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Makeable Land

Backgrounds and Progress of Land Consolidation, Making of New Land and Land Reclamation in the Dutch Post-War Reconstruction Period (1940-1965)

A.F.J. Niemeijer

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Partly revised and updated English edition

Colophon
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Backgrounds of Rural Development: Land Consolidation, New Land and Land Reclamation in the Dutch Post-War Reconstruction Period (1940-1965)
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This book is an English edition of a 2016 publication – then part of a series of publications on the Dutch Post-War Reconstruction Period. Although the main frame of this new edition is similar to the 2016 Dutch version many details and all appendices have been left out. But it was also partly updated and revised and its chapters have been newly arranged too. Besides several other or new pictures were added. The contents of this new edition therefore can be considered fairly different from the 2016 version.

The author likes to express his acknowledgement to Anita Blom, Gerre van der Kleij, Jarno Pors and all at the Cultural Heritage Agency. A special mention deserve Peter Nijhof – because of involving me in this matter – and, last but not least, my dear wife Marta Dozy who not only endured the making of the first edition but the compilation of this second one too.

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Contents

Section 1

Introduction

1 Background, questions and methodology

1.1 Introduction

This book is mainly about a relatively recent period in Dutch history and spatial developments and it focuses in particular on the countryside. From ca. 1940 Dutch rural regions underwent rapid and severe interventions as an (inevitable) result of intentional modernization but as a consequence of two destabilizing incidents too.

1.1.1 Land development and the reconstruction period

To some, the years after the Second World War are perhaps synonymous with the sedate 'good old days'. However, the Dutch reconstruction period was also a highly dynamic era. These years were marked by the American economic Marshall Plan[1], by the 1953 North Sea flood (*Watersnoodramp*) and by the end of the Dutch colonial empire. It was also the period of the introduction of television, of industrial and agricultural upscaling, of the realization of urban extensions, of the construction of hundreds of kilometres of motorway, and above all of a growing confidence. In short: during the reconstruction period, Dutch society was gathering steam.[2]

One specific aspect of this period was a growing control of administrative bodies and organizations over rural areas: legislation and regulation, interest groups,[3] standardization and market forces began to shape rural developments. This partly explains why many aspects of the modern Dutch countryside originated in the reconstruction period. For this, if for no other reason, it deserves our attention. The present publication zooms in on rural land development[4] during that time, in particular in relation to agriculture.

1.1.2 Periodization and key concepts

The Dutch reconstruction period covers the years 1940-1965. Its beginning is defined by the announcement on May 21, 1940 – one week after the Netherlands capitulated to the German invading force – of the *Eerste Wederopbouwbesluit* or First Reconstruction Decree by the

1 Wieringermeer Polder and characteristic farm after its reconstruction, probably ca. 1950. The dual carriage road leads to the Afsluitdijk.

1 Between 1948 and 1953 the Netherlands received 3,5 billion guilders in financial support and borrowed another 600 million. (respectively ca. 13 billion and 2,2 billion euros in today's currency; http://www.iisg.nl/hpw/calculate2-nl.php).

2 Compare Schuyt & Taverne 2000, 22 ff.; http://www.seniorplaza.nl/Jar4550_Inleiding.htm; http://www.seniorplaza.nl/Jaren50_Inleiding.htm; http://www.seniorplaza.nl/6070_1.htm; http://www.historischnieuwsblad.nl/nl/artikel/6615/gezien.html.

3 *Standsorganisaties* (interest groups) are consultative bodies promoting the interests of various industries and professions.

4 In this section, the concept of land development (Du. *landinrichting*) is used in a wider sense than that referred to in the Dutch *Landinrichtingswet* and *Wet inrichting landelijk gebied (WILG)* by the term *landinrichting*. We use 'land development' primarily to refer to land consolidation, primary or secondary land reclamation, and land acquisition by the drainage of surface waters. In the 1980s, the Dutch term *landinrichting* was formalized. The 1985 *Landinrichtingswet* ('Land Development Act') – no longer in force today – uses a more narrow definition: '*Landinrichting strekt tot verbetering van de inrichting van het landelijk gebied overeenkomstig de functies van dat gebied, zoals deze in het kader van de ruimtelijke ordening zijn aangegeven.*' ('Land development purports to improve the organization of rural areas in accordance with their functions as assigned in the context of spatial planning').

2 Survey map of Dutch topography: provinces, main cities and towns, rivers

plenipotentiary for the Dutch government, General H.G. Winkelman. The end of the period coincided with the moment in 1965 when the 1950 *Wederopbouwwet* (Reconstruction Act) was rescinded and the 1965 *Wet op de Ruimtelijke Ordening* (Spatial Planning Act) came into force.[5]

The present publication mostly centres on three forms of land development: the formation of new land (by draining water bodies), land consolidation (or re-allotment), and (primary or secondary) reclamation (of wastelands etc.). Together, these three main ways of expanding the total surface of cultural landscapes (in the sense of anthropogenic landscapes intentionally designed and created) have greatly contributed to the modern appearance of the Netherlands. (fig. 1)

The Netherlands is situated in north-western Europe, bordering the North Sea in the west and the north and bounded on the east by Germany and to the south by Belgium. The Netherlands (incorrectly often called Holland, which is only the western part) counts 12 provinces; it is a small country that occupies only about 33,750 km2 or 33,750,000ha (land surface) but nevertheless it counts over 17mln inhabitants. It is the densest populated country in Europe.[6] (fig. 2)

1.1.2.1 Polders and 'droogmakerijen'

Outside the Netherlands, the creation of new land is probably the best known form of Dutch land development, no doubt in part fed by the well-known saying (at least as early as the mid-17th century) that God created the earth but the Dutch made their own country.[7] After all, the tradition of creating new land on former sea or lake bottoms dates back to the late medieval period.

5 Tunnissen & Van Zundert 2009, 37; Ramakers 1994, 11 (http://repository.ubn.ru.nl/handle/2066/93656). A section of the Land Consolidation Act had already been suspended on July 1, 1962.

6 See e.g. https://en.wikipedia.org/wiki/Netherlands

7 Niemeijer 2016, 6-13.

3 The island of Texel (Noord-Holland Province) with the 1876 Prins Hendrik Polder and its equally old polder mill. Left of this a 1958 pumping station. This polder was one of the first reclamations in the Waddenzee, but not all Dutch new land acquisitions were successfull. Agriculturally this one proved to be a failure because of its saltish sandy soil.

A brief discussion of the Dutch concepts '*polder*' and '*droogmakerij*' is in order here to avoid possible confusion, especially as regards the precise meaning of the term 'polder'. In Dutch, the word '*polder*' refers to any area in which the water table is artificially regulated. '*Polders*' in that sense are usually surrounded by dykes, often also by ditches or canals, and may be situated either above or below sea level. Many of these '*polders*' originated as former peat-cutting operations or clay pits. Unfortunately, such soils are highly sensitive to compaction and the ground level of these *polders* has been steadily dropping as a result. This has sparked a series of ever more ingenious devices to keep the water table within agriculturally manageable levels. Since the 15th century, polder mills have been deployed for this purpose. (fig. 3)
The Dutch word '*droogmakerij*' refers to a former body of water that has been drained by means of windmills or (steam) pumps and turned into dry land. Any *droogmakerij* is therefore a *polder* (in the sense that it still requires constant drainage) but not every *polder* is also a *droogmakerij*. The Netherlands contain thousands of smaller and larger *polders*, of which several hundreds are also *droogmakerijen*. *Droogmakerijen* (as well as the so-called *bedijkingen*, sections of embanked and drained coastal water) occur only in the northern and – especially – western provinces and in the former Zuiderzee, today IJsselmeer or Lake IJssel. In these areas, water management mostly entails the discharge of excess water; increasingly, however, it also involves letting outside water in to prevent soil compaction or salinization. Together, all ca. 450 Dutch *droogmakerijen* (i.e. former bodies of open water) cover an area of over 300,000ha, or ca. 1/10 of the total surface of the Netherlands. Of these 300,000ha, ca. 180,000ha were formed after 1930, particularly in the form of the so-called IJsselmeer Polders.[8] To these polders should be added the thousands of reclaimed smaller and larger former wetlands and marshes, which also require constant artificial drainage.

1.1.2.2 Land consolidation

Land consolidation only became an integrated and substantial component of Dutch agricultural modernization at the start of the reconstruction

[8] Van Rijn & Polderman 2010, 52-61.

period. This was in part due to the fact that 700,000 to 800,000ha had already been scheduled for thorough agricultural reform well before the Second World War. At that time, however, the proposed approach met with little success: by 1938, less than 20,000ha had been implemented. Acceleration of the process had to wait until after the Second World War. In 1950, ca. 50,000ha were completed; in 1965, this figure had increased to ca. 225,000ha, and in 1975 it reached 600,000ha.[9]

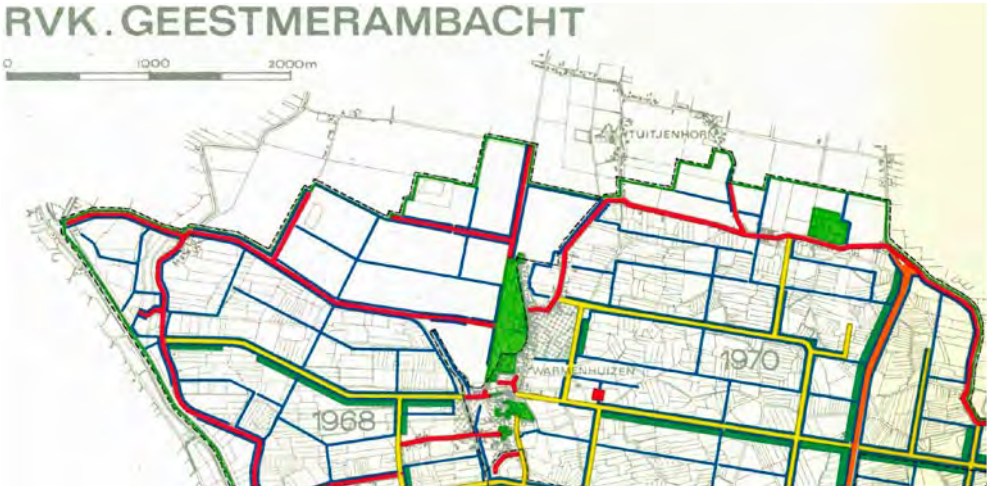
Land consolidation has many aspects and various definitions. The following definition, from the early 1950s, is sufficiently comprehensive: '*Land consolidation comprises agronomic interventions intended to create opportunities for a more intensive and economically more viable exploitation of the soil by removing obstructions to agriculture that proceed from scattered and fragmented land ownership.*'[10] Until the early 1950s, land consolidation was regarded as an intervention intended almost exclusively for the benefit of agriculture or agricultural interests. Soon afterwards the definition was substantially (and legally) expanded so as to accommodate other interests as well. Land consolidation was continued after the reconstruction period at an even larger scale. (fig. 4)

1.1.2.3 Reclamation

This publication will also study (primary or secondary) reclamation at length. Of course, reclamation is an old phenomenon. Wherever human groups became sedentary the need arose to adapt the local terrain to their current needs. In relatively dry areas, that could be achieved by simply clearing away the vegetation and laying out fields and pasture land. In many wet areas, land modification involved systematic drainage. These forms of reclamation have been practiced for thousands of years; in the Netherlands, they continued until the 1960s. Over the centuries, techniques changed but the results remained very similar. Although the total surface of reclaimed land steadily increased, in the early 19th century the Netherlands still contained ca. 900,000ha of waste land. Those areas – heath, moors, marshland, sand drifts – posed a challenge which more modern inventions (fertilizers) and techniques (machines) handled with ever greater efficiency. Reclamation of waste lands are of all times, but from ca. 1900 they became ever more centrally organized, conducted and systematically realized by specialized new companies. (fig. 5)

1.1.2.4 The Netherlands are 'manicured' lowlands

A similar process occurred on land reclaimed from the sea, lakes and other surface waters. There, too, the techniques changed before the results did. In the Lowlands on the North Sea, the embankment of shorelines and the drainage of surface waters by windmills and – from the mid-19th-century onwards – steam pumps started a tradition which created hundreds of thousands of hectares of new land. In the reconstruction period, all polders and those in



4 A detail of a Geestmerambacht map showing its land consolidation with former and present parcellation and the new roads and watercourses, etc. (Noord-Holland Province)

9 Van den Brink 1990, 73 ff.; *Winkler Prins Encyclopedie* 1953, Vol.16, 223; Andela 2000, 178-179.

10 After *Winkler Prins Encyclopedie* 1953, Vol. 16, 223.

5 Former Head Office of Nederlandsche Heidemaatschappij (aka Heidemij) in Arnhem, Province of Gelderland and erected in 1912-1913. (Photo ca. 1930)

the former Zuiderzee in particular (since its embankment in 1932 called IJsselmeer) were icons of civil engineering and water management. Gradually these methods were supplemented by rainbowing: the mechanical application of huge quantities of slurry to raise the land surface. Oddly enough, those most impressed by these gigantic projects tended to be foreigners. Even today, it is they who are eager to see the 'polders' and who are astonished when while standing on a dyke they notice how the land surface on one side lies well below the water surface on the other.
All in all, the two latter forms of land development – reclamation and drainage, in combination with land consolidation projects carried out throughout the country – are at the root of the often heard phrase that the Netherlands are 'manicured' lowlands. Hardly a scrap of land remains untouched – even Dutch 'nature' has been carefully constructed.

1.1.3 Issues to be addressed

This publication will investigate the land consolidation projects, reclamations and polder formations of the reconstruction period as well as, more specifically, their impact (past and present) on the spatial organization of the Netherlands. Traditionally, reclamations and the acquisition of new land in the form of polders (we will further use te term 'polders' instead of '*droogmakerijen*') were obviously a source of national pride, and all Dutch geography textbooks contain long lists of land formation projects and reclaimed 'wilderness'. Opposition against these large-scale interventions, which were detrimental to what was regarded as 'real nature', is a relatively recent phenomenon, roughly since the 1960s. For a long time, land consolidation projects and the agronomic engineering which accompanied them – soil movement, deep ploughing, road construction, water management – were equally unpopular. Initially, those who objected were mainly the many individuals who were agronomically (i.e. physically) affected; they were later joined by others who observed the interventions from a cultural-historical perspective. The first group included many farmers (both land owners and tenants) and individuals and organizations traditionally involved in nature conservation. The second group encompassed (as it still does) individuals, such as experts and participants,

who are involved in (the management of) historical-cultural landscapes, as for example historical-geographers and archaeologists. Environmental protectionists were and are also critical observers. Today, although land consolidation projects continue to meet with a critical reception, overall attitudes are slightly more positive. Yet even one of the latest published books within this subject – Elpers' differentiated *Wederopbouwboerderijen* – asks for paying attention to this controversy when she writes on modernising vs. tradition in farming and agri-business. She emphasizes the 19th- and up to mid-20th-century notion of a linear progress to a better future should be replaced by a more carefully balanced appraisal or even an ambivalent and conflictuously attitude.[11] One of the questions which led to the present publication is whether the arguments of past and present opponents are still valid in view of current perspectives, and if not, why.
The preliminary answer to that question is a qualified 'no'. In fact, the land consolidation projects – and in general all processes shaping the Netherlands in the 20th century – deposited a new chronological stratum onto the landscape. In essence, the phase in human spatial interaction this particular stratum represents is no different from earlier interventions, which, after all, were likewise primarily fuelled by functional considerations. What is different, however, are the methods, their scale, and above all the rate of change. The speed at which this spatial process operates is a product of contextual factors, some of which this book will address in more detail. Yet another aspect of the rate of spatial change is 'human impatience'. Many are quick to judge a new spatial configuration even before, or at the very moment of, its completion, and certainly long before the intended new landscape has fully matured. For example, upon completion, any 'furnishings' are usually still only rudimentary, for the newly planted trees along lanes and roads in the 20th century were seldom mature. That being said, many final versions of green plans were undeniably a watered down version of the original designs, due to financial considerations.

1.1.4 Why this book?

This book proceeds from the Cultural Heritage Agency of the Netherlands' role in the inventory and assessment of buildings and areas from the reconstruction period. The national policy strategy document *Kiezen voor karakter. Visie Erfgoed en Ruimte* ('Character in Focus. Vision Heritage and Space', or *VER*, 2011) advocated a form of careful management of thirty National Interest areas considered typical and recognizable manifestations of the reconstruction period. Of those thirty areas, eight were classified as rural while the remainder represented the reconstruction of urban areas damaged during the Second World War and the creation of new residential zones. In reference to these areas the VER stated: *'During this period, many imaginative, innovative and novel designs* [were] *implemented, both in urban reconstruction and expansion and in the reorganization of rural areas and the creation of new land. The particular qualities of these areas deserve greater public awareness and the most exceptional among them are worthy of public protection.'*[12]
This book will discuss the spatial aspects of damage inflicted upon rural areas as a result of various defensive measures and acts of war during or on the eve of the Second World War (1939/40-1945) and, to a lesser extent, the 1953 North Sea flood. In some cases the damage necessitated repartitioning and re-allotment, as on the island of Walcheren. We will also address spatial development in rural areas where land acquisition, drainage and new reclamations were involved. Cases in point are the IJsselmeer polders and reclaimed peat marshes and heath. In addition to the eight National Interest areas we here present six others, out of a far greater number which, according to the VER, deserve 'greater public awareness'. In this publication they are indicated as 'Type areas'. Regarding these six areas our chronological focus somewhat transcends the boundaries of the reconstruction period proper, in part because in the course of our research it became evident that the presumed break represented by the war years 1940-1945 was less radical than previously thought. In other words: there was more continuity than expected.

