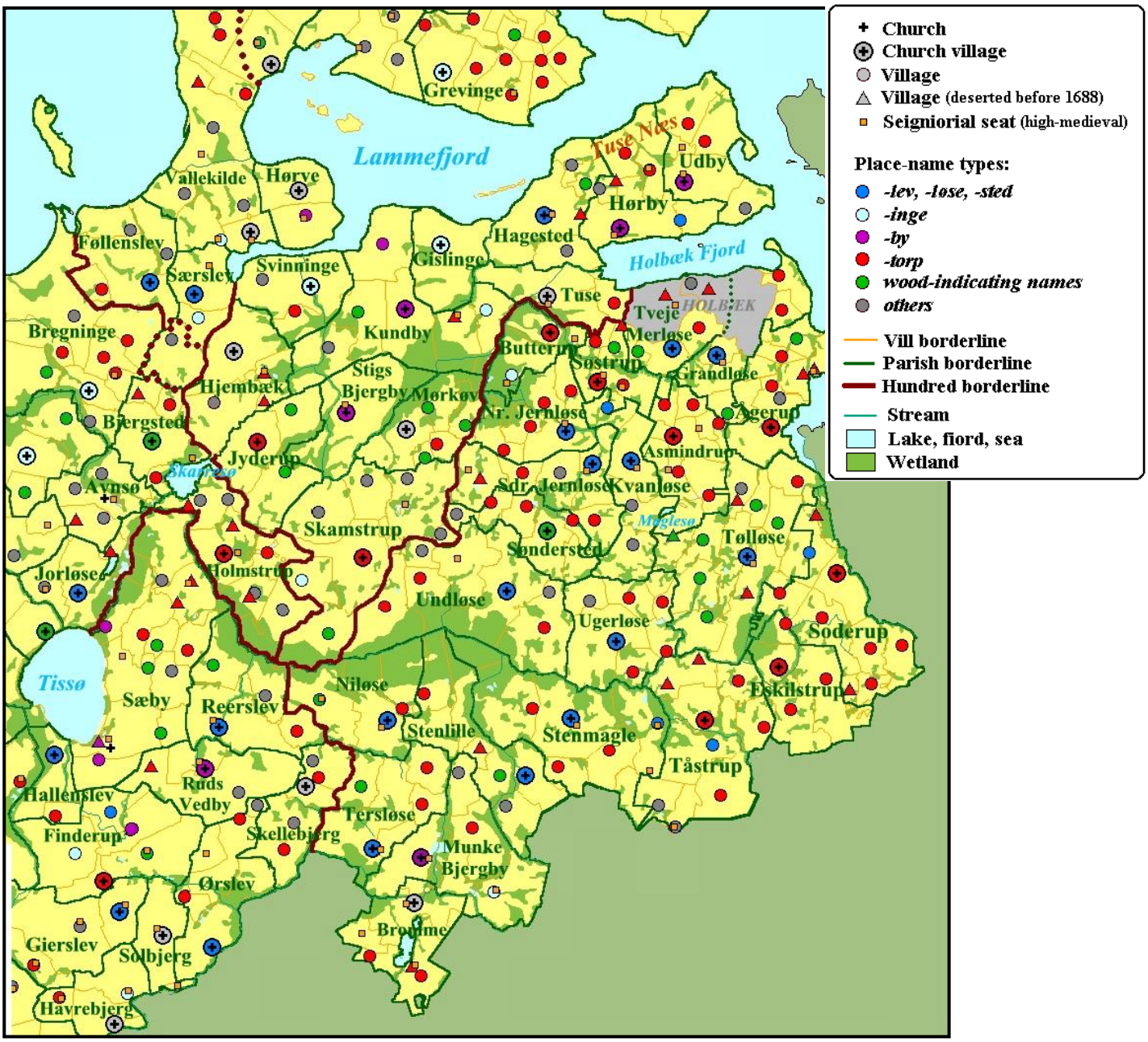


Figure 5.14. Medieval parish- and settlement map for the eastern parts of NW-Zealand (Skippinge, Tuse and Merløse hundreds).

Also for the central inland parishes of the region, the most probable cause for decentrally-situated church villages seems to be an equivalently biased settlement structure, as the remote areas of such parishes in most cases are characterized by still existing woods or wetlands, and/or settlements with young and even clearance- or wood-indicating place-name types. Examples of this are the northern Sæby parish (Løve h.), the eastern Mørkøv parish (Tuse h.), and the south-eastern Soderup parish (Merløse h.), shown in figure 5.14. In several cases, the remote parts of such parishes with decentral churches are adjacent to similar remote parts in neighbouring parishes, forming a counterpart to the above-mentioned 'church-clusters'. Indeed, I consider this tendency to be so outspoken that I would like to promote the method of 'parochial decentrality of churches' as a supplementary spatial-analytic tool for identifying areas of no or only very limited cultivation and habitation at the time of church building and parish establishing - which in NW-Zealand for a large part means the twelfth and the early thirteenth century.

A cognate type of spatial studies can be performed on settlements with 'inexpedient parochial allocation', that is to say settlements, which are situated closer to a church of a neighbouring parish than to its official parish church. First, it should be emphasized that 347 of the 395 known medieval villages in the included 77 rural parishes of NW-Zealand were in fact parochially allocated to the closest existing church. At the establishing of the early parochial system, it looks as if it was an important aim to consider the interests of all the scattered parishioners. Indeed, several at first strange-looking parish forms begin to make sense when one also takes into consideration the distances between the villages involved and the surrounding churches. However, for 48 villages (or 12 per cent of the material) this was not the case. A suggestion by Danish historian Erland Porsmose (1981), that such inexpediently-allocated villages in most cases must have come into existence after the finishing of the parish structure, is heavily supported by the findings of NW-Zealand, as 42 of the villages in question have name-types still in use in the thirteenth century and later. In a few cases, inexpedient parish allocations can be explained by features in the physical geography, such as major streams or moors situated between the village and the nearest church, but usually the most plausible explanation seems to be that the settlement is founded in an area, which was not habitated until after the time, when the parochial structure had taken its - more or less - final form (i.e. the beginning of the thirteenth century). If originally desert woodland in the remote outskirts of the parish at a later time was taken into use, this did not mean that the owners (or rather: the administers) of the parish church were inclined to regulate the boundaries; in fact, they had good financial reason not to, as more parishioners meant more tithe. For areas with clustering of such inexpediently allocated villages in several adjacent parishes, it should therefore be safe to argue that such areas were not colonized before the thirteenth century at the earliest.

The above-mentioned method should, however, only be used with some caution, as 6 of the 48 illogically parochial-allocated villages of NW-Zealand are having Iron Age name-types, and hence appear to be older than both the church raising and the parish establishing. Interestingly enough, four of the villages in question are known to have housed a high medieval magnate, and that just might be (part of) the reason for this rather peculiar phenomenon. It is also worth noticing that all four villages are allocated to some of the biggest churches in the region (Ubby, Ars h.; Kundby, Tuse h.; Hørby, Tuse h.; and Vig, Ods h.), which all have significant seigniorial characteristics in their architecture. It is therefore my thesis that we are dealing with churches raised in an early phase of the parochial development (probably early twelfth century), which several of the local magnates have found prestige in attaching themselves to; in fact, it is quite possible that the leading families have played an important part in financing the building of these churches. Eventually, as the forest clearance and cultivation increased in the course of the twelfth and the thirteenth century, the more remote and peripheral outskirts of the old parishes were habitated, and for the sake of the churchgoing of the settlers, new and smaller parishes were established in the colonized areas. But even though some of the magnate families now were living closer to the new churches, they still preferred to use the old grand church, which they had contributed to the building of and at which cemetery their ancestors were buried - while they were probably not too keen on the thought of turning to the new, small and poorly decorated churches of the settlers. This is of course all mere speculations, but it is suggestive that while all of the four parishes in question held one or more high medieval seigniorial seats, such signs of magnates usually are lacking in the smaller neighbouring parishes, which the old-named villages were situated closer to.

6. Medieval economy in NW-Zealand : 'Episcopal taxation'

While the earlier mentioned land registers of the seventeenth century are the first Danish economical sources of a nationwide covering, a few regional lists of medieval origin are preserved as well. These lists are, however, far from being straightforward documents, and the exact nature of their compilation has in most cases been the subject of intense controversy.

An illustrative example of this is the *Roll of the Bishop of Roskilde*, especially a certain list called *Parish List no. II* included in this episcopal compilation. The roll itself states that it is compiled in the 1370s, but the list in question is undoubtedly older; exactly how old is disputed, with various datings within the span of 1270-1320. As the name indicates, the Parish List is a register of all the parishes in the diocese of Zealand - or at least it was, as the first two folios with information of *c*.128 parishes unfortunately are lost. For the remaining 267 parishes, the list contains three columns, with the name of the parish in the middle, and two economical figures in the left and the right columns. The first column solely states a figure in the unit of either *ore* or *marca*, which are two well-known Danish economical units of the time used on both amounts of money, quantities of grain, and sizes of land; the proportion being 1 *marca* = 8 *ore*. Converted to ore, all values are given in whole and even numbers, going from 2 to 16 ore (i.e. ¼ to 2 mark), with only the value of 14 ore left out. The last column informs of either an acreage or a quantity of seed measured in ploughs.