[11] Elpers 2019, 15-18.
[12] VER 2011, 46 ff., especially 53, 84-87.

6 Aerial view of a typically Dutch lowland river landscape with long narrow parcellation. The river Lek, near the town of Schoonhoven, Zuid-Holland Province. (Photo September, 2006)

For a more detailed introduction to the historical context we refer to the publication *Post-War Reconstruction; the Netherlands 1945-1965*.[13]

1.1.4.1 The VER's aims

The VER defines its focus for the reconstruction period as 'the presentation of an era'. In its own words: *'It is the State's aim to effect, at a regional level, a permanent, visible presence of the period 1940-1965 in the future arrangement of the Netherlands.'* This applies equally to urban reconstruction areas, to new housing developments and to rural areas. The eight rural National Interest areas represent four main types, defined by their origins:

- Landscapes shaped by (reparation of) war and/or flood damage;
- Landscapes resulting from land consolidation;
- Landscapes that are the product of (primary or secondary) reclamation;
- Landscapes formed on newly created land.
- In actual fact these four forms merge in various ways.

The six Type areas which proceed from the VER are somewhat different, in that land loss and functional changes were also involved. Together, these fourteen areas are but a selection out of a much larger body of recent landscapes that were studied. They have been included for various reasons beyond the strictly morphological. Also considered were location (spatial distribution within the Netherlands), subsoil (the various landscape types), age (chronological range), type (origins, implementation and organization), representativeness (visibility and/or contrasts) and whether or not they were exemplary (i.e. served as pioneer projects). For the benefit of readers who are unfamiliar with the subject we will now present a brief outline of the origins and geographical location of Dutch historical-cultural landscapes. (fig. 6)

1.2 Historical-cultural landscapes in the Netherlands – a brief outline[14]

It is important for a proper understanding of Dutch spatial developments to realize that the country's population density has always been exceptionally high and that any private reclamation of 'empty land' virtually ceased after the medieval period, especially in the lowest sections. Instead, land was issued for reclamation by the local aristocracy or other

13 Blom, Vermaat & de Vries (eds) 2016.
14 A comprehensive outline is: Ten Brinke & De Jong 1987.

landlords. Of particular relevance here is the fact that reclamations followed different patterns in different parts of the country.[15] Overall, peat areas unaffected by the sea were reclaimed in strips: regular blocks of parallel, long and narrow fields (as in the provinces of Noord-Holland, Zuid-Holland and Utrecht). Where proximity to the sea did affect peat and clay areas (until their final embankment, that is) the dominant field pattern was more haphazard, consisting of irregularly shaped small fields in which tiny differences in elevation, former tidal creeks, terps and other elements remained visible (as in the provinces of Zeeland, Friesland, Groningen).[16] Yet other areas were rarely or never exposed to the sea: undulating sandy soils which until the early 20th century were exploited only extensively and where plenty of 'wilderness' was still to be found. Not that these grounds were deserted; on the contrary, they were 'common grounds', used for various purposes by the adjoining villages (as in the provinces of Overijssel, Gelderland, Noord-Brabant). Yet these same provinces also contained old agricultural land. In the Netherlands, these field complexes are known by various names (*essen, engen, enken*, or, in the case of small, individual reclamations, *kampen*). Researchers of historical cultural landscapes distinguish a wide variety of morphological types. On a West-European scale, however, they are fairly common and rather reflect a wide range of adaptations to local conditions. In addition, the Netherlands in the past encompassed significant stretches of raised bog, especially in the provinces of Groningen, Drenthe, Overijssel, Noord-Brabant and the north of Limburg. From the medieval period onwards, these were being reclaimed in a highly organized and systematic fashion in the context of peat digging operations and the transportation of the finished product, turf (as an industrial and domestic fuel). Today, the resulting landscapes are still called '*veenkoloniën*', 'peat colonies'. Omitted from this discussion is the southernmost part of Limburg, featuring an almost un-Dutch landscape of undulating hills and highly fertile loamy soils (loess). Finally, for centuries the Netherlands have been acquiring a steadily growing number of polders wrestled (sometimes repeatedly) from the sea or bodies of freshwater. The best known of these are those in the provinces of Noord-Holland and Zuid-Holland, and the large 20th-century polders in the former Zuiderzee (now IJsselmeer), mentioned earlier.[17] The latter are typical for the reconstruction period (for a general overview, see fig. 7).

1.2.1 Historical-cultural landscapes and changing landscapes

This brief outline is essential to explain certain developments that peaked in the reconstruction period, more specifically the apparent uniformization of the landscape. Converging processes were undoubtedly at work in Dutch spatial development. Agro-engineering enterprises converted sometimes very different initial configurations (i.e. landscape types) into more or less similar cultural landscapes. In landscape terms, reclamations, land consolidation and polder formation frequently produced similar outcomes because similar functional arguments and factors prevailed in the execution stage.
That being said, as with many older cultural landscapes it is often the smaller details which make a landscape appear essentially different, tell the individual stories behind its formation and reveal its intrinsic value and its assets. Where dissimilar initial configurations resulted in very similar landscapes it is important not to describe the spatial interventions which gave rise to them as one uniform process, but rather to focus on the different processes which were active in those areas. Cases in point are the landscapes formed by consolidation projects carried out in the north-east near Oudeschans (between Winschoten and the German border; Groningen Province)[18] and in the south-west on the island of Schouwen-Duiveland (Kerkwerve, between Brouwershaven, Haamstede and Zierikzee; Zeeland Province).[19] Today these areas may seem fairly similar, but in the 1950s they were vastly different in appearance and conditions. The area around Oudeschans was characterized by a scattered field pattern of thin strips formed centuries earlier in the context of peat digging operations in raised bogs (a so-called '*veenkolonie*'). Kerkwerve and surroundings, on the other hand, featured a

15 What follows here is a rough outline that omits many of the details and nuances. It is certainly not our intention to present the reclamation of the Netherlands as a straightforward and simple process. To non-Dutch readers, however, it may be helpful to have basic grasp of the relative locations of the various forms of reclamation and the resulting landscape types. A slightly outdated but still useful publication in English is Audrey M. Lambert (1971), *Making of the Dutch Landscape; Historical Geography of the Netherlands*. A valuable source in Dutch is J.A. Hendrikx (1998), *De ontginning van Nederland; Het ontstaan van de agrarische cultuurlandschappen in Nederland*; Many more recently published general and specific historical-geographical books and articles (in English) by Hans Renes (J. Renes) may be retrieved via http://uu.academia.edu/HansRenes

16 Today, the areas mentioned here are roughly situated at elevations ranging from 1m below sea level to 25m asl.

17 All polders are situated at elevations ranging from (just below) sea level to as low as -7m asl!

18 http://library.wur.nl/WebQuery/tuin/33379.

19 http://library.wur.nl/WebQuery/tuin/33455.

7 An overview of the Zuiderzeewerken ('Zuiderzee Works'), e.g. showing 'old land, new land, old towns and new towns'.

mosaic of small fields marked by micro-relief and tidal forces. The first area, in Groningen, was thoroughly overhauled in the 1960s in the context of a so-called '*aangevraagde ruilverkaveling*', a 'requested land consolidation'. The second area, in Zeeland, was seriously eroded during the 1953 North Sea flood, after which it was redeveloped under the *Wet Herverkaveling Noodgebieden*, the 'Land Re-Consolidation in Disaster Areas Act'. Today, neither the topographical map nor satellite images nor photos taken in situ show any conspicuous differences between the two landscapes.[20] However, it would be wrong to conclude that the stories behind them would not reveal any meaningful differences either. (fig. 8, 9, 10, 11)

1.3 Dynamics and continuity

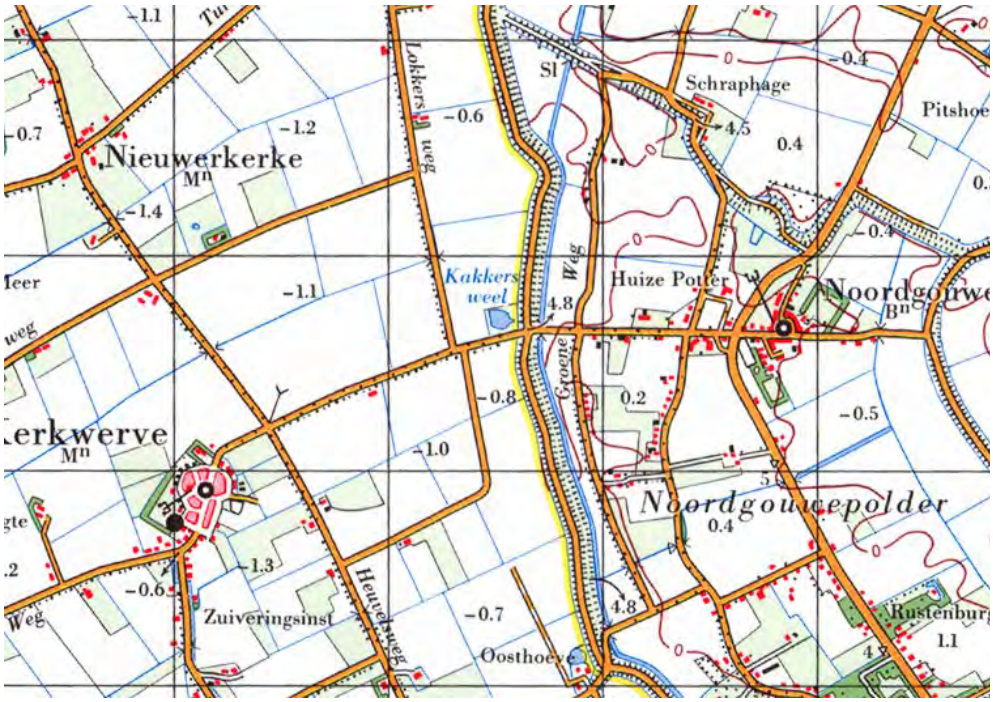
The Cultural Heritage Agency of the Netherlands believes that such differences in fact exist and

[20] Compare the various editions of the 1:50,000 *Topografische Kaart* (Topographical Map, similar to the British Ordnance Survey maps); see for example https://nl.cyclomedia.com/nl.

8 Oudeschans, Groningen Province 1953. The area was dominated by regularly shaped plots.

9 Oudeschans, Groningen Province 1971. After the land consolidation the area had totally changed and parcelling was scaled up. Oudeschans and Kerkwerve were very different around 1950 but became very much alike.

10 Kerkwerve, Schouwen-Duiveland island, 1949. The area could then be characterized as 'craquelurely' or mozaically parcelled.



11 Kerkwerve, Schouwen-Duiveland island 1962. After the North Sea flood in 1953 and a re-consolidation the area had totally changed and parcelling was scaled up. Kerkwerve and Oudeschans were very different around 1950 but became very much alike.

that they allow for a deeper understanding of, and lend additional meaning to, these landscapes in terms of their cultural value. In the Groningen example, the land consolidation process in question was a standard one, while in Zeeland it proceeded directly from a brief but extremely dynamic period with profound consequences.
In this context, the concept of the dynamics of a situation needs to be redefined. We regard dynamics – a force or forces causing change – as a highly discontinuous factor, unlike standard procedures which result from continuous factors, for example consultative frameworks or legislation.[21] Therefore, besides change itself the dynamics of a situation also, and especially, encompass the forces leading to change, or in other words: the potential for change. Examples of highly dynamic areas are the Dutch coast (forces of waves, rollers and wind) as well as landscapes which are the product of human-nature interaction (horsepower, draglines and even legal force) and as such are still developing today. But whereas dynamics as such can be apprehended an incidental factor, dynamics usually refer to continuous developments as in dynamic landscapes, dynamic periods and dynamic processes. To discriminate between the two we need to mention a related dichotomy, viz. continuity and discontinuity.

1.3.1 Continuity or discontinuity

The potential for change implied by the term discontinuity is one of the starting points of this publication. We intend first and foremost to draw attention to the major events and developments that formed the basis for changes in rural land development during the reconstruction period. Conspicuous among them are two major calamities which affected the Netherlands: the Second World War (1940-1945 and the mobilization period prior to the German occupation) and the 1953 North Sea flood. Also to be mentioned here are the sudden boom in land consolidation projects, the rapid acquisition of new land, and the pre-1965 reclamations (primary or secondary). On the surface, these events and developments appear to be discontinuous dynamic factors.

However, we will show that, in fact, the developments affecting rural areas were definitely continuous. Processes that were already active continued, with or without interruptions by incidents or disasters of relatively short duration. The already working (intrinsic or external) dynamics of markets, modernisation, mechanization, legislation at most slowed down in the trains of 1940-1945 and 1953 but despite the interruptions their trends continued and even strengthened up.

1.3.1.1 Interruptions

In the Netherlands, the Second World War began on May 10, 1940, when Germans troops overran the nation and carried out heavy bombardments. The national government fled to London and the occupying forces *de facto* were in control. In the course of the occupation the German authorities built an extensive defensive infrastructure which vastly outmatched the largely obsolete Dutch defences. The most important elements of the new German military infrastructure were dozens of airfields as well as the Dutch section of the German coastal defensive line, the *Atlantikwall*. Extensive inundations, deliberate or accidental, were also part of the new defences. For five years, targeted destruction of (traffic) infrastructure by either the occupying or the Allied forces was a daily event. About 200,000 Dutch residents did not survive the war, half of them Jewish citizens who were murdered in the German extermination camps.[22]
The North Sea flood, which struck the Netherlands on February 1, 1953, particularly affected the islands and coastal regions near the estuaries of the rivers Rhine, Meuse and Scheldt. In dozens of places an exceptionally high surge breached the dykes along the tidal inlets. Tens of thousands of hectares were flooded and remained inundated for a long time; over 1800 people and tens of thousands of cattle drowned.[23] Yet, despite the seriousness of these two catastrophes, in both cases the recovery was surprisingly quick and demonstrated a great resilience.

1.3.1.2 Continuity

The Cultural Heritage Agency of the Netherlands (RCE) aims to keep the period 1940-1965 recognizable at a regional level.

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21 Today dynamics usually refers to the results of power or force, as in tidal or coastal changes, accomodation of vegetation to changing circumstances and in 'dynamic landscapes'. From historical point of view dynamics also – and in the first place – relates to the intrinsic (physical or non-physical) power, force or pressure itself – the potency of change and changing. The original meaning can be traced back in *adynamic* and *adynamia* which mean *weak(ness)* or *powerless(ness)*.

22 On the Netherlands during de Second World War, see De Jong 1969-1994 (http://www.niod.nl/nl/download)

23 On the 1953 North Sea flood in the Netherlands, see *Verslag over de stormvloed van 1953* (http://repository.tudelft.nl/islandora/object/uuid:b5ef3731-92b0-4404-8dfc-8ab7f63619ae?collection=research)

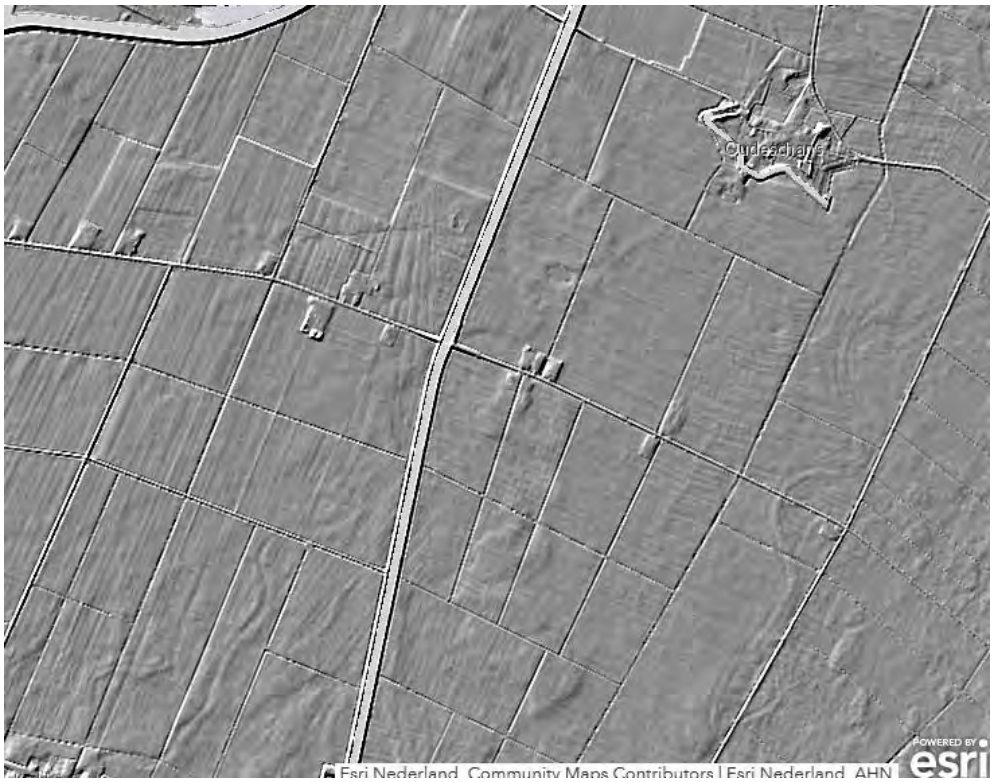
However, the underlying assumption, explicitly asserted by some, that this period represents a clear break in the spatial development of the Netherlands is unfounded, at least in part. On the contrary: despite limited resources (financially and otherwise), activities which at the start of the war had been suspended were resumed as soon as possible. For now, two examples will suffice: the Zuiderzee Polders (now IJsselmeer Polders) and the Vriezenveen land consolidation project. The first plans for the realization of the Zuiderzee polders date back to the 19th century. They were implemented from ca. 1920 onward under a government minister who had also been one of the architects. The best known polder in the area – the Noordoost Polder – was drained in the middle of the war; on top of that, it became a test case for the German colonization policies in conquered areas in Central and Eastern Europe.
The second example is the Vriezenveen land consolidation project, physically executed in the period 1955-1967. The project application was filed at the beginning of April, 1940, one month before the German invasion of the Netherlands, but the first plans for land consolidation in this area were drafted almost ten years earlier. In 1940, ideas on consolidation strategies were still fairly rudimentary, but by the time Vriezenveen came up, the oldest designs still proved their worth in the implementation phase. In this case, continuity is apparent not only in the lasting qualities of the original concept but also in the fact that the existing landscape structure was embedded in the implemented design.