Table 6.1. Example of the information in Parish List no. II on two parishes in Merløse hundred.

vi ore	Myætheløsæ (Tveje Merløse)	habet terras vnius aratri
i marca	Søstorp (Søstrup)	habet terras ad dimidium aratrum

As mentioned, the first folios of the list are not preserved, which also means that the overall headings of the columns are missing. This has caused an intense debate among Danish scholars on what the figures are in fact all about. Today, most will agree that the right column deals with arable land belonging to either the vicarage (*mensa*) or the parish church (*fabrica*). More controversy is connected to the mark/ore-figures, which will be used in this analysis, but most likely we are dealing with some sort of parochial taxation, roughly assessed on basis of the economical potential of the parish's productivity. My personal guess is that the figure represents a fixed commutation of the bishop's tithe, paid in either money or grain by leaseholders of the actual bishop's tithe; if so, Parish List no. II can be seen in close connection to the preceding *Parish List no. I*, which explicitly is a register of all the holders of the bishop's tithe (*decime episcopalis*) of each parish on Zealand; only for a minority of the parishes, the episcopal third of the tithe were directly going to the bishop's *tabula*, while the majority of the tithes were allocated to either canons of the chapter in Roskilde or to episcopal manors situated all over the island - or, more rarely, to local monasteries. However, my thesis is not without its problems, and several other valid theses are possible, and since we do not know for certain exactly what the mark/ore-figures are representing, I will use the neutral appellation '*episcopal taxation*'.

All the rural parishes of NW-Zealand are included in the preserved folios of *Parish List no. II* - that is to say, all the parishes existing at the time, as the old parish of Læsøholm (Ars h.) in the sparsely habitated centre of the region at some time between the episcopal taxation (*c*.1300) and the compilation of the entire roll (1370s) was divided into the parishes of Holmstrup and Avnsø; in the Parish List, these two parishes are therefore assessed as one. The episcopal taxation of the 76 rural parishes in NW-Zealand differs, just as for the rest of the island, from 2 ore to the maximum 16 ore, with a regional average of 11.2 ore. As shown in figure 6.1, the lowest assessed parishes are generally concentrated to the central and the southern parts of the region.

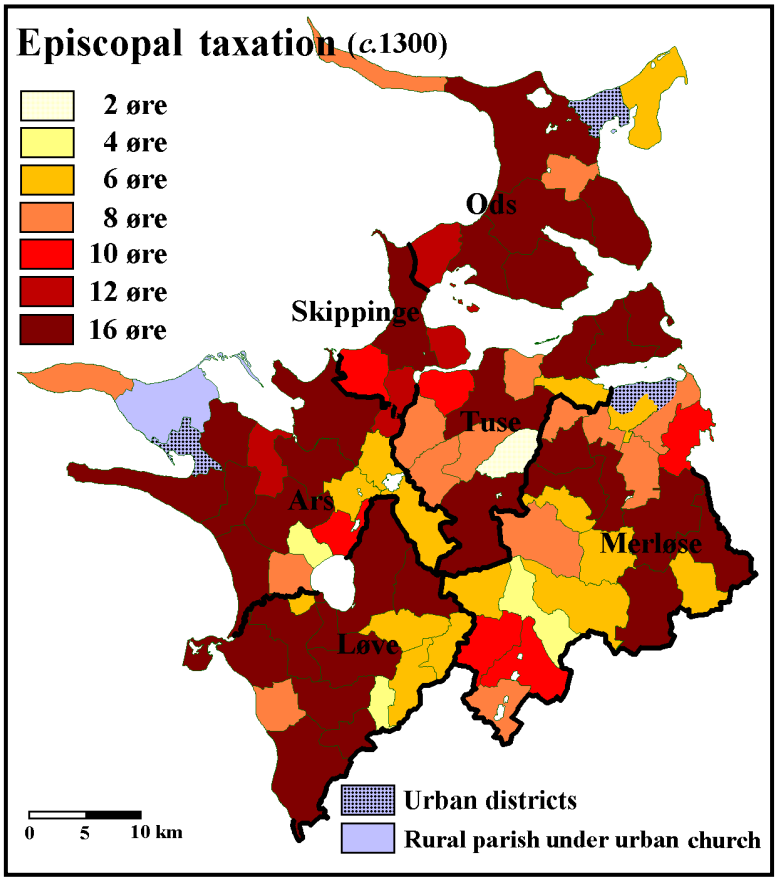


Figure 6.1. High medieval parishes in NW-Zealand classified from the 'episcopal taxation' in Parish List no. II (c.1300). The bold lines represent boundaries of the medieval hundreds.

The episcopal taxation of the parishes in NW-Zealand did not, apparently, vary in relation to whether the parish churches were built in High Romanesque or Late Romanesque style. However, there is a distinct difference when looking at parishes with Early Gothic churches, as these parishes were taxed significantly lower than the 'Romanesque-church parishes' (figure 6.2). This is quite interesting, as the period of Early Gothic church building (1250-1350) coincide with the period in which the Parish List is thought to be compiled, and so for the Early Gothic churches, at least, the time of the construction of the church does appear to reflect the parochial economy.

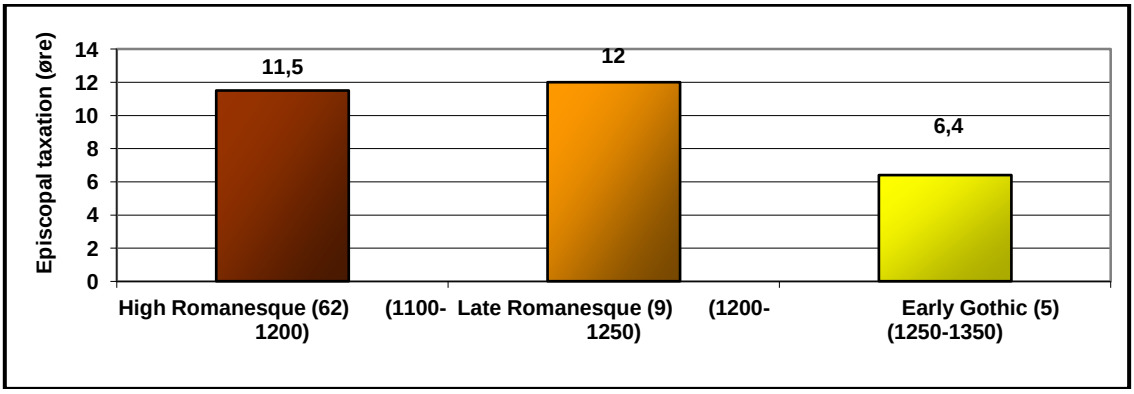


Figure 6.2. Average episcopal taxation for the parishes of NW-Zealand divided into three groups by the dating of the parish church. The number of parishes for each group is stated at the base of the columns, the average taxation (in ore) above the columns.

The differing in parish taxations cannot be explained by corresponding differences in parish sizes only. Certainly, size did matter, as most of the parishes larger than 20 km² also were assessed to the top rate of 16 ore, while parishes of smaller areas generally were taxed lower. Still, if it was only a

matter of physical size, the medium-sized parishes in the western parts of the region appear to be taxed rather high, which is also the case for several of the small and medium-sized parishes in the eastern districts. Conversely, the central and southern parts of the region hold several parishes of strikingly large size compared to their taxations. Once again, a way to test the correlation between episcopal taxation and parish size is to calculate and map the intra-proportional values of the two parochial data sets (episcopal taxation per km²), which should provide us with a rough idea of the regional distribution of relative taxation - and hence the contemporary assessment of the parish's economical potential - by the end of the High Middle Ages.

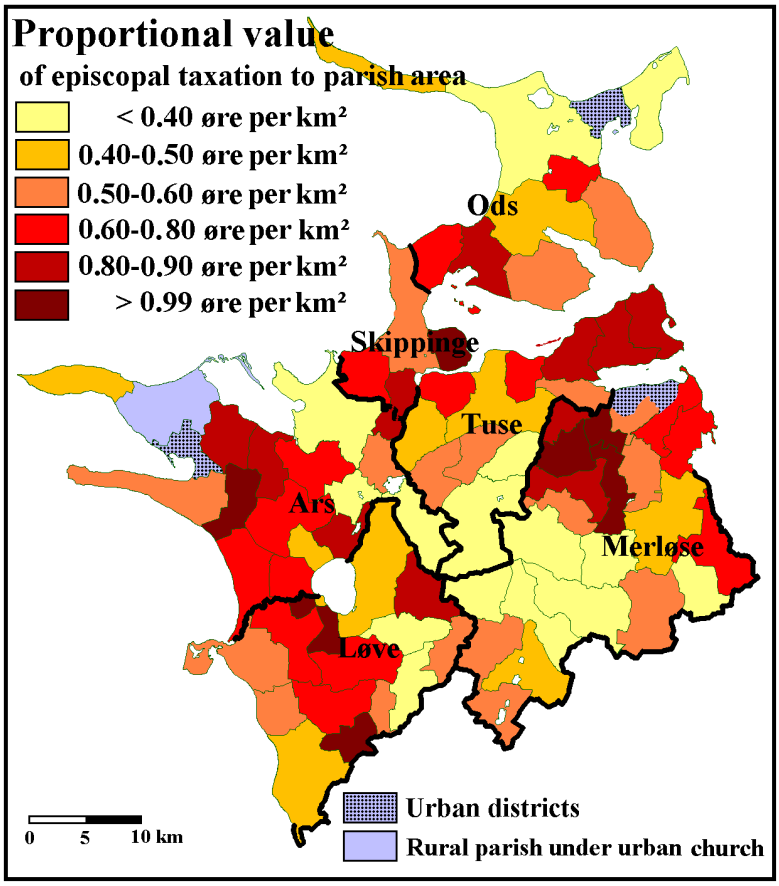


Figure 6.3. High medieval parishes in NW-Zealand classified from the proportion between the 'episcopal taxation' of c.1300 and the total area of the parish (ore per km²). The bold lines represent boundaries of the medieval hundreds.

As seen in figure 6.3, the mapping of the proportional values between taxation and parish size in NW-Zealand results in a rather systematic pattern. Proportionally high taxations emerge in the north-western Merløse, on Cape Tuse (north-eastern Tuse), in Skippinge, and in the central part of northern Ars. Due to their minute sizes, also the small parishes to the south-west of Tissø spring to eye with high values in this analysis. On the other hand, parishes with proportionally low taxations are concentrated in the Åmose district of southern Merløse and southern Tuse, the eastern parts of Løve and Ars, and in most of Ods. Within 'the better middle class', we find a belt of parishes in the western part of the region. A first conclusion from the analysis of area-proportional taxations in NW-Zealand must therefore be that something more than just parish size has influenced the assessment of the parishes' capability of paying an ecclesiastical due.