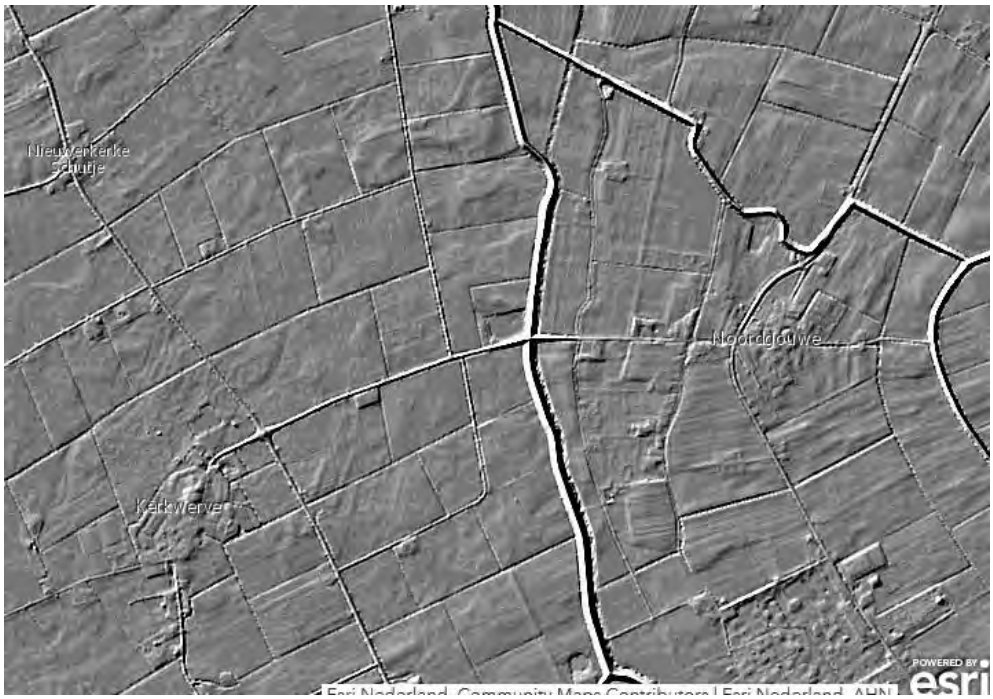
In this publication, the at first unexpected conclusion that even a historic event like the Second World War turned out to have been merely an interlude, has led to a greater emphasis on the historical background of land development, with more attention to earlier developments. Continuity occupies a place of its own in the spatial process in other ways as well. Each new addition constitutes yet another chronological layer of spatial development, a new text, written on that 'sheet' of the earth's surface humanity can reach. Sometimes the goal is complete erasure of the old texts but usually it is rather to enhance their legibility and to adapt them to the demands of a new age. A '*tabula rasa*' approach is only feasible in new polders; in situations where land is subjected to reclamation and especially land consolidation, it is more accurate to speak of a '*palimpsest*': the writing over of a partly erased surface. Some years ago Renes wrote about what he called palimpsest layers in landscapes: "[...] when older traces shimmer through a landscape that is dominated by the relics of later developments." Using the words *dominated by the relics of later developments* it seems he means these later landscapes are relics from the past too. In this book we will use a slightly different look at palimpsest landscapes, but Renes's view is important anyway. Our view here is that any landscape – so including the recent or only several dozens of years old land landscapes – may contain and/or show palimpsest values. Shimmering, recognizable or clearly visible. We'll speak in short about this later (see: 10.5.3.1). This is also true for the above pictured Groningen (Oudeschans) and Zeeland (Kerkwerve) areas. (fig. 12, 13) (also see 1.2.1 and fig. 8, 9, 10, 11)
Scattered through the book some of the so-called box texts contain more examples of palimpsest features. Vertical stratigraphy as well as horizontal movements of successive cultural expressions are dimensions of the same process whereby human ingenuity tackles life's challenges. In that sense, there has been nothing new under the sun for centuries.[24]

1.4 Goals and purposes

Our purpose with this English edition is to assist in making the available expertise on modern Dutch landscapes more widely accessible. These landscapes date roughly to the mid-20th century. All have a number of traits in common which do not – or no longer – conform to popular perceptions of the classical 'Holland' or – more accurate – 'the Netherlands'. No more picturesque village scenes with simple peasants in country costume, no more smallholdings with a few heads of cattle and dimly lit scenes of crofters eating a scant meal of potatoes. Not so! Instead, this publication will demonstrate how, from the mid-20th century onwards (and in fact from the 1930', the Dutch countryside and Dutch farmers have been part of a modernization wave

[24] Renes 2015, 403, 407 ff.





12 + 13 DEM / AHN pictures of both above mentioned areas Oudeschans, Groningen Province and Kerkwerve, Schouwen-Duiveland island, show interesting palimpsest features. Most striking are former meandering brooklets and tital creeks respectively.

which has placed them in the forefront of agricultural production worldwide. That this agricultural quality leap to a great extent has been brought on by the many land consolidations, land reclamation projects and reclamations of wastelands will become obvious.

The original goals of this publication proceed from what the Cultural Heritage Agency of the Netherlands earlier formulated as '*keeping the period 1940-1965 visible at a regional level*'. This book may help to build more support by expanding the existing body of knowledge of and interest in the assets and qualities of reconstruction-period land development. In addition, and in particular, it will hopefully demonstrate that these assets and qualities are not restricted to the eight selected 'National Interest areas', but that they can be identified in many other rural areas throughout the country. Throughout the book, box texts zoom in on these eight areas as well as six others which deserve to be more widely known (the 'Type areas'). Some of the latter fall outside our period 1940-1965, an illustration of the fuzziness of spatial and temporal boundaries and the continuous and multi-layered nature of land use and land development which characterizes them. Together, these six areas encompass a somewhat broader chronological and functional scope than the eight others, and some may serve as examples how best to handle yet other areas which at first glance appear to have been robbed of their value by the consolidation process.

1.5 Questions & answers

This publication is not only meant as a textual and pictural account of investigations of rural and agrarian developments in the mid-20th century but it also aims at answering specific questions.
The book will therefore attempt to formulate answers to five questions, all relating to spatial (rural) change:

1. What was the nature of the war damage inflicted on Dutch rural areas during the Second World War, which factors caused it, and which areas were hit hardest?
2. What was the nature of the damage sustained by Dutch rural areas during the 1953 North Sea flood, which factors caused it, and which areas were most affected?
3. What (other) physical and social factors led to and/or contributed to the large-scale modification of the existing landscape?
4. Which continuous and discontinuous actors and factors were predominantly involved in the reconstruction of Dutch rural areas in the period 1940-1965?
5. Which rural areas can be considered type cases for the (spatial) developments of the reconstruction period 1940-1965?

This last question is the focus of the text-box presentations of eight National Interest areas and six others derived from them.

1.5.1 Accessibility of literature and sources

In order to be able to answer these questions we approached them from different angles and consulted various sources and publications. With few exceptions, these are in Dutch and therefore inaccessible to a non-Dutch audience. Moreover, little has been written on the 20th-century changes that affected Dutch rural areas. For decades, historical publications ignored the 1920s, 30s and 40s and the reconstruction period in rural areas. The 1937 French publication *L'agriculture' aux Pays-Bas* was a rare exception. It was followed by post-war publications in numerous languages on the Zuiderzee Polders (IJsselmeer Polders) and the Delta Works, but these focused on (construction) engineering and urban planning rather than agrarian and rural modernization. The past two decades finally saw a growing interest in the reconstruction period and, by extension, in Dutch rural areas during the interbellum, the Second World War and the years that followed.
The present text is a revised and updated version of a 2016 digital – and only limitedly printed – publication by the Cultural Heritage Agency of the Netherlands (RCE and predecessors), which in its turn proceeded from a 2007 report, *Oorlogsschade, watersnoodschade en ruilverkaveling in de wederopbouwperiode (1940-1965)* (War Damage, North Sea flood Damage

and Land Consolidation during the Reconstruction Period, *(1940-1965)*). This 2007 report was part of a wider RCE research programme centring on the hallmarks and qualities of architecture and spatial planning during the reconstruction period. It sparked off the scheduling of almost 200 national monuments, some of which will also be mentioned in this book. They include sections and artefacts of the Delta Works, Deelen Airport, and the Noordoost Polder.

1.6 Relevance

Besides attempting to create a greater awareness of the qualities of Dutch reconstruction-period areas, this book also presents examples of how established values and assets can be integrated in (future) transformation processes. These goals have already been realized in part by a series of studies targeting the eight selected national reconstruction-period areas, conducted by a number of different consulting firms on behalf of the Cultural Heritage Agency of the Netherlands (an overview of these studies is included after the References section). Some tables and texts contain extensions and information concerning post-reconstruction years – here and there even into the 21st century. Usuallly this information was supplied in order to emphasize (continuing) trends.
Instruments at the government's disposal to facilitate awareness, appreciation and maintenance of the reconstruction period include administrative arrangements with the authorities involved concerning legal and/or spatial-planning-based protection of the core qualities of the selected National Interest areas. To this, the government has added the financial tools '*onderzoeks- en plankostenbudget*' [research and development budget] and '*cofinanciering van (pilot)projecten*' [co-financing pilot projects].[25] We must conclude that the selection of these areas is only the first step towards their long-term responsible management and ongoing development. Likewise, selection and the accumulation of expertise are the first step towards a greater awareness of the qualities inherent in the reconstruction period and its characteristic visual manifestations.

1.7 Methods

This introductory chapter is not the place to go into the details of the actual selection process, but it is important to briefly mention the criteria that were used. These are virtually identical to those the RCE has applied to its evaluation of built and urban heritage for many years – but not (yet) to more recent cultural landscapes. In this respect, it is important to point out that especially reconstruction-period landscapes predating the period 1940-1965 may have additional value, assets and characteristics in that they contain older or otherwise significant relics or artefacts. Alle of the below mentioned criteria enclose two or up to five sub-crieria, not included here. They are in the 2017 (digital) Dutch version of this book.[26]
The criteria that were leading in the selection procedure are:

I. Cultural-historical significance;
II. Historical-spatial and/or urban significance;
III. Geological, historical-geographical and/or archaeological significance;
IV. Situational and/or assemblage significance;
V. Degree of preservation and/or visibility;
VI. Rarity and/or distinctiveness.

To these six main criteria, a seventh was added specifically for rural reconstruction-period landscapes:
VII. Landscape dynamics

Landscape dynamics – used here in the classical mechanical sense – as such do not constitute an asset, but their assessment provides an indication of the extent to which a (cultural) landscape has been affected by various (natural and/or antropogenic) forces.

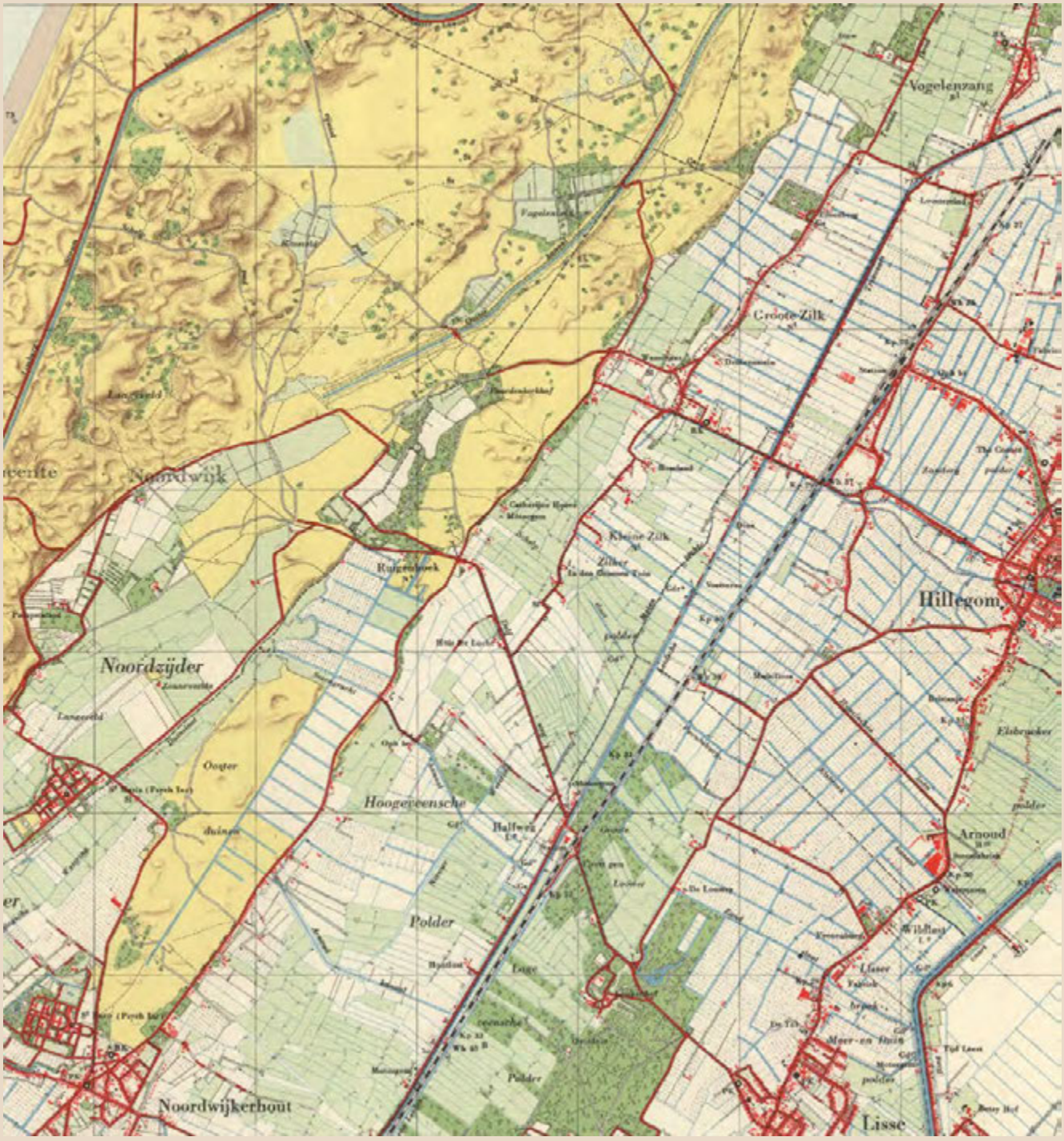
[25] VER 2011, 53.
[26] https://cultureelerfgoed.nl/sites/default/files/publications/rce_het-maakbare-land.pdf , 265, 266. The crieria are comparable to the ones before used by RCE for urban areas, but they were adapted for the rural regions.

1.8 Organization of this book

This introductory chapter is followed by Section 2, 'Causes of Transformation', which addresses the main causes of the extensive transformation of the Dutch (cultural) landscape. The section zooms in on the Dutch government's motives for engaging in spatial interventions during the reconstruction period. The emphasis is on aspects of imperfections, on war damage and North Sea flood devastations and first of all on the context and history of land development. Section 3, 'Implementation', discusses the various consequences of the earlier identified causes, such as planning and legislation specifically targeting land consolidation, land acquisition, and the reclamation of wastelands – that ended ca. 1960. Institutions and organizations involved in implementation are listed, and the section concludes with a review of how the implementation process actually worked out in various subjects within the programs.
Throughout the text, fourteen box texts present an equal number of areas that may serve as examples. Of these, eight are 'National Interest areas' of the reconstruction period proper; the other six, 'Type areas', provide a broader perspective and slightly extend the chronological boundaries. The box texts have not always been chronologically inserted but – where as regards content – thematically.

Oosterduinen, 1935-1980

Reclamation of wasteland and soil removal, Noordwijkerhout Municipality



Left: Topographical map with situation around 1950, composed of maps 24 H, Hillegom (1949) and 30 F, Leiden (1951). Scale: ca. 1:37.500
Right: Topographical map with situation around 2009, composed of maps 24 H, Hillegom (2009) and 30 F, Leiden (2009). Scale: ca. 1:37.500
Note the Arnoud sand-lime brick factory (Steenfabriek). Also note the awkward consequence of the border between Noord-Holland and Zuid-Holland Provinces. This can easily be recognized through two square bends in the diagonally running main road.

Identification

- In this book Type area Oosterduinen might be the clearest example of continuity in spatial development in the 20th century: continuous change in a relatively small area began in the pre-war years and lasts until the present day.
  The Oosterduinen (Du. '*duinen*' = dunes) are an agricultural area and a zone of partly dug away inner dunes (beach ridge complex) north of Noordwijkerhout and west of Hillegom (Zuid-Holland Province). Since the removal of the dune sand, the area of the Oosterduinen has been characterized by extensive flower bulb fields.
- The exploitation of the Oosterduinen for the purpose of sand extraction began in the mid-1930s. In the 1960s the process in places involved dredging up the sand from lower strata, resulting in a small, 35ha, lake which was then adapted for recreation purposes.[1]

Problems

Around 1935, when sand extraction in this beach ridge complex started, it was still considered a pristine nature area. As archaeologist and botanist, R. Oppenheim wrote: '[...] *only two years ago, high dunes stood south of Ruigenhoek;*[1] *they are gone – and next year no doubt already replaced by a checkerboard of cheerful colours. And a bit further on, [...] where the heath used to blossom luxuriantly [...] there the metal attacks the sand in powerful strides. And how long will it be, before this small corner of pristine nature, too, has fallen victim to progress?*'[2]

For centuries, parts of the (inner) dunes were reclaimed and/or dug away. Similar sand pits and reclamations can be found in the Netherlands from the Wadden Islands down to Zeeland; especially the beach ridges and dune valleys (= fossil beaches) were popular. Arable fields were created along the entire North Sea coast (e.g. on the island of Ameland and also near Castricum, Wassenaar, Oostvoorne, and on Walcheren).[3] From the late 18th century onwards such activities increasingly encroached upon the inner dunes, particularly in connection with various forms of market gardening. By way of a bonus, digging down to a level of ca. 0,5m above groundwater level produced an enormous quantity of sand which was then available for other purposes. It was used to raise the ground surface in towns and cities, which in the mid-19th century began to expand, and in the late 19th century it was discovered that the sand was suitable for the production of so-called sand-lime brick.[3]

Much of the Oosterduinen sand was processed at sand-lime brick factory *Van Herwaardens Kalkzandsteenfabriek* in Arnoud near Hillegom; at the time it was rumoured that it was the largest plant of its kind in Western Europe (today it no longer exists). In 1956, the factory owned ca. 100ha of land in the Oosterduinen. Once the top layer of the sand had been removed, the factory wished to continue its exploitation by means of sub-surface dredging. In principle this was allowed, for the enterprise was a private one, except that the government ceased to subsidize the process after the phasing out of reclamations became official policy in 1961.[4]

Nonetheless, the provincial authorities initially refused to issue a permit for the dredging operations due to concerns that they might lead to soil salinization. In 1962-1963, however, the permit came through after all, in part because the factory and the government had reached an agreement to the effect that, after completion of the operations, the company would sell the area to the Province (for a symbolic sum).

Realization

Around 1935, at the start of the sand extraction operations at Oosterduinen, an approximately north-east to south-west oriented canal was dug over a length of ca. 3km. Over time, a constantly expanding grid of perpendicular ditches was formed. The sand was carried off by barges, starting at this network of so-called Oosterduinse Sloten (Du. '*sloten*' = ditches) and on through Steengracht Canal and the Leidsche Trekvaart towards the brick works. (fig. 14) The plots between the ditches measured ca. 120 x 250 to 350m. The total area where the sand had been removed extended well beyond the original 100ha to ultimately reach about twice that size. Because the top soil was systematically dug away until a few decimetres above groundwater level, the remaining terrain was eminently suitable for the cultivation of flower bulbs. The proposed dredging site was situated west of the denuded area. Once the agreed-upon sale of the area had taken effect the *Provinciale Planologische Dienst* ('Provincial Planning Agency') designated the ca. 35ha artificial lake and immediate surroundings as a recreational zone. Part of the lake, which by then had reached a depth of 13m, was set aside for swimming and other aquatic sports while the shores provided room for holiday cottages, which were being built from ca. 1980 onwards.

One interesting aspect of this particular reclamation is the fact that the 1927 Provincial Road Plan entailed the construction of an (almost entirely) new north-south motorway along the eastern

14 A picture of Van Herwaardens lime stone factory at Arnoud, near Hillegom (Noord-Holland Province). Note the already dug off and leveled dune zone. (Unknown date)

15 Aerial impression of land reclamation area Oosterduinen with flower bulbs growing, today's recreational functions, some preserved dune massif and far top right dune rows and the North Sea.

flank of the Oosterduinen beach ridge. A section of this road actually materialized at that time, in the form of e.g. a pre-war divided four-lane motorway segment near Katwijk. Further preparations for the construction of provincial motorway No. 1, which was to lead to Noord-Holland almost up to Haarlem, were halted in the early 1970s. The Zuid-Holland section was eventually built as a two-lane road along the Oosterduinen, but it terminates at the Noord-Holland boundary where it links up to an undersized local road. The Noord-Holland section was never built due to opposition from municipalities and a growing awareness of nature values and environmental concerns. (fig. 16, 17)

Key qualities

The reclamation of the Oosterduinen was one of the last examples of the large-scale conversion of the Holland dune soils, and also one of those still recognizable today. The former sand pit and reclamation area Oosterduinen, where operations commenced around 1935 and ended in the late 1970s, features a 'traditional' layout of canals and rectangular plots meeting at right angles (orthogonal plan). The lake Oosterduinse Meer is the product of the political climate of compromising of the early

16 Flower bulbs fields on dug off and leveled former dune sands. Left a road on former, relatively low and flat authentic surface level.

17 A field impression of today's colourful flower bulb raising.

1960s, which led to an important transfer of ownership and a new purpose for the area. The creation of the lake set in motion a trajectory which culminated in today's intensive long-stay recreation. Its history can be traced back to the period well before the 1960s, when day visitors and other tourists would be drawn to the area because of its colourful 'checkerboards' formed by the flower-bulb fields. Although these fields were the antithesis of the natural qualities which had existed before 1935, today some interesting natural flora and fauna has returned in several places, thanks in part to the presence of the lake which forms an oasis at the transition between the dunes and the urbanized hinterland. Very few buildings in the area are typical of the reclamation period, but the ditch network is nearly complete and very characteristic for the large scale system of soil removal and transport. For decades, the land was leased out for flower-bulb cultivation without any built structures being added. Since the 1980s, however, several greenhouse complexes have arrived especially in the southern part of the reclamation, and the characteristic openness of the landscape has suffered as a result. Despite these changes, the specific reclamation form of the Oosterduinen beach ridge, the (status of the) motorway along its eastern boundary and the (history of the) lake are curious relics of the rapidly changing ideas regarding the spatial development of the west of the country towards the end of the reconstruction period.

In 2016, a permit was granted to continue sand extraction in the lake down to a depth of 30m.

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Notes

1 See 1950 and 2009 maps, centre.
2 Oppenheim 1937.
3 The (older) dune reclamations are easily identifiable after zooming in on maps from ca. 1870 onwards on http://www.topotijdreis.nl/.
4 In the *Troonrede* (Speech from the Throne, the annual formal opening of a new session of Dutch parliament) of 1961, the cessation of all government-supported reclamations was announced.

Section 2

Causes of Transformation

2 Rural development and spatial organization in the Netherlands before 1940 as causes for later transformations

For a proper understanding of specifically Dutch forms of land development it is essential to first become acquainted with certain facts about rural conditions, spatial organization and problems in the Netherlands in the years before the Second World War.

2.1 A general overview[27]

Rural developments started ages ago as a counterpart of (semi)sedentary ways of human living. Different kinds of land reclamation for agricultural purposes have been a common practice for millennia. Reclamation techniques and intensity were always dependent on local conditions and traditions, with the most fertile or versatile areas in particular being in great demand. It was there that reclamation was at its most intense and population densities were highest. Today, it is difficult to find locations within the present Dutch borders where the results of pre-1600 reclamations of waste lands are still visible, but maps as early as the 17th century clearly show the low-lying west and much of the north to have been almost completely reclaimed, while the process was much less advanced in the east and south. This remained the situation until the mid-19th century. Interestingly, the conditions in which reclamation took place in especially the west of the country[28] created something of a paradox. There, peat digging and dredging exacerbated land loss and hence the expansion of bodies of water. These former marshlands were subsequently partly reclaimed and drained to become what are called '*polders*'. The groundwater table in these areas is mostly several meters below sea level so that they can only be kept dry by incessant pumping. Locally, peat dredging operations and the reclamation of the resulting bodies of water continued until well into the 20th century.[29]
Roughly from the 15th century onwards, areas where agricultural land was in short supply could occasionally be expanded by exploiting land that marked the boundary between water and dry land. Embankment was the obvious method to permanently convert such grounds into agricultural fields. In time, expertise in the conversion of surface waters into (agricultural) soils became more advanced. Particularly in the west and north of the present Netherlands, a basic understanding of the drainage process developed from the late medieval period onwards. Outlet sluices, drainage ditches and canals, (circular) dykes, lift-locks and polder mills were all part of a constantly upgraded toolkit that was deployed in ever more ingenious combinations. After the mid-19th century, steam or engine pumps were increasingly used for initial drainage and to keep the land dry.[30]

Mainly in the north and north-east of the Netherlands vast and sometimes inaccessible marshes could only be exploited after intensive drainage. In these areas – the so-called '*veenkoloniën*' (peat colonies) – the first systematic reclamation stage involved digging away metres of peat which was cut into turves and used as fuel. The underlying sands were subsequently 'fertilized' by digging in the top peat layer, which was unsuitable as a fuel source. On a national scale, the resulting '*dalgronden*'[31] ('peat bottom soils') in the provinces of Groningen, Friesland, Drenthe and Overijssel added substantially to the total supply of agricultural land. This specific form of reclamation was an extension of the turf industry; in the north and north-east, it continued well into the 20th century.
Meanwhile, reclamation also took off in areas where population pressure was less and different restrictions and conditions traditionally applied. This was certainly the case in the west of the modern province of Noord-Brabant, where towns had been able to supply their own fuel since the medieval period by digging for turf in the region's vast peat marshes. The loss of land that accompanied the process was later compensated in stages; numerous dykes can still be recognized in the area.[32]
In the more thinly populated areas in the east (provinces of Gelderland and Overijssel) and south (Noord-Brabant and the neighbouring north of Limburg) reclamation was less extensive than it was in the west; hundreds of thousands of hectares of wastelands remained untouched there. In the east, factors contributing to that situation included tradition-based, restrictive practices with respect to land

27 Several fine historical overviews of Dutch agriculture in publications by J. Bieleman.
28 Viz. the provinces of Noord-Holland, Zuid-Holland, Utrecht, but also in Friesland and Overijssel.
29 https://en.wikipedia.org/wiki/Polder: In fact here are three types of polder: 1. Land reclaimed from a body of water, such as a lake or the sea bed, 2. Flood plains separated from the sea or river by a dike, and 3. Marshes separated from the surrounding water by a dike and subsequently drained.
30 Reh, Steenbergen & Aten 2007 is a comprehensive issue on polders and structuring them.
31 The term '*dalgrond*' has been in common use since the early 19th century.
32 See e.g. K.A.H.W. Leenders 2013.

use and land ownership, and also the lesser fertility of the region's (sandy) soils together with insufficient drainage conditions. In the south, the political situation long remained an important additional factor, besides limited soil fertility. Even after the Netherlands had achieved more or less its present shape the 1830s, the provinces of Noord-Brabant and Limburg as well as the region of Zeeuws-Vlaanderen (south of the Scheldt estuary) continued to serve as strategic buffer zones; the less they were developed the more effective they could function as such.[33] Several of the fens and moors areas in the southern municipalites of Noord-Brabant remained unreclaimed during the 19th century – specifically in the Peel, on the border between Noord-Brabant and Limburg.

2.2 Stagnation from the end of the 19th century

In the course of the 19th century, the limiting factors in the east and south gradually became less important. From the middle and particularly the end of that century, large-scale reclamations were undertaken there, just like elsewhere in earlier ages. In a parallel development, however, some areas reclaimed in the past deteriorated again in the late-19th century. Similar processes of deterioration occurred throughout the Netherlands but paradoxically it was most pronounced in areas where fields were intensively used and/or particularly small. One of the causes was the import of cheap agricultural products from the Americas, which in the final decades of the 19th century led to an agricultural crisis all over Europe, with famines and mass migrations as a result. In addition to this external factor several internal ones compounded the situation, some of them applying specifically to the Netherlands: small-scale agriculture (often on scattered fields), inadequately regulated drainage (which was not always a consequence of the low situation of the country) and a frequently poor road infrastructure (some wettish parts of the country only to be reached over water). Additional factors were insufficient training and education and, in particular, extensive fragmentation of land ownership and land use. From the late-19th century onwards all these elements together put the Dutch agricultural sector under a severe strain, under (regional and/or sectorial) stagnation and it (ultimately) led to structural landscape changes. Among the most important of these changes was the so called 'land consolidation', which in half a century became to contain solutions for many agricultural and rural problems. Depending on the time and the place the concept of land consolidation can comprise several specific meanings, but a common characteristic is enlarging field units owned or in use by individual farmers.

2.3 Three main traditions in Dutch gaining new cultivable grounds

Together with both traditions of 1. *land reclamation* in former waste lands and 2. *land acquisition by draining* bodies of surface water (*polders*), from ca. 1900 onwards 3. *land consolidation* quickly became one of the most dynamic benchmarks and forces in rural land development in the Netherlands. Since the 19th century, each of these three forms of cultivable land reorganization or expansion has undergone a profound development in which each faced its own challenges, especially because, since the start of that same century, these processes were being transformed from a series of small-scale private initiatives into vast enterprises regulated by legislation. The next sections will attempt to provide a brief explanation for these three, largely separate, developments. We will start our explanation in the 19th century and finish it around the beginning of the Second World war. The war and the 1953 North Sea flood became incidental reasons for change on their own and will be discussed later.[34]

2.3.1 Land reclamation (of waste land or waterlogged land)

In the late 18th century, it became necessary to expand the amount of cultivable land in the Netherlands through the reclamation of unproductive or low-productivity areas. A number of competitions were organized in

[33] Earlier, large sections of Brabant and Limburg (the so-called '*Generaliteitslanden*') had been administered directly from The Hague by the States General to serve as a buffer zone between the Republic of the United Netherlands and any Habsburg or French aggressor. After the French occupation of the Netherlands – the Napoleonic era – the territories of what are now Belgium and the Netherlands for fifteen years were one nation, but the differences between north and south proved to be insurmountable. The Belgian secession from the Netherlands in 1830 meant that the buffer and its defensive lines once again became important. For decades afterwards, mutual suspicions ran high and the national military apparatus maintained a permanent state of readiness.

[34] A reliable and extensive contemporary introduction is in: Sleumer 1952, 94 ff.

which plans could be submitted to create more agricultural land in the Holland dunes, in Het Gooi (near the town of Hilversum) and also on the sands and the peat marshes of the northern and southern Netherlands. A famous project was the establishment, starting in 1818, of a number of 'charitable colonies' or 'Colonies of Benevolence', the so-called '*Koloniën van Weldadigheid*' in the borderlands between the provinces of Friesland, Drenthe and Overijssel.[35] Besides this on the sands and the peat soils the reclamations continued throughout the 19th century. Specifically on sandy soils, targeted areas included the so-called *markegronden,* while in the *veenkoloniën* the reclamations resulted in peat bottom soils ('*dalgronden*'; see above) that remained after the removal of sometimes several metres of peat.

The term *marke* (originally 'border, division') denotes both a territorial unit (the – usually uncultivated – common land associated with a particular settlement, called *markegronden)* and a specific group of individuals (the collective body of farmers who administer, and control access to and exploitation of, the *marke* and who are called the *markegenoten)*. In 1809-1810, when the Netherlands were occupied by the French and placed under direct French administration, they abolished the traditional privileges of the *marke*, thus creating a legal basis for private or common enclosure of the *markegronden* and (possibly) for subsequent reclamation. An important aspect of this process was the fact that the *markegenoten* had to decide on the matter by vote, and by majority could decide in favour of a partial or complete enclosure or sale of the *marke (*also called '*gemeynt*', 'commons'). The pressing need to become self-supporting forced the State to take appropriate action. Reclamation of uncultivated land – including the *marken* – was one of the measures taken. Specifications included an adequate road and water infrastructure as well as the enclosure of newly reclaimed land by either an (at least) 8-feet-wide ditch or an (at least) 5-feet-wide and 4-feet-high bank. These specifications were accompanied by certain tax benefits, such as a 50-year exemption for reclaimed land. Some of the conditions and stipulations regarding the 1809 enclosure of the *markegronden* seem almost modern, and they will reappear at a later stage.[36]

After the establishment of the independent Kingdom of the Netherlands, the measures that had been introduced in the French period were initially put on hold. Eventually, however, they were replaced by new though similar ones, in some cases at a provincial level. In 1837, the State introduced an almost identical but more flexible version of the measures introduced in the French period.[37] From the 1830s onwards, other newly introduced measures and acts were also to have a lasting influence on land development; some of them are discussed below. In 1832, the Land Registry or Cadastre (*Kadaster*) was established, followed in 1840 by the introduction of the '*Wet omtrent den vrijdom van lasten, terzake van landontginningen en landverbeteringen*', the 'Exemption Act regarding Land Reclamations and Land Improvement'. The combined effect of the first-half-of-the-19th-century measures was that the number of *marken* subjected to enclosure increased significantly in the decades after 1840, especially in the provinces of Overijssel and Drenthe.

Two further measures were important on this matter. First there was the introduction of the 1851 Act '*regelende de onteigening ten algemenen nutte*' ('for the Regulation of Expropriation for the Common Good', the so-called Expropriation Act or *Onteigeningswet*). This was followed in 1886 by another Act which regulated *marke* enclosure: the 'Act of May 10th, 1886, to wit, arrangements for the furtherance of the enclosure of *markegronden*', also known as the *Marke* Act. The 1851 Act made it possible, among other things, to claim space for public amenities including those that benefited reclamations, while the 1886 Act aimed to stimulate the enclosure of *marke* land. This Act did not, however, have much impact on actual practice, but mainly re-invented the legal possibilities and facilitated companies to enter the field. Even after 1886, each individual *markegenoot* could still demand enclosure and such demands were still decided by the *markegenoten* by majority vote. The new *Marke* Act also prescribed a prior decision as to the course of existing and future roads and waterways as well as the drafting of

a land development plan in which the (spatial) rights were guaranteed of all individuals concerned. The stipulation that *markegenoten* were allowed to engage in land exchange or sale prior to enclosure constituted a new element. (fig. 16)

[35] See e.g. http://www.zeeveld.nl/wp-content/uploads/Over-duinboerderijen-en-haar-bewoners.pdf; Gevers 1826; Blink 1929, 37 ff.; https://nl.wikipedia.org/wiki/Maatschappij_van_Weldadigheid; https://en.wikipedia.org/wiki/Society_of_Humanitarianism

[36] Demoed 1987, 45-53.