In figure 6.4, I have calculated the average level of the area-proportional episcopal taxations within each of the 12 selected land-type areas of the region. If indeed the area-proportional taxation can be seen as an expression of relative land-value around 1300, then the absolute best-valued lands of the region are found in the neighbourhood of Holbæk Town, here represented by the areas NW-Merløse and Cape Tuse with average taxation values of 0.89 and 0.90 ore per km². For the parishes in all the

remaining land-type areas of plain loam, average values are distributed within the span of 0.55-0.72 ore per km². Looking solely at the group of land-type areas with loamy soils in plain terrain, the analysis could at first indicate that the light moraine soils of Cape Tuse were taxed significantly higher per area unit than the heavier moraine soils of the region. However, since the medium-clayey soils of NW-Merløse as the only ones can match the superiority of Cape Tuse's light moraine soils, the explanation for the distinctly higher taxations for these two particular areas is probably to be found in the close proximity to the town of Holbæk. One step below the areas of plain, loamy soils, we find the group of hilly loam-lands with average levels in the interval 0.42 to 0.53 ore per km²; this time, the lowest values are found for the parishes on the light moraine soils of eastern Løve. Not trailing far after, the parishes of the sandy soils around Lake Skarresø follows with an average of 0.39, while once again the *peloton* is rounded off by the wetland parishes of Åmosen with a mere 0.23 ore per km².

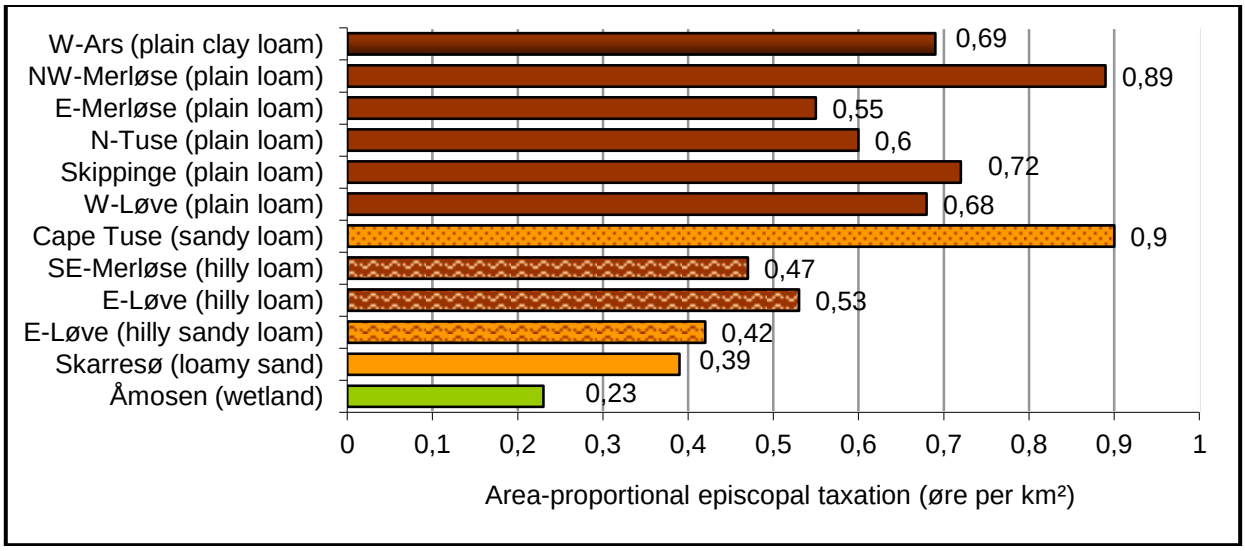


Figure 6.4. Average area-proportional episcopal taxations (episcopal taxation to total area of parish) in twelve land-type areas of NW-Zealand c.1300.

Of course, average values can conceal rather significant fluctuations within the material, and for several of the land-type areas in the analysis, there are indeed quite differing internal values, but the identified tendencies are still very strong, when looking at how the proportional taxations of all the parishes within the region are grouping in clusters, which I have tried to visualize in figure 6.5. Parishes situated on moraine soils in plain terrain near the towns of Holbæk or Kalundborg, or the episcopal castle of Dragsholm, present area-proportional taxation values within the interval 0.90-1.10 ore per km² (or in a few cases even more). When moving away from the urban centres (and Dragsholm Castle), the area-proportional taxation of lands of otherwise similar natural conditions (plain moraine) and similar cultural characteristics (early clearance and cultivation) fall to a level of 0.60-0.80 ore per km²; such districts can be located in western Løve, central Ars, and northern Tuse. The next level on this potential 'land-value scale *anno* 1300' is made up of moraine-soil parishes characterized by high medieval woodland and clearance, which in NW-Zealand means eastern Merløse, eastern Ods, western and southern Ars, the coastal areas along the Great Belt, and the parishes to the south of Åmosen (southernmost Merløse and easternmost Løve). Here the proportional values differ from 0.40 to 0.60 ore per km². In this analysis, the internal differences of 'clayeyness' among the moraine-soil types do not seem to matter much on the percepted land value. On the sandy soils (Lake Skarresø area) and the hilly moraine soils (south-eastern Merløse and eastern Løve), which still by the end of the Middle Ages were quite dominated by woodland, the level of area-proportional taxation values is slightly lower than for the above-mentioned group, namely 0.35 to 0.55 ore per km². Finally, the wetland parishes around Åmosen constitute the bottom level of the potential land-value scale with values between 0.17 and 0.32 ore per km².