[37] *Ibidem* 54-64.

18 Often (former) markegronden (common fields) were visually and functionally devided into individually owned or cultivated grounds. Sometimes these same markegronden came into the possession of great (institutional) landowners, such as Insurance company 'Utrecht', that might take care of reclamation.

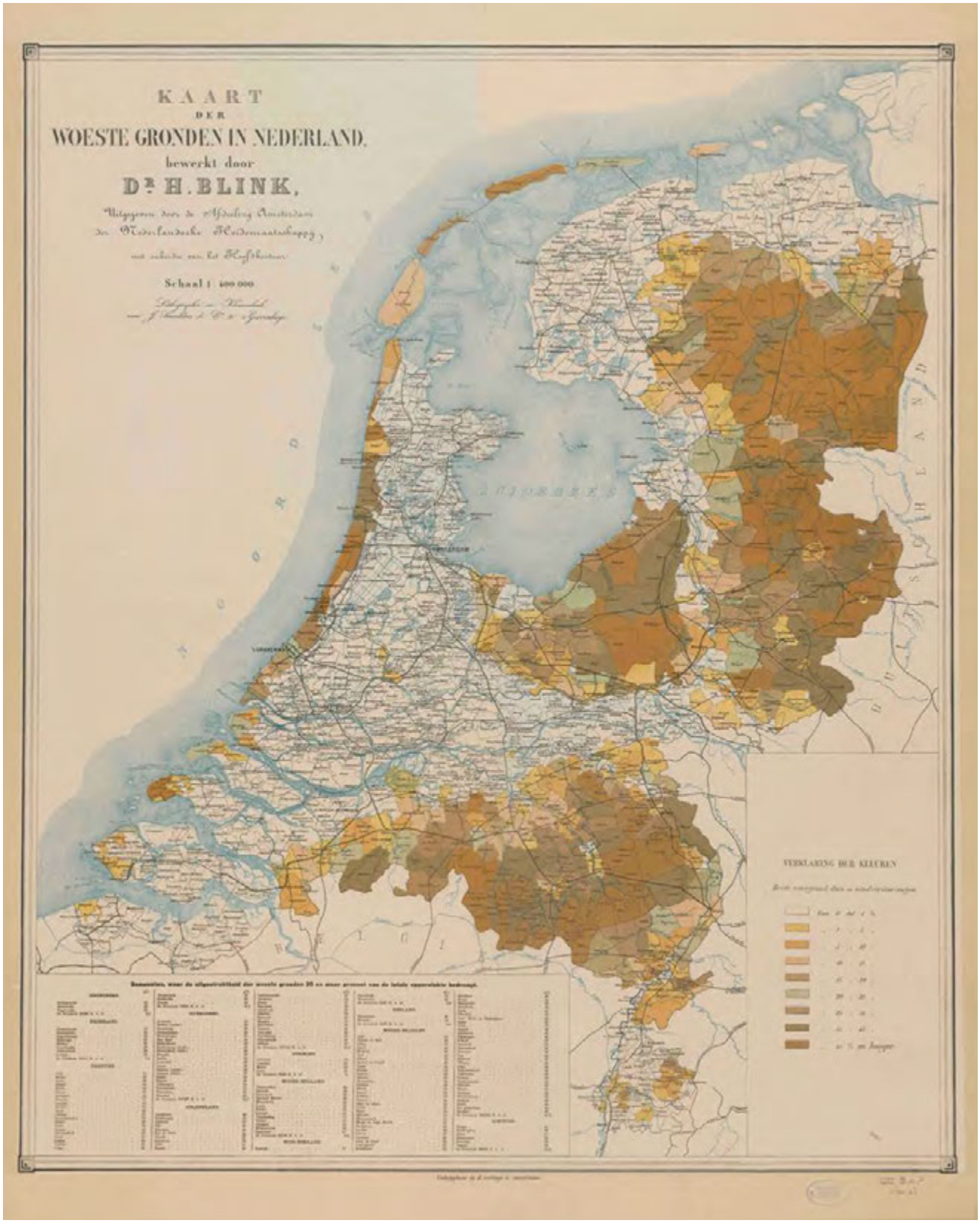
Unlike earlier legislation, however, the 1886 *Marke* Act did not prescribe reclamation or the demarcation of reclaimed sections by ditches or banks.[38] In other words: precisely those elements which many *markegenoten* were ignoring anyway were explicitly omitted from the 1886 Act.[39] The *Marke* Act should be viewed in its proper context, however, for around 1886 the total surface of common land (*marken*) – which was not the same as wasteland! – had already contracted to ca. 36,000ha. The vast majority of *markegronden*, amounting to several hundred thousand hectare, had already been enclosed – but not nearly all of it had also been reclaimed.[40] On the contrary: much of the land earmarked for reclamation by the *Nederlandsche Heidemaatschappij* (usually abbreviated to Heidemij; established in 1888, shortly after the *Marke* Act came into force) was former *markegrond*.[41] One of the goals of this public-private enterprise (to be discussed later) was to engage in large-scale reclamations and other agronomic projects. Its founding members were well aware that the Netherlands at that time still contained almost 600,000 hectares of wasteland, more than half of it in the provinces of Drenthe, Overijssel and Gelderland and to a lesser extent Noord-Brabant. This situation significantly reduced the *Marke* Act's potential effect on the private reclamation process, making it far less significant than is often thought.

Nonetheless, in the 19th century the process of reclamation of wasteland was unstoppable, as these figures illustrate: in 1833, ca. 28% of the total land surface of the Netherlands was wasteland; in 1885, it had dropped to ca. 18%. In absolute terms, wasteland decreased from ca. 906,000ha in 1833 to ca. 592,000ha in 1885, a 35% reduction. (fig. 17) Over the next few decades, up until ca. 1910, the area of wasteland further decreased with ca. 50,000ha down to a total of 543,000ha.[42] In other words, by the start of the 20th century, or about a century ago, ca. 16 % of the Netherlands had not yet been reclaimed. Until the Second World War, further reclamations amounting to ca. 270,000ha followed, leaving a more or less equal area – i.e. another ca. 270,000ha – of wasteland, or ca. 8% of the nation's total surface. In the next 25 years – the post 1940 reconstruction period – these figures underwent an only relatively limited change, leaving the total area of wasteland at just over 200,000ha, or 5.5% (see below for more details; see also Table 2.1).[43]

2.3.2 Polders (and/or reclamation of water surfaces)

Since the late medieval period, it had been common practice in the lower parts of the Netherlands to drain depleted peat extraction pits, (natural) lakes, coastal salt marshes and inlets. The creation of a large number of polders after ca. 1600 was followed by a second burst of activity from the mid-19th century onwards, but in these later polders the familiar windmills were usually replaced by steam power, as in the Haarlemmermeer Polder (18,000ha; 1852; originally a mainly natural lake between Amsterdam, Haarlem and Leiden) and the Prins Alexander Polder (2,650ha; 1874; depleted peat extraction zone, east of Rotterdam).[44] From those days 'polder making' was no longer a strictly private or water board enterprise but had become a matter of state involvement and needed a legal basis. The so-called Y-Polders; Du: IJ; pronounced [ɛi̯]) were an unusual case because they came into being thanks to a national concession. They were formed ca. 1875

38 *De Nederlandsche Staatscourant* 1886, No. 117 (May 19) (accessed via www. delpher.nl).
39 Hermans [1945], 108, 109; See *Markenwet*, Art. 39.
40 Blink 1929, 51; see e.g. Hermans [1945], 108; the provinces of Noord-Brabant and Limburg were possibly excluded.
41 Otto 1963, 68-73.
42 Hermans [1945], 14; Schuiling 1915, 549 ff.; A.J. Grandjean 1962, 328.
43 Some tables show (slight) contradictions; usually these are due to differing sources or literature.
44 Van der Ham 2009, 277-283; Thurkow 1985.



19 Map by geographer H. Blink showing waste lands in the Netherlands. Edition: Nederlandsche Heidemaatschappij, 1892.

Table 2.1 Wastelands and reclamations in the Netherlands, 1833-1960.

Woeste grond (ha)	1833	1857	1885	1900	1910	1920	1930	1940	1960
Groningen	37,629								
Friesland	37,963								
Drenthe	179,748								
Overijssel	150,198								
Gelderland	164,659								
Utrecht	16,369								
Noord-Holland	38,727								
Zuid-Holland	13,388								
Zeeland	16,414								
Noord-Brabant	181,049								
Limburg	70,362								
The Netherlands	906,506	726,000	592,319	590,848	542,877	481,691	378,225	269,820	200,000
% of land surface	27.70		18.10		16.00		11.60		6.00
Wasteland decrease (ha)			**1833-1885**		**1900-1910**	**1910-1920**	**1920-1930**	**1930-1940**	**1940-1960**
The Netherlands			314,187		47,971	61,186	103,466	108,405	70,000
Wasteland decrease (ha)			**1833-1885**				**1885-1930**	**1885-1940**	
The Netherlands			314,187				214,094	322,499	

Sources: Hermans [1945], 14 and Grandjean 1962, 328.

20 The North Sea Canal as it was designed in the 1860s. The course of the canal was designed to lead through the existing IJ (Y), a western branch of the Zuiderzee (see bottom right). The IJ and the Wijkermeer (see top left) had to be reclaimed and poldered.

21 An excavateur in the digging ditches in Wieringermeer Polder. (ca. 1930)

when a 20km westward extension or branch (the IJ) of the Zuiderzee near Amsterdam was drained in the context of the construction of the North Sea Canal.[45] (fig. 18)
Around the same time, ideas were launched to drain the Zuiderzee itself (and parts of the Waddenzee between the northern coast and the Frisian Islands as well). The first plans were rejected, but from 1887 onwards civil engineer Cornelis Lely and the *Zuiderzeevereeniging* (*Zuiderzee* Association) came up with a series of realistic proposals. It was to be several more decades before the final plan materialized, but when Lely himself became Minister of *Waterstaat* (Water Management) and a severe flood once again inundated the Zuiderzee coasts (1916), the die was cast. In 1918, the Zuiderzee Act was passed and work commenced shortly afterwards. The plans included the construction of the so-called *Afsluitdijk* ('Enclosing Dyke'), closing off the Zuiderzee between the provinces of Noord-Holland and Friesland, as well as five large polder projects. The first was the Wieringermeer Polder (20,000ha; dry in 1930), followed in 1942 by the Noordoost Polder (48,000ha). In fact, work on the Noordoost Polder commenced in 1936, well before the Second World War, but it was developed from 1942 onwards, i.e. in the middle of the war.[46] (fig. 19) Remarkably, the total surface of the Noordoost Polder alone equals that of all the wasteland reclaimed in the provinces of Drenthe, Overijssel, Gelderland and Noord-Brabant between ca. 1893 and 1930 put together.

2.3.2.1 State involvement

Obviously, the creation of polders on this scale would be impossible without close collaboration of all government branches and institutions.[47] This was a national undertaking for which several new departments were created within the Ministry of Water Management, such as the *Dienst der Zuiderzeewerken* ('Zuiderzee Works Agency') and the *Rijksdienst voor de IJsselmeerpolders* ('State Agency for the IJsselmeer Polders') responsible for, respectively, matters related to civil engineering and the development of the new polders. These were later joined by other new institutions including the *Rijksplanologische Dienst* (RPD; 'State Service for Urban and Rural Planning'). An important aspect of polder formation was the fact that it drew on the expertise and contributions of a range of scientific disciplines and that the scale and the internal organization of the new polders were based on then current economic and social needs. Overall, the internal organization of both the Wieringermeer Polder and the Noordoost Polder was pre-planned, in the sense that it was based on modules produced on the drawing board and that most of the farm layouts were strictly rectangular. Private or non-regulated farm designs were not allowed and potential candidates for the farms were carefully vetted as to their level of education, professional skills,

45 The name IJpolder can hardly be found on todays maps anymore. The Y stretched out from Amsterdam to Beverwijk on the inner dunes. The former Y is now a hardly to be recognized polder district buzzing with port facilities and recreational zones.

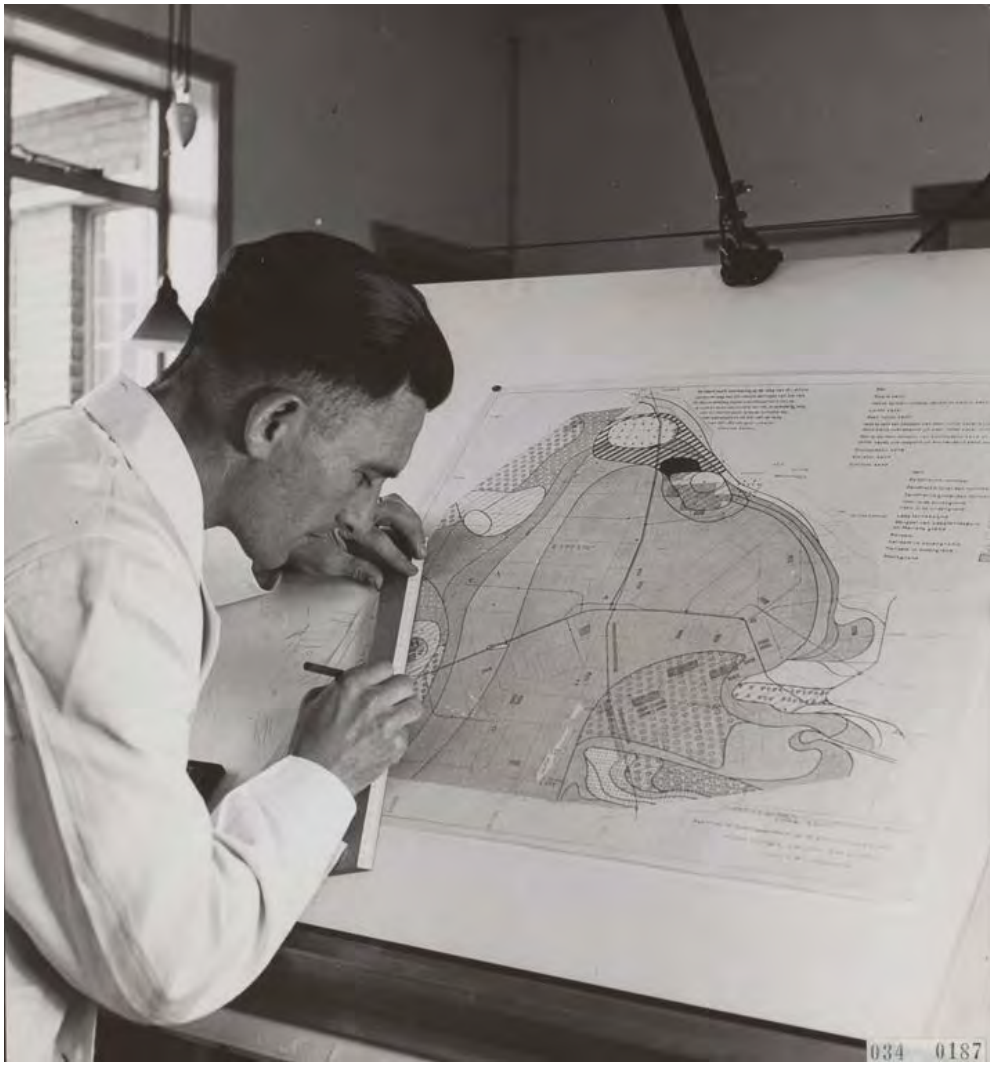
46 Van Duin & De Kaste 1995; https://nl.wikipedia.org/wiki/Zuiderzeewerken. Today, Oostelijk and Zuidelijk Flevoland together are simply called Flevoland. The polder which never materialized – to be called Markerwaard – would have been situated in the western part of the Zuiderzee / IJsselmeer / Lake IJssel.