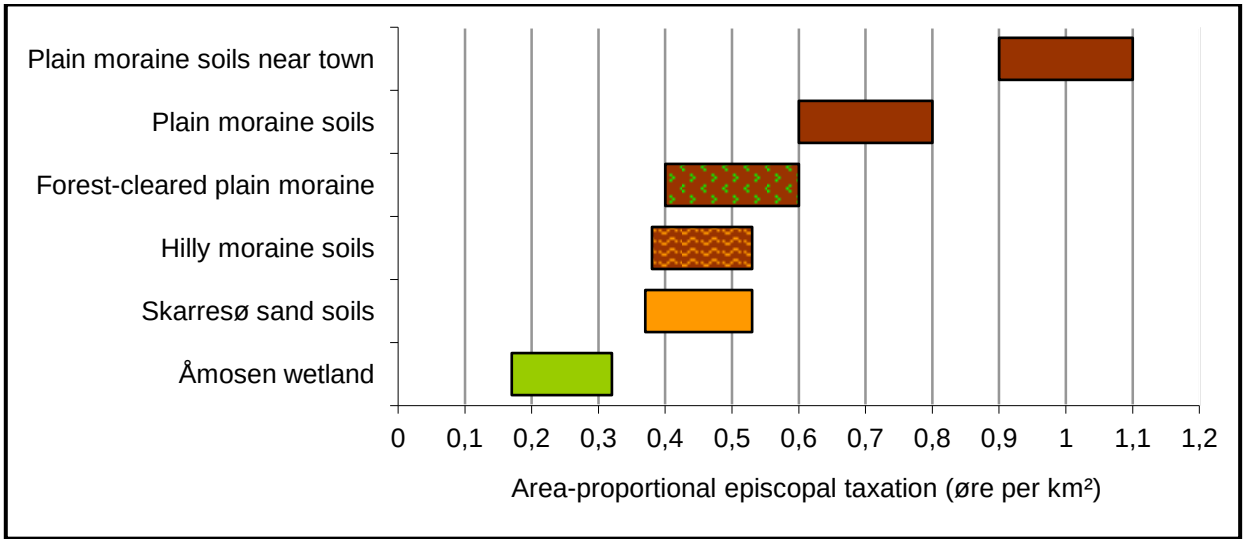
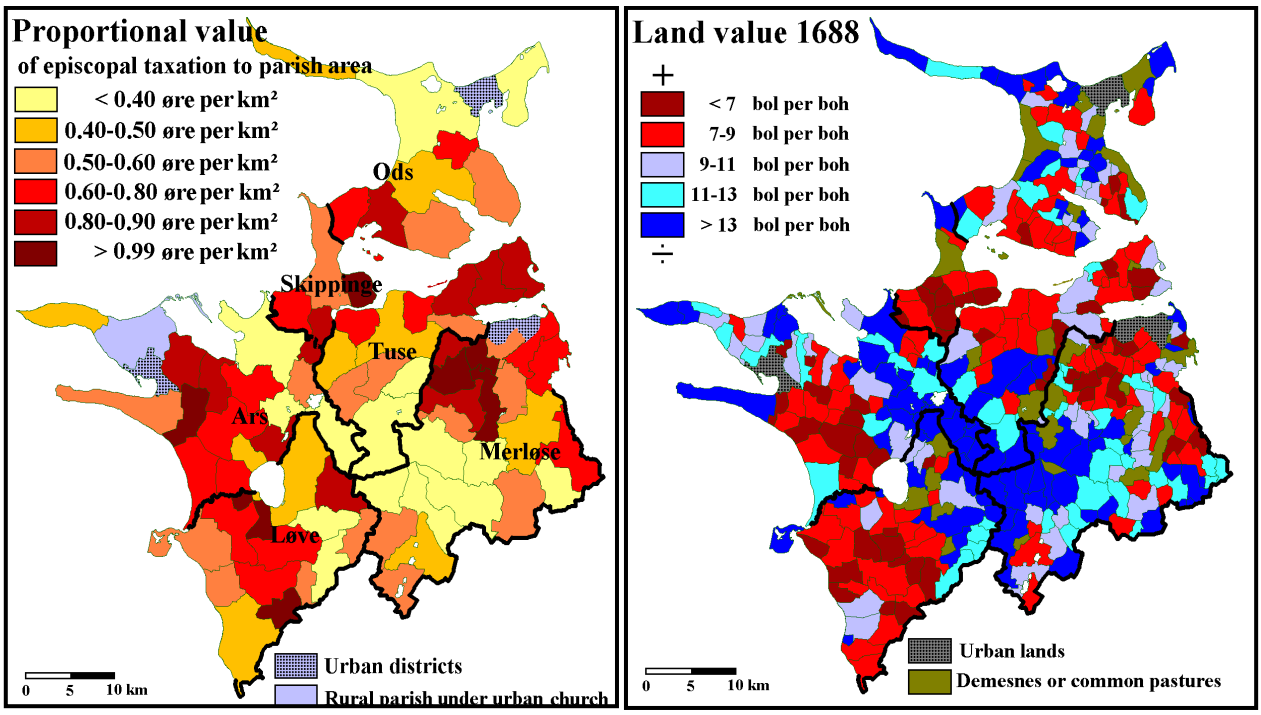