47 In the 19th century, the Haarlemmermeer Polder and the IJ Polders had also been State enterprises but the newly acquired land was privately sold afterwards.

origin, religion and 'modernity'. As a result, top-of-the-range technology as well as strict social-cultural selection provided the foundation for the drainage and development of parts of the Zuiderzee. (fig. 20) (Also see Box Text Noordoost Polder)
Beside the IJsselmeer Polders the last decades of the 19th century and the first of the 20th century also saw the (State) realization of a number of other polders elsewhere the country (Noord-Holland [e.g. Naardermeer][48], Zuid-Holland [e.g. Polder Biesbosch], Friesland [e.g. Hornstermeerpolder, Workumerwaard][49], Groningen [e.g. De Kwelder] and Zeeland [e.g. Kreekrakpolder]) in former lakes and salt marshes. With their modest scale – a few hundred hectares at most – these polders were tiny compared to the *Zuiderzeewerken*.[50]

2.3.3 Land consolidation

The third main factor driving the transformation of the Dutch rural landscape is land consolidation. The term land consolidation may refer to several more or less distinct interventions in the rural landscape. Today in the Netherlands it mostly refers to an integral approach to land tenure and social and economic conditions in combination with functional modernization. Earlier forms of land consolidation mainly involved land re-allotment (or re-allocation), an interpretation which has remained current only in so-called (private) voluntary re-allotment.[51] (fig. 21)
Although the need for land exchange was not limited to particular regions it was most



22 Rationalism in 'Labatory Noordoost Polder'. Results of soil exploration are being fixed on paper. (1943)

48 Most of the Naardermeer was reclaimed in 1886, but the polder was left to drown again and in 1906 became the first property of the *Vereniging tot Behoud van Natuurmonumenten in Nederland* (Society for preservation of nature monuments in the Netherlands).
49 Kunst 2018, 2-10.
50 See also https://nl.wikipedia.org/wiki/Lijst_van_land acquisitionsprojecten#Nederland; An Overview of Land Consolidation in Europe. Arvo Vitikainen 2004, In: *Nordic Journal of Surveying and Real Estate Research* VOL 1, 2004 25-44.
51 A well known case is the private re-allotment of dispersed fields owned by R.D. Soeters and W.H. Smits in 1905. Soeters was an associate member of *Nederlandsche Heidemaatschappij* from the beginning (ca. 1889).

pronounced in sandy areas and in origin medieval reclamations on clay and peat soils. Yet from the start the agronomic or agro-engineers of *Nederlandsche Heidemaatschappij* (est. 1888) concentrated their activities on the eastern and southern sandy regions.

2.3.3.1 Land consolidation and re-allotment

At first, land consolidation and re-allotment projects were not nearly planned and prepared as meticulously as the construction and layout of polders, although there were exceptions. Land consolidation may involve several separate measures for the improvement of (living) conditions in a (rural) region; re-allotment is usually one of its elements.[52]
In the past, repartitioning and land exchange between private owners have always been common. Usually, only two owners were involved and the transaction attracted little official notice, let alone interference for the purpose of taxation. Nonetheless, from the medieval period onwards land exchanges were accompanied by some paperwork, if only to be able to tax the right address. In 1832, the establishment of the *Kadaster* led to an accurate and nation-wide registration and taxation of immovable property. It is often assumed that the cadastre maps of several regions reflect a long-term stability in parcellation, but of course in reality new roads and railway construction cut across the area on a substantial scale from the 1830s onwards. Agricultural and other rural changes, as well as changes in land ownership, land use and even drainage were or might be additional factors contributing to land fragmentation. For centuries but especially in the final quarter of the 19th century, agricultural land became increasingly more fragmented as properties were divided among a growing number of owners and tenants. The causes varied, but a few stood out: growing demographic pressure, as well as land shortages, the introduction of fertilizers, and crop specialization. The obligatory but by no means universally welcomed enclosure of former *markegronden* (or *gemeynten*, as comparable juridical entities were called in some southern parts of the country) contributed to the process, as we saw earlier.

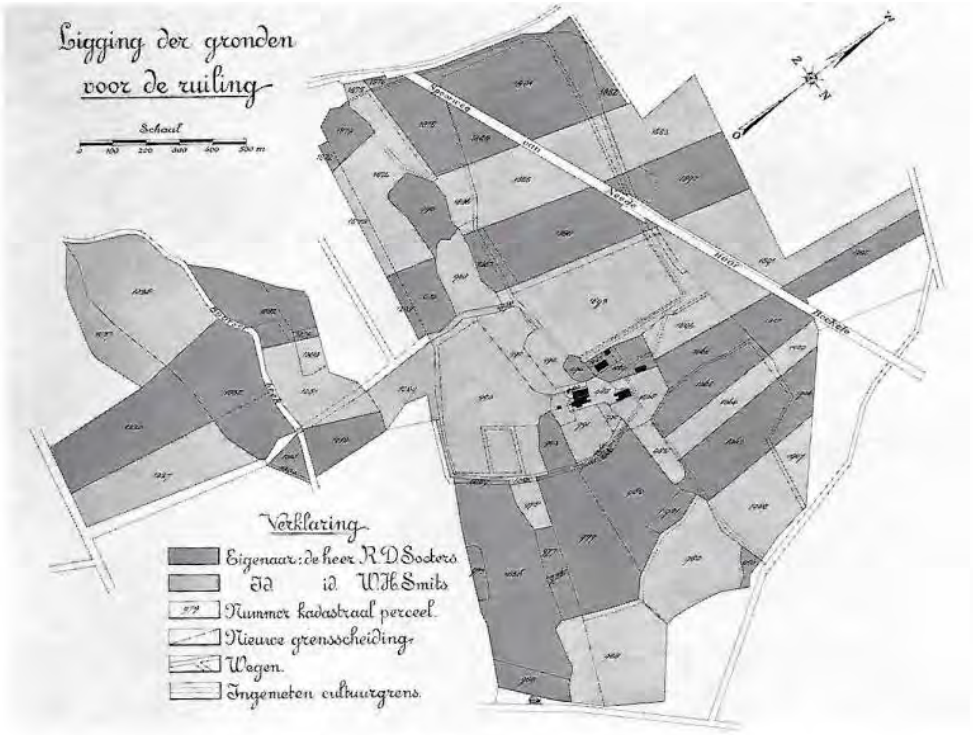
2.3.4 Interconnected factors

Of course, the above mentioned factors were all connected, which is why a short explanation may be in order here. Yet we cannot disregard two major aspects on rural development: first we must mention activities of a series of 18th- and 19th-century (provincial) societies of agriculture, some of them experimental and innovative. Second there was the late 19th- and early 20th-century emergence of so-called (cooperative) diary and food factories and other (joint) rural enterprises and activities, e.g. ground tillage, transport or purchasing goods.[53] Favourable results from both aspects could positively affect modernization and stimulate participating in rationalization. But this proved to be far from guaranteed as will be shown below.

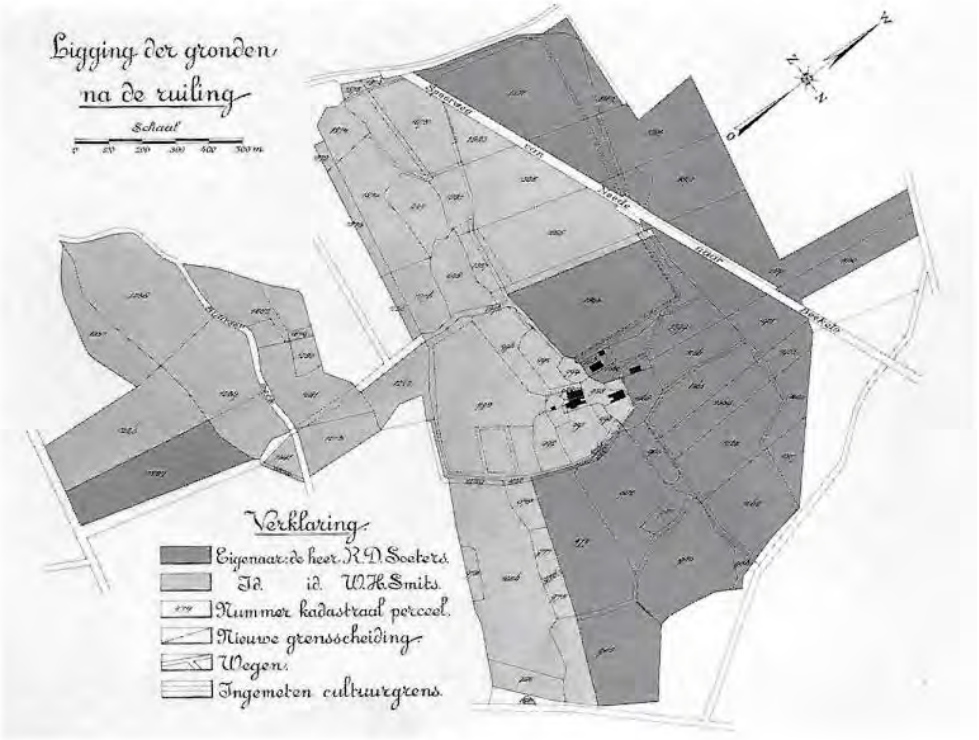
2.3.4.1 Demographic factors, specialization and fragmentation

When birth rates rose and mortality rates dropped, farmers had to feed more mouths with the same amount of land they split up their properties and divided them among their children (almost always their sons). It was a viable solution because the land had become more fertile – and with it, more productive – after the introduction of fertilizers and more intensive forms of soil preparation. Targeted production for a niche market also enabled farmers to generate some extra income, provided market prizes were favourable.
By specializing in, for example, (soft) fruit or vegetables, or in craft activities such as basket weaving or clog making, a farmer might generate just enough income. Steigenga concluded that a combination of agricultural specialization and downsizing (or fragmentation) had kept the agrarian work force stable for a long time.[54]
Fragmentation of land ownership (or land use) had a major drawback, however. Fields of one individual farm were or might be scattered over large distances, making transportation time consuming and the use of heavy machines almost impossible. Loss of time and energy was not the only problem; other impediments were also quite common, such as a lack of right of way or even of roads altogether. The latter situation prevailed in wet and/or low-lying parts of the country, e.g. scattered in the provinces of Noord-Holland and

52 http://www.fao.org/docrep/006/y4954e/y4954e06.htm#TopOfPage; Re-allotment can be defined as the transfer of proprietary rights through the reassignment of land ownership.
53 Minderhoud 1940, 21-116; [Deckers] 1937, 175 ff.: Ca. 1935 there were over 500 cooperative diary factories plus over 360 privately owned ones – most of them small sized and of local importance of course.
54 Steigenga [1939], 32 ff, 76 ff.



De voorloper van de ruilverkaveling in Nederland.



23 t + b An example of a private voluntary re-allotment between two owners in the Achterhoek area (Gelderland Province), dated 1905.

24 Crofters tried to make living out of their small holdings – sometimes by specializing on niche markets such as poultry farming (e.g. duck decoying, selling eggs), preserving fruit or vegetables or producing honey. This small holding is in the hamlet of Raakeind (Noord-Brabant Province) (Photo 1923)

Zuid-Holland and along the major rivers, and besides these wet areas in Friesland and the former marshes of north-western Overijssel too. So-called '*vaarpolders*' or 'punting polders' – which were common in the medieval and later clay and peat reclamations – still had hardly any roads; even in the first half of the 20th century most local and some regional traffic was by barge or other small vessels. (fig. 21)

2.3.4.2 Fertilizers, smallholdings and fragmentation

The introduction of synthetic fertilizers was a major factor towards the improvement and expansion of farming. In the final decades of the 19th century its sales soared but ultimately sorted a paradoxical effect: the availability of fertilizers in combination with the farmers' will to survive meant that even with less land a small farm could still be viable. This trend counteracted forced migration to the cities and greatly improved rural self-sufficiency. On top of that, the owners and tenants of these smallholdings could also be hired as farmhands on larger farms. After the 1880s, the number of smallholdings compared to the total number of farms therefore grew significantly, both absolutely and in relative terms. A parallel factor pushing the number of smallholdings up was the agricultural crisis of the 1880s, which resulted in lower market prices. With the sale of non-perishables no longer being profitable, farmers looked for niche markets that could be lucrative even on a small scale. (fig. 22)

Downscaling peaked in the decades around 1900, receiving a further boost from another process, a relative increase in (smallholding) tenancy. In the period 1888-1910, the proportion of tenant farms of 5ha or less rose by almost a quarter from 40.8% to 49.6%.[55] Table 2.2 illustrates the same process: between 1883 and 1910, the percentage of smallholders rose from 44.6% to 52.4%, with an absolute increase of 42,600 (+ 64%).[56]

55 *Rapporten* 1912, 106

56 It should be noted here that Steigenga's [1939, 36] much older data for 1910 deviate considerably. Steigenga [1939], 35.

Table 2.2 Total number of agrarian land users and farm size in the period 1883-1970.

Number of holdings per category	1883	1898	1910
1-5ha	67.000	80.300	109.600
Percentage	44,60%	47,30%	52,40%
5-10ha	31.500	34.400	41.400
10-20ha	27.300	29.300	30.800
20-50ha	20.800	22.000	23.800
50-100ha	3.300	3.400	3.300
>100ha	ca. 300	ca. 200	216
Total (approximately)	150.100	169.700	209.200
	Proportional increase / decrease % 1883-1910	**1921**	**1930**
1-5ha	64	112.600	110.600
Percentage		50.80%	47.20%
5-10ha	32	49.000	55.500
10-20ha	13	34.500	41.200
20-50ha	14	22.700	24.100
50-100ha	1	2.600	2.500
>100ha	-28	250	195
Total (approximately)	39	221.600	234.100
	Proportional increase / decrease % 1910-1930	**1945**	**1959**
1-5ha	1	103.500	87.700
Percentage		44.70%	38%
5-10ha	13.4	56.000	62.200
10-20ha	13.3	46.000	53.900
20-50ha	1	23.500	24.500
50-100ha	-24	1.600	2.032
>100ha	-10	132	incl.
Total (approximately)	11.2	231.800	230.300
	Proportional increase / decrease % 1930-1959	**1965**	**1970**
1-5ha	-20.7	72.200	42.497
Percentage		34.50%	23.00%
5-10ha	11.2	52.465	39.155
10-20ha	13.1	55.221	52.079
20-50ha	0.1	25.311	27.881
50-100ha		2.119	2.283
>100ha	-24.6	incl.	224
Total (approximately)	-11.6	209.315	184.613
	Proportional increase / decrease % 1959-1970		
1-5ha	-51.6		
Percentage			
5-10ha	-37.1		
10-20ha	3.4		
20-50ha	8.80		
50-100ha	8.90		
>100ha	58.9*		
Total (approximately)	-19.8		

Sources: Van Zanden 1985, 333; Landbouwcijfers 1960, 42

These numbers suggest that a nation-wide growth of the number of people employed in farming of almost 40% in less than thirty years was accompanied by an even sharper relative increase in the number of farmers working only 5ha or less. Around 1880, there were ca. 67,000 smallholders; by 1910, this had increased to nearly 110,000. In other words: despite ongoing reclamation, the fragmentation of land ownership and land use continued unabated The average farmer had increasingly less acreage at his disposal, especially small farmers although their numbers finally stabilized around 1930. In simple terms: in the Netherlands, too many farmers were working too little land.[57] As can be deducted from the table slow decrease of numbers started somewhere around 1940; fastening of the tempo of termination of smallholdings only began around 1950.[58]

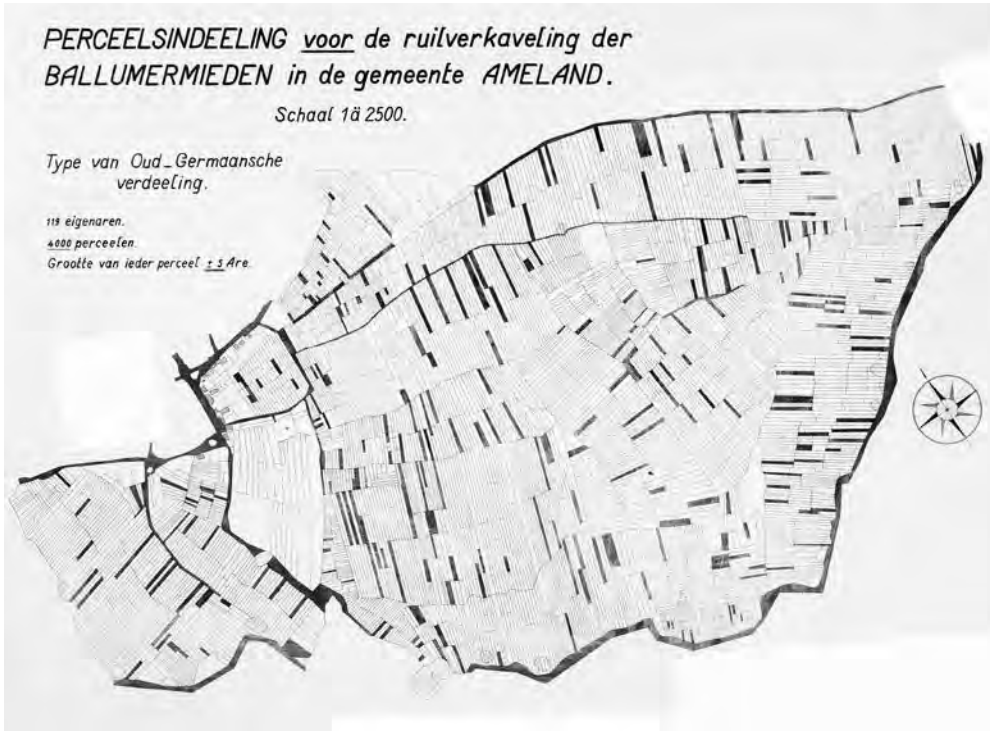
2.4 The first efforts to improve rural conditions

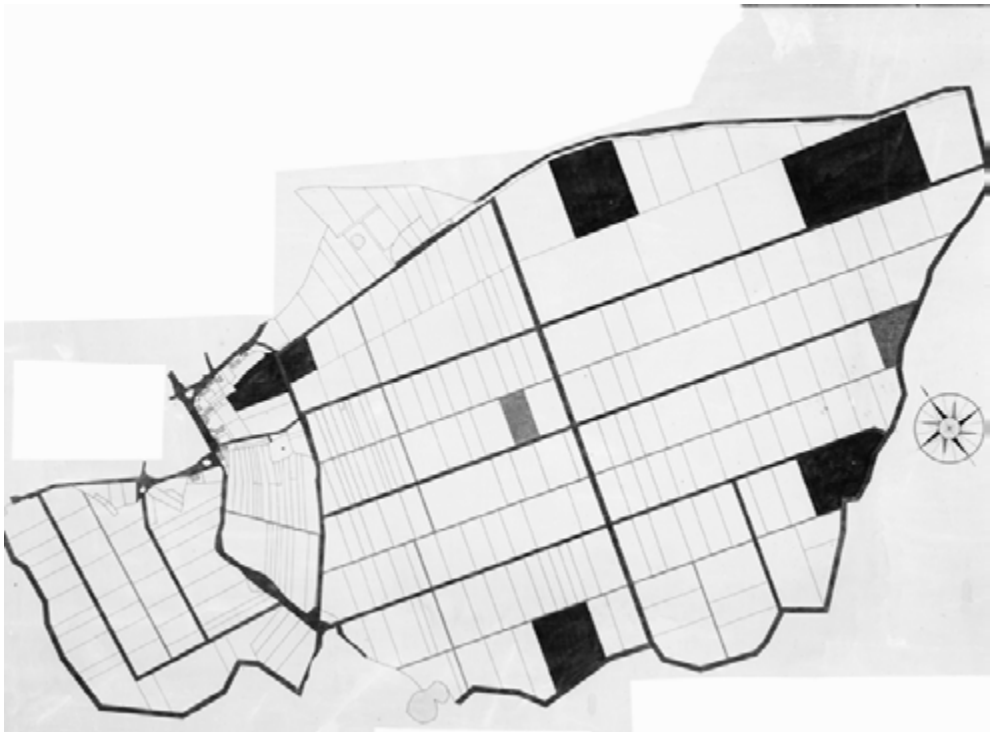
Following a number of privately organized land consolidation projects, the Dutch State drafted a plan to legally facilitate land exchange. The term '*ruilverkaveling*' had not yet been introduced when the process was publicly discussed in the Netherlands for (probably) the first time, on November 21, 1889, in Amsterdam, during the annual meeting of the *Vereeniging voor Kadaster en Landbouwkunde*, or 'Association for Cadastre and Agriculture'. A certain C.W. Hoffmann used the word '*landverlegging*', literally 'land relocation'. Since then, it has gradually become clear that what Mr. Hoffman was referring to was, in fact, re-allotment and thus involved only the transfer of proprietary rights. The legal framework, however, was only established thirty-five years later, in 1924. The two institutions mainly responsible for placing the subject on the political agenda were the above mentioned *Heidemij* and the *Vrijzinnig-Democratische Bond* ('Liberal-Democratic League', est. 1901). The term *landverlegging* ceased to be used in the media after ca. 1903 and was replaced by the more explicit r*uilverkaveling*, literally 'land exchange through repartitioning'. A committee established about the same time studied the matter and in 1905 presented a proposal for a land consolidation act. Meanwhile, the first examples of land consolidation projects involving a group of individuals made headlines, not least because the projects had been handled by the *Heidemij*. Among the first land consolidation projects implemented under its supervision was the Zeijerveld project in the municipality of Vries (Drenthe Province; 1908). After a previous enclosure and allocation of former *markegronden* by local farmers had produced highly inefficient results, the director of *Heidemij* acquired the land and produced a completely new plan. It was implemented by *Heidemij* itself and featured a practical structure that included roads and watercourses.[59] Two other early plans concerned the re-allocation projects Ballumer Mieden (on the island of Ameland; 1913-1920)[60] and Nieuwleusen (Overijssel Province; 1915). (fig. 23, 24) However, this second enterprise failed when at the last minute some of the land owners refused to cooperate.[61] A short time later, a second re-allocation project in the same area, Dalfser Hooislagen (Overijssel; 1918-1924), was successful. (For Dalfser Hooislagen and Nieuwleusen, see the relevant Box Text).

2.4.1 Regression: self-sufficiency and fragmentation

While attempting to stimulate agricultural modernization the government was putting the cart before the horse, at least with respect to the future and long-term viability of farming, for its 1918 *Landarbeiderswet*, or 'Farm Labourer Act', made it easier to work a smallholding and even encouraged it.[62] The Act facilitated the establishment of a small farm and farm house as a measure to halt further rural unemployment and also – as in the 19th century – to stimulate self-sufficiency. But it had an undesirable side-effect: it also stimulated fragmentation, or at least a reduction in the size of the average farm. We will not focus on this fact but mention must be made of the ca. 26,000 farm labourers owning up to 0,99ha of ground in 1938 – and about the same number still in 1948![63] Nonetheless, in defence of those responsible for the Act – who, incidentally, were no 'experts' in

57 Steigenga [1939], 35.
58 Landbouwcijfers 1960, 42. (1950: 101.737 smallholders)
59 DIT is 59 Provinciale Overijsselsche en Zwolsche Courant, February 6, 1909.
60 *Het Centrum*, February 14, 1916 (second edition) (accessible via www. delpher.nl).
61 *Provinciale Overijsselsche en Zwolsche courant*, April 4, 1914, p. 4. A few years later, land consolidation proceeded successfully, this time on a larger scale and in accordance with the 1924 Act.
62 Loans were made available for setting up a new farm. By then there were more than 300,000 farm workers; however, over a period of four decades only a few thousand of them availed themselves of this option. The law became effective in 1920, after the First World War.
63 Sleumer 1952, 140.





25 + 26 Maps of scattered landownership in Ballumer Mieden on the island of Ameland. Left: condition of scattered land, focused on two owners before the land re-allotment or land consolidation; right: properties of these two owners after the re-allotment. Ballumer Mieden was a so-called voluntary land consolidation, without legislative interference.

the field – it should be noted that they could not have foreseen that several decades later the political and economic climate would be completely reversed. Still, we should emphasize that the State's incipient involvement with farming practices after ca. 1920 was a major step forward, also in areas like quality control by such means as testing stations or the organization of agricultural training.

2.4.2 Dutch agricultural problems: a contemporary view

The First World War (= the Great War; 1914-1918) was scarcely over when rural issues were back on the agenda. The headline of a 1922 newspaper article read: 'The stagnation in Dutch agriculture and horticulture'. In addition to printing a long list of issues the accompanying article also presented a number of recommendations, such as: '1. Better drainage, 2. A land consolidation act, [...], 4. Revision of the tenancy system, 5. Regulation of mortgages, [...], 7. Extension of primary agricultural education, [...], 9. Elevation of the farm-labouring class, [...], 12. Heathland reclamations and the establishment of farms on wasteland!'[64] These problems and recommendations to a large extent touched upon spatial and social and economic issues. Interestingly, 'Improvement of (traffic) infrastructure' is not among the twelve listed items. Overall, the agricultural crisis fuelled the call for land consolidation and by implication for a more radical intervention in the Dutch rural situation than just re-allocation of ownership.

2.5 The beginnings of real change: public attention through the 1924 and 1938 Acts

Partly as a result of the First World War it was 1923 before a proposal for a Land Consolidation Act was finally filed. In 1924, the long anticipated Act was accepted. In the deliberations which led up to it, it became apparent that in the Honourable Members' (Du. *Eerste Kamer*) opinion the Act's scope should be extended beyond land exchange. The first speaker, Mr. J. Weitkamp (representative of a conservative, Christian party and himself a farmer, and with a solid electoral base) observed: '*The purpose of land consolidation is the merger of suitable fields, resulting in a substantial reduction of the number of fields. The roads leading to the scattered plots tend to be poor. Many roads cross land owned by others which therefore has to remain partly uncultivated. The use of modern farming equipment is impossible. Land consolidation also allows for significant improvement of the drainage situation. Moreover, fewer fences, hedges and trees are required. Weed control becomes much easier, etcetera.*'[65] In fact, Weitkamp thus succinctly summarized both the main problems affecting these areas and land consolidation's main goals. With one exception: the social and cultural aspects which in many areas were inextricably linked to the process and included the poor education of many of those involved. Others during this same debate also pointed out the role of rural traditions. What is remarkable is that all the items listed by Weitkamp had also been addressed by the old 1809 Act concerning the *Marke* enclosure. One in particular – the last item on Weitkamp's list – was to become a source of grave concern among future cultural-historians, since the quality of land consolidation landscapes allegedly suffered severely because of it: the loss of fences, hedges and trees. In practice, however, the effects of the Act were mitigated somewhat by for example an explicit ban on the felling of trees. Moreover, this same Section 27 of the Act stated that those responsible for its implementation should strive to preserve the natural beauty of the locality.[66]

2.5.1 The first legal goals – but hardly any progress

The 1924 Land Consolidation Act might have led to a revolution in land use and land ownership if circumstances and conditions had been favourable. But the 1920s and 30s brought a severe economic crisis which did not stimulate taking risks. Further the governmental conditions for loans and interests were hardly attractive for smallholders with their scattered fields. Although the Act was a legeslative leap forward in land development to come it's most important role probably was to draw public

64 *Algemeen Handelsblad*, June 14, 1922, evening edition, 9.
65 *Leeuwarder Courant*, June 13 1924 (second edition).
66 See http://resolver.kb.nl/resolve?urn=sgd:mpeg21:19221923:0002126&role=pdf

attention to the problems. It is important therefore to sum up some arguments in favour of land consolidation mentioned in the 1924 Act:
1. The merging of scattered fields;
2. By implication, the creation of larger fields and, consequently, their reduction in number;
3. Improved traffic infrastructure;
4. Improved drainage.

These same four arguments would be repeated many years later in the reconstruction period, when tradition and innovation were re-invented. The 1924 Land Consolidation Act did not affect many changes in land ownership. In August 1938, when the Act was revised, less than only a disappointing 20,000ha had been processed. What went wrong and why? We will discuss the 1924 and 1938 Acts in greater detail later on (viz. 8.2.3).

2.6 On the eve of the Second World War; an overall view

In the years leading up to the Second World War, reclamation, drainage of surface waters and land consolidation together created tens of thousands, even hundreds of thousands of hectares of new agricultural land in the Netherlands. With well over 250,000ha, reclamations of wasteland contributed the bulk, followed at a considerable distance by the polders, contributing almost 75,000ha (if the Noordoost Polder is included).[67] Land consolidation lags far behind, amounting to 20,000ha up to the Second World War, although the number of filed applications rose substantially after the introduction of the revised Act in 1938. Very few of the approved land consolidation projects were actually implemented during the war but preparations for some were started.
Other chapters in this book will address the drastic changes in these numbers after the Second World War and the associated pronounced shift in focus towards land improvement, particularly through land consolidation. First, however, we will look at other causes of rural and agricultural problems – and subsequent changes – such as the massive destruction sustained during the Second World War and the damage which resulted from the 1953 North Sea flood. This will be followed by a discussion of some specific problems already touched upon in the preceding chapter but this time presented in the light of the reconstruction period that followed them.

[67] Roughly the period 1900-1940. One example of a pre-WWII consolidation which continued up until ca. 1965 was that in *Peelsche en Rijtsche Heide*, in the south of the province of Noord-Brabant; see the Box Text on this consolidation project.

Dalfser Hooislagen and Nieuwleusen, 1918-1924 and 1925-1928

Land consolidations, Dalfsen Municipality

Identification

- Two contiguous land consolidations in a rural zone north-east of Zwolle (Province of Overijssel) and extending from south-east to north-west on both sides of the Zwolle-Assen railway line and, a short distance to the west, the A28 motorway.
- The land consolidation Dalfser Hooislagen (207ha) is a so-called 'voluntary land consolidation', realized from 1918 onwards. The land consolidation Nieuwleusen (1,231ha), to the north-west, was one of the first to be carried out under the 1924 Land Consolidation Act. Both consolidations were planned and executed by the *Nederlandsche Heidemaatschappij* or Heidemij.

Problems

In 1912 a few land owners in Dalfser Hooislagen who together owned ca. 300ha expressed their interest in land consolidation. The initiative was taken up by the *Nederlandsche Heidemaatschappij*. The area in question was regularly flooded. The southern section comprised long rectangular parcels while the rest was wasteland. At the time the land was mostly put under hay. There were 65 land owners. The individual plots measured ca. 1,500m long by only 6 to 40m wide (!), with railroad tracks cutting across some of them. Much of the area was without roads or puntable ditches, rendering it barely accessible. In early April, 1914, the owners voted on a proposed (voluntary) land consolidation which only entailed a simple exchange and merger. Some of the participants initially obstructed the process, but in September, 1918 most of them had changed their mind and the *Heidemaatschappij* was commissioned to begin a land consolidation, albeit only for 207ha of Dalfser Hooislagen. The implemented solution involved a division into regular, rectangular fields, improved drainage and a few access roads. The land consolidation Dalfser Hooislagen was completed in 1924.

In the area of the land consolidation Nieuwleusen, carried out next, the problems were similar but on a much larger scale (1,231ha) and there were also many more land owners (767). Here, interested parties made their wishes known around 1923 and the plan was submitted for inspection in August, 1925. In Nieuwleusen, the problems were quickly solved. Thanks to the in the mean time introduced legal instrument of the 1924 Land Consolidation Act, the votes against (nineteen, representing only 86ha, so there was a dual minority) were unable to halt the proposal. The following discussion concentrates on this second land consolidation, being the more interesting of the two. (fig. 25, 26)

Realization

When *Heidemij* started with the land consolidation Nieuwleusen, it also began working towards a solution for one of the main problems that affected the entire region: poor drainage. The land consolidation Nieuwleusen discharged into the Stouwe or Steenwetering, which was diverted underneath the Lichtmis Canal via a culvert (at the large 'crossing' on the map). The construction of an engine-driven pumping station (west of the area shown on the maps) began in 1925. It was designed by engineering firm Van Hasselt & De Koning (today Royal Haskoning).

Heidemij attacked the project with vigour, aided by a labour force of unemployed individuals organized by the *Rijksbureau voor Ontwatering* ('State Agency for Drainage'). The project design was revolutionary for its time. The area was characterized by a fine-meshed grid of elongated administrative plots dissected by the railroad tracks, the Lichtmis Canal and, running parallel to the latter, the 19th-century national road.[1] Onto this canvas the architects projected a plan which seemed to draw on contemporary urbanist elements as encountered in for example plans by H.P. Berlage and K.P.C. de Bazel. Roads and waterways meeting at oblique angles and perpendicular T-junctions dominated the plan, which seems to have been mainly aesthetic in intention. But at the same time it was also highly functional and convenient for motorized traffic, which was just emerging at the time. The railway line Zwolle-Assen and the Lichtmis Canal (which was barely functional for drainage purposes and in the late 1960s was filled in to construct the A28 motorway) were effortlessly integrated in the overall layout.

On the map, nothing in the layout even remotely hints at randomness or an organic development. At the time, the difference with the field patterns of the surrounding areas was staggering. There, long narrow plots and regular blocks with tiny fields formed a stark contrast with the spacious broad strokes of the modern land consolidation Nieuwleusen. Even today, the by now over 90-year-old land consolidation is instantly recognizable on topographic maps and aerial photos.

Towards the end of 1928, the land consolidation was completed. It was celebrated and frequently alluded to in the press. The number of individual plots had been reduced from ca. 2,000 to ca. 400 and ca. 40km of new roads as well as ca. 60 new farms (i.e. a form of colonization) had been realized, and thanks to its improved drainage infrastructure the area had become suitable for full-range agricultural exploitation. (fig. 27, 28, 29, 30)

Key qualities

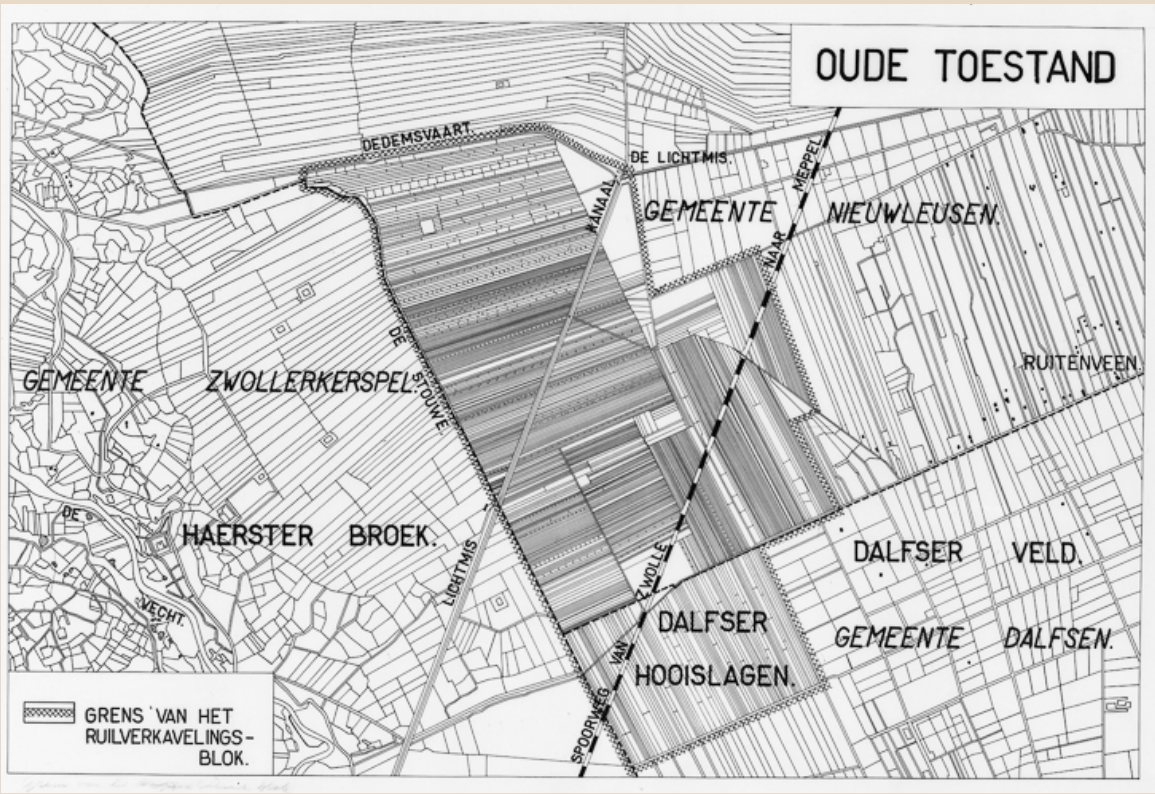
The new layout of the land consolidation Nieuwleusen, which encompasses the embankment of the Zwolle-Assen railway line and the former national road (today A28 motorway), is characterized by a system of mostly 'oblique' roads and canals. Just before each crossing, they turn at a ca. 45° angle, an element which betrays the influence of contemporary urbanist practice. It is a convenient configuration for traffic; a similar system was later applied in the Noordoost Polder. Most of the later land consolidations – and certainly those after the war – did not repeat the rigorously geometric layout of Nieuwleusen; 'modern' does not always last. Many of the later *'landscape plans'* (see 1954 Land Consolidation Act) rather aimed for a more 'organic' impression. Also typical of Nieuwleusen is its remarkably open character and its sparse built elements. Many of those (mostly farms) date from