Figure 6.5. Generally applying intervals of area-proportional episcopal taxations in the parishes of NW-Zealand divided into groups based on their natural- and cultural-geographical conditions.

A number of critical arguments can rightly be put forward against the analytical method used above, especially as to the uncertainty of the included parameters (e.g. the actual parish size, and the principle and whole nature of the 'episcopal taxation'), but to the advantage of the method it must be admitted that the proportional values show a remarkably clear and systematic tendency, not least when compared to variations in the physical geography of the parishes, and distances to economical centres such as town markets and castles.

Economical development c.1300 to 1688



Comparison of figure 6.3 and figure 3.3 showing regional differences in area-proportional taxation (and hence the potential land value) in NW-Zealand c.1300 and 1688 respectively, as expressed by the 'episcopal taxation' in Parish List no. II (ore per km²) and the Land Register of 1688 (barrels of land per barrels of hartkorn); for the latter, it should be reminded that low land-value rates indicate a high taxation.

If the performed analyses of the episcopal taxation of *c.*1300 and the hartkorn taxation in the Land Register of 1688 can be regarded as representative cross-sections in the agro-economical situation

of NW-Zealand, a comparison of the two taxations could provide us with an idea of the intermediate development. Even though we cannot come up with any absolute definition of the proportion between the two taxations (How many barrels of hartkorn in 1688 corresponded with 16 ore of episcopal taxation in 1300?), we can by comparing the parish proportions all over the region identify areas of different development. Above, this is done rather crude by a simple visual comparison of the earlier mapped area-proportional values of each taxation (figures 6.3 and 3.3).

The perhaps most striking finding from this comparison is the similarity of the distribution patterns - which can be taken as another plus for the validity of the method and principles behind the medieval cross-section analysis. To a very large extent, it is the same districts within the region that show either high or low taxation values in *c*.1300 and 1688.

A more accurate way of comparing the two cross-sections, and hereby track any potential and systematic variation, is to calculate the proportion of the two sets of taxation values themselves. This is done in figure 6.6, where the hartkorn taxations of 1688 have been summed up to parish level, and then divided with the figures of the medieval episcopal taxation. Admittedly, this is a bit like dividing potatoes with tomatoes, and of course, the actual proportion value itself is not very informative; the analytical merit first appears when used on a regional-comparative level. According to the principle of the method, parishes with relatively high proportional taxation values (barrels of hartkorn in 1688 per ore of episcopal taxation in *c*.1300) have experienced more economical growth in the intermediate period (i.e. 1300 to 1688) than parishes with relatively low proportion values. It should be emphasized, that the proportion values do not say anything about the absolute size of the growth or even if it was positive or negative.