DE RUITEN
EN
VEENENKAMPEN
WEST
BROEK
DWARSBROEK
HOOISLAGEN

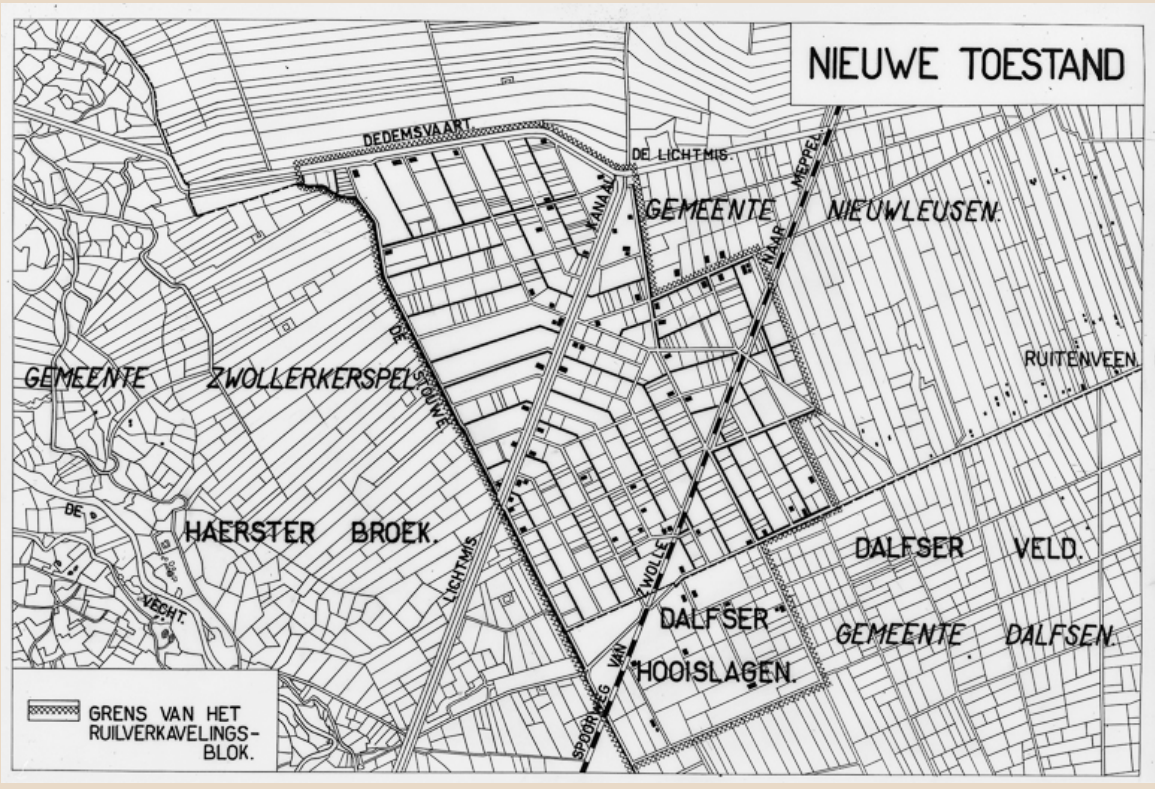
Dalfser Hooislagen and Nieuwleusen
Left: Topographical map with situation around 1910, composed of Bonnebladen 288 (1911), 289 (1910), 304 (1917) and 305 (1911).
Scale: ca. 1:50.000
Right: Topographical map with situation around 1933, composed of Bonnebladen 288 (1933), 289 (1933), 304 (1933) and 305 (1933).
Scale: ca. 1:50.000. Maps showing land consolidations Dalfser Hooislagen and Nieuwleusen. Left: situation ca. 1910, before transformations; right: situationca. 1933, after transformations. The early-20th century geometrical, 'urbanesque' layout in the centre is striking.

27 Dalfser Hooislagen before and after land consolidation and focused on possessions of two land owners, A and B.

28 Dalfser Hooislagen before and after land consolidation and focused on possessions of two land owners, A and B.



29 Land consolidations Nieuwleusen and Dalfser Hooislagen before (‘oude toestand’ after (‘nieuwe toestand’) land consolidation.



30 Land consolidations Nieuwleusen and Dalfser Hooislagen before ('oude toestand') and after (‘nieuwe toestand’) land consolidation.

the 1920s and 30s and are typical of the original appearance of this early land consolidation, proceeding from the 1924 Act. Its 1923/25 plan was undoubtedly iconic, also because it presents a stark contrast with the slightly earlier, adjoining land consolidation Dalfser Hooislagen which was implemented before the introduction of this Act but nonetheless contributed to it. (fig. 31, 32)

31 A field impression of land consolidation area Nieuwleusen. (Photo 2006)

32 A 1933 farm complex within land consolidation area Nieuwleusen. (Photo 2008)

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Note

1 Administrative plots can only be identified on paper (e.g. in the cadastral register) but are virtually indistinguishable in the terrain although there may be some forms of demarcation, ditches, stones, trees, etc.

Peelsche Heide and Rijtsche Heide, (1937-) 1946-1965

Heath reclamation, Reusel-De Mierden Municipality

Identification

- Rijtsche Heide (ca. 800ha) is situated south of the town of Tilburg, near Reusel (Noord-Brabant). It is a patchwork of open and semi-open fields interwoven with scattered timber and shrubbery. To the west and south it borders on Belgian territory. Peelsche Heide (ca. 450ha) is an area of former heathland and bogs, east of Rijtsche Heide. During the reclamation it was forested and today it features parcels of variable vegetation.
- The reclamation of Rijtsche Heide coincided with repairs of the war damage caused by Operation Market Garden (September, 1944). The work was carried out in the period 1946-1965, for which the *Dienst Uitvoering Werken* (DUW) contributed some of the labour. The (partial) afforestation of Peelsche Heide occurred from 1938 onwards. Rijtsche Heide and Peelsche Heide are a part of the Kempen region (Campina). Reusel is further known for its vast, early 20th-century reclamations known as *Landgoed Utrecht*.[1]

Problems

Even before the war, wasteland was being reclaimed in several places through afforestation to increase the area of woodland in the Netherlands. This was also the case in this border zone south of Reusel, in an area known as Peelsche Heide. Wasteland was usually converted into arable fields or pasture but in this instance afforestation was preferred, creating woodland plots dissected by roads and paths. The area's peripheral location complicated the reclamation process. Furthermore, several stretches of heath alternated, in the south merging into a peat bog which continued on the other side of the Belgian border. On the other hand, the work could be done at relatively little expense due to the large number of unemployed people who via government schemes (*DUW*) could be drafted for infrastructural projects.
The reclamation of the adjoining Rijtsche Heide was part of a wider response to the post-war demand for cultivable land to boost the food supply. On December 10, 1946 *Gedeputeerde Staten* of the province of Noord-Brabant accepted proposals submitted by a number of municipalities for the reclamation of wasteland, Reusel Municipality among them. The reclamation work probably started soon after, for its progress can be traced on topographic maps from that time onwards. (fig. 34, 35)

Realization

The reclamation of Peelsche Heide almost certainly began shortly after 1937, probably as one of the projects carried out by the *Stichting Werkverschaffing en Ontginning in Noord-Brabant*[2]; *Staatsbosbeheer* collaborated in the forestry work.
Unusually, one of the new forest roads was given a circular shape, a feature which still exists. The story goes that the circle was the idea of a Reusel civil servant and that it matches the Paris Place d'Étoile in size. The latter is incorrect, for the diameter of that round square is 250m while that of the Reusel circle is ca. 540m. In the north-west the circle has always bordered on an arable field. Ca. 2012, the trees inside this '*Groote Cirkel*' ('Big Circle') were cut, creating a clearance surrounded by woodland. Off-centre inside the circle is the so-called Reuselse Kei, a large boulder which unlike many in the Netherlands was not transported by Ice Age glaciers but by a river. Originally, the forest road which leads from Reusel to this larger circle also contained a second, smaller one (see for both circles the 1973 map, centre-right, and especially the aerial photograph). A point of interest is that the wider area contains a number of preserved burial mounds and prehistoric flint sites. Their presence was already known before the Second World War, and this may have influenced the decision to opt for this particular form of reclamation, which causes relatively little damage to the 'soil archive'. So far no similar mounds have been identified in the Peelsche Heide, but Neolithic and Bronze Age vestiges are sure. Overall, the forests (but not necessarily the trees) planted around 1940 are still standing today. (fig. 33)
The adjoining peat bog and fen area along the Belgian border to the south was not included in the reclamation and afforestation. This region – partly dug away in the 19th century – is known as De Reuselse (and Postelse) Moeren (i.e. fen and marshland) and today is a nature preserve owned by *Staatsbosbeheer*.
The reclamation of Rijtsche Heide, west of Peelsche Heide and up to the Belgian border, started in 1946 and was supervised by, among others, *Ontginningscommissie* ['reclamation committee'] *De Kempen*, another regional organisation. The reclamation continued until the mid-1960s but its apex lay in the period 1949-1954, when several pre-existing (unmetalled) roads running roughly north-south were upgraded and a number of reclamation roads were built in the intervening space. Rijtsche Heide was reclaimed approximately from north to south by 'rolling out' a patchwork of plots with boundaries more or less perpendicular to the existing roads. Most of the soil was converted into arable fields, except for the south-eastern section of Rijtsche Heide, the so-called Torenbroek bordering on De Reuselse Moeren, which was forested.
In recent years, agricultural fields on and around Rijtsche Heide have grown in size and barns and byres for industrial indoor livestock farming ('meat factories') have claimed more space.

33 Aerial view of the Rijtsche and Peelsche Heide, e.g. showing the 'Groote Cirkel' ('Big Circle') and (left) the Belgian border.


Heide
Rijtsche Heide
Peelsche Heide
Rijtsche Heide
Peelsche Heide
Beuzels
Post

Peelsche Heide and Rijtsche Heide
Left: Topographical map with situation 1915-1930, composed of Bonnebladen 705 (1931), 706 (1927), 721 (1926) en 722 (1929). Scale: ca. 1:40.000
Right: Topographical map with situation around 1970, map 57 A, Weebosch (1973). Scale: ca. 1:40.000
Maps showing waste land reclamations Peelsche Heide and Rijtsche Heide. Left: situation ca. 1930, before reclamation; right: situation ca. 1973, after reclamations and laying out forested area. Notice 'De Grote Cirkel' in the Peelsche Heide. (centre right)

34 A restored interbellum farmhouse (right) and its post war reconstruction period barn in Rijtsche Heide near the village of Reusel.

35 The socalled 'Reuselse Kei', a 1240kg erratic boulder, probably transported to the Peelsche Heide from the South in an ice floe in a former River Meuse course.

In addition, some wind turbines were built in the area's western section parallel to the Belgian border in 2014. (fig. 36)

Key qualities

Despite recent upscaling of the livestock farms and the construction of wind turbines, the mid-20th-century reclamations Peelsche Heide and Rijtsche Heide and nature preserve De Reuselse Moeren have changed very little. The development in stages and the parcellation of the area between 1938 and 1965 is still easily recognizable and several constructions (e.g. farms and houses) from that period have survived, while the scale of the area's access roads and its vegetation elements still echo the reconstruction period. Yet another valuable asset is the contrast in management regimes between the area's Dutch and Belgian sections: the Belgian part is 'residential parkland' while the Dutch part consists of open farmland. Over all the reclamations aptly illustrate how factors like the human urge to enforce a certain format, local needs, national legislation and regulation play a leading role in the organization of the terrain and thereby of the cultural landscape. This is most apparent in the national border, which after 1930 became increasingly more clearly marked on maps and aerial photos. (fig. 37) Today, traditional landscapes and their soils often serve human needs and desires, and those may vary widely across borders. The Belgian border in Peelsche Heide and Rijtsche Heide shows a particularly poignant historic element referring to the First World War: the electric wire fence along the border in this sparsely populated area claimed the lives of over a hundred individuals who illegally attempted to cross it.

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36 Rijtsche Heide reclamation farm. A 1953 farm in a characteristical longitudinal Noord-Brabant Province style. (Photo 2008)

Notes

1 These reclamations were initiated in 1898 by insurance company '*De Utrecht*'; the transformation of bogs and fens into woodland, pasture and arable fields was handled by the *Nederlandsche Heidemaatschappij*.

2 'Foundation employment scheme and reclamation in Noord-Brabant'; the foundation was short-lived, existing only from 1937 until 1942.

37 A field impression of the western part of the Rijtsche Heide with the Belgian border marked by the forested horizon. (Photo Summer, 2008)

3 War Damage and post-war recovery as incidental causes of interrupted continuity

Some Dutch landscapes were so profoundly devastated or altered by the Second World War that they arguably may be called the scars of war. In most cases, damage or alterations were undone, mitigated by the passing of time, incorporated, or transformed. This is also true of changes or damage sustained immediately before the war as a result of defensive measures. In urban areas, war damage (repaired or otherwise) is often still recognizable and therefore part of the collective consciousness. In rural areas the situation is usually different. There, post-war changes were often profound to the point of reducing any war damage to little more than just one of many reasons to overhaul the entire pre-war landscape, usually in the context of land consolidation, redevelopment or repartitioning. Damage in these areas was often manifest as destruction of the landscape and any built structures in it as a result of inundations, whether deliberate or not. The post-1945 changes in land development turned pre-war landscapes upside down but, paradoxically, also made the various types of rural zones and landscapes that still showed scars of the Second World War comparatively rare. One such odd example is the Wieringermeerpolder, completed in 1930 but inundated again only fifteen years later. In the Netherlands, the term 'war damage' above all evokes the devastation caused by the German air raids on Rotterdam on May 14, 1940; or, in line with traditional Dutch defensive tactics, of the deliberate inundation of the above mentioned Wieringermeer Polder by German forces on April 17, 1945. (see 3.4.4) Both incidents were acts of terror, serving little or no direct military purpose. Both also accurately defined – bar a few days – the beginning and the end, respectively, of the most traumatic period in recent Dutch history. Of course, many other forms of damage occurred or were inflicted as a result of hostilities or Allied actions and sometimes even shortly before the German invasion, when the Dutch army was preparing its defensive lines. War damage zones of various kinds can thus be encountered in many areas. This chapter discusses the origins, development and continuation of some of those structures and areas. It starts from the (debatable) premise that any military intervention in the terrain, or any act of war, inevitably will be accompanied by some form of damage – small or extensive – to the natural or cultural landscape. Some very different types of damage will be discussed, the common factor being the fact that they mainly affected rural, i.e. non-urban, areas. Another shared element are the profound alterations to the landscape these forms of damage represented or indirectly caused, as well as the fact that they formed an (usually explicable) interruption in an otherwise continuous landscape development. The damage is therefore interpreted as the outcome of an incident; the Second World War was *not a structural cause* of landscape change *but an incidental one*. In the discussion a distinction will be made between damage caused by military activities and that brought about by other major spatial interventions. In addition, this chapter will address, albeit relatively briefly, recovery and repairs undertaken during the war, as well as various views on damage and recovery.
Broadly speaking, it could be argued that the most drastic interventions in rural areas were the clearances, initiated by the Dutch defenders before the German attack of May 10, 1940. The clearances included burning down or destroying farms in order to get free field of fire and to prevent the enemy would use farm buildings as hiding places or shelter. In fact both aims had hardly any result because the battle was over in only a few days leaving a severely struck landscape zone. Next these clearances were very much intensified by the occupying forces from the beginning until the end of the war. Most clearances served to prepare the ground for the creation of minefields or barriers, the construction or extension of airfields and 'fake air strips'; or they were part of the deliberate destruction of many conceivable kinds of infrastructural works. Also highly destructive were the sometimes orchestrated but usually uncontrolled inundations instigated by German but occasionally also Allied forces. Further, there was direct damage as a result of acts of war such as air raids, artillery fire or plane crashes. Finally, so-called collateral damage could also have an impact on the landscape.[68]

[68] An important modern inventory of war damage in the Netherlands is Van Blankenstein 2006. Hundreds of damaged municipalities, places and other hit targets are alphabethically ans chronologically listed.

3.1 Dutch defensive lines and works

A number of Dutch landscapes still bear visible traces of the fact that they were purposely organized so as to stop an enemy. The most obvious of these, are the defensive lines constructed in the 1930s to block or prevent an expected German attack. The best known defences from the Interbellum period are the *Nieuwe Hollandse Waterlinie* (New Holland Waterline)[69], the *Grebbelinie* and the *Peel-Raamstelling* (*stelling* = defence line). The Nieuwe Hollandse Waterlinie runs from the Zuiderzee