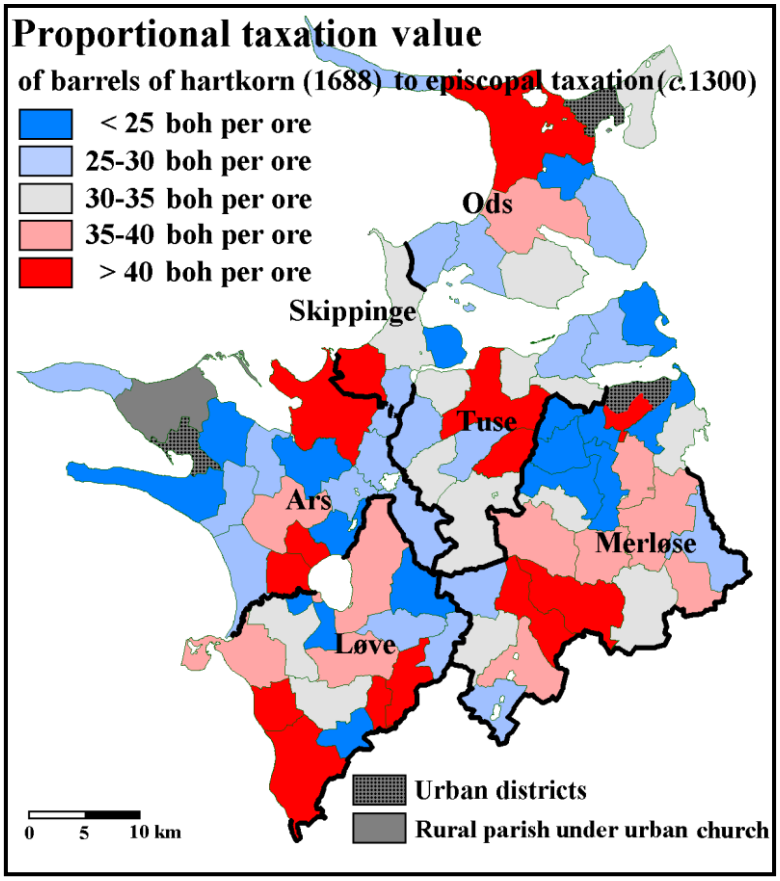


Figure 6.6. High medieval parishes in NW-Zealand classified from the proportion between the hartkorn taxation of 1688 and the 'episcopal taxation' of c.1300. The bold lines represent boundaries of the medieval hundreds.

The average proportion value of the two taxations for the parishes in NW-Zealand is 31.4 barrels of hartkorn (boh) per ore. This average represents quite a spread, as a few of the parishes for various reasons end up with rather extreme proportion values, but for about 75 per cent of the parishes, the proportional taxation values are found within the interval of 20 to 40 boh per ore. Compared to the other analyses in the NW-Zealand project, the proportion values of the two taxations mapped in figure 6.6 show the hitherto least notable signs of any systematic intra-regional variation. Parishes with high potential growth rates are scattered all over the region in pairs or small groups. The only major area of adjoining high-valued parishes is found in the central and especially the south-western part of Merløse, while areas of small proportional values - and hence signs of low, none or even negative growth in the period *c*.1300 to 1688 - are located in north-western Merløse, on Cape Tuse, and in large parts of Ars, especially in the vicinity of Kalundborg.

As I will try to show in the following, the results from this last analysis do actually make sense, when they are carefully interpreted in coherence with all the preceding analysis, whereas an attempt to evaluate the economical development *c*.1300-1688 on this analysis alone would almost certainly lead to highly erroneous conclusions. Some of the most systematic findings of the region occur in the hundred of Merløse. If the analysis in figure 6.6 does indeed say anything about the potential economical growth from *c*.1300 to 1688, the parishes of the north-western part of the hundred do not appear to have reclaimed any more arable land after 1300. Thus, the extensive founding of thorpes around the old settlement core of Iron Age-villages (figure 4.6) seems to have taken place before the beginning of the Late Middle Ages. This corresponds well with other findings in the survey that the demographical density and the proportionally high taxation found in both the fourteenth and the seventeenth centuries (figures 6.3 and 3.3) were already established in the twelfth century (figure 5.7). In spite of the indication of low growth between *c*.1300 and 1688, it would be very wrong to see the north-western Merløse as an area of late medieval crisis and decline. On the contrary, the district was throughout the entire analysed period (*c*.1000-1688) among the most densely populated, most intensively cultivated and highest taxed areas of the region, but this position was apparently already reached at an early stage in the Middle Ages. Based on figure 6.6, it is probably more just to speak of an economical progress during the Late Middle Ages and/or Early Modern Times for the central parts of Merløse, and especially for the parishes in the Åmosen wetland district. As these areas were still rather modestly cultivated in 1688 (figures 3.1 and 3.2), the intermediate growth in taxation should most likely find its reason in a contemporary increase in the market for pastural products. Especially the meadows of Åmosen, which in 1662 was the centre of an extensive butter production (figures 3.12 and 3.14), appear to have experienced a significant increase in land value compared to the high medieval situation, even though they still in 1688 were among the lowest taxed lands in the region (figure 3.3)

Finally, I will give a few examples that the blue areas of the map in figure 6.6 do not necessarily reflect identical developments. Unlike north-western Merløse, neither Cape Tuse nor the solitary blue enclave in the easternmost part of Merløse (Soderup parish) give any impression of being old settlement centres. On the contrary, both the place-name material and the church-/parish-conditions strongly indicate that Cape Tuse was not colonized until the Viking Age, and Soderup parish even later (figures 4.1-4.3, 5.11 and 5.14), but in both places the development appears to have taken speed in the period 1000-1200, while the colonization to a large part was concluded by the end of the High Middle Ages. A completely different picture emerges in the 'blue area' around Lake Skarresø in the easternmost Ars hundred. In this hitherto quite deserted woodland area with sandy soils and in some places rather hilly terrain, there was in fact founded a number of colonial clearance thorpes in the High Middle Ages, but many of them were deserted again in the Late Middle Ages (figure 5.13), and today it is still the most forest-dominated part of the region. On the sandy plains north and north-west of Lake Skarresø, however, the high-red colours in figure 6.6 indicate the possibility of a significant late medieval growth, which - if indeed true - probably should find its cause in a contemporary growth in the economical importance of rye production (figure 3.6), as the area does not appear much oriented on pastural production by the end of the period (figure 3.12).

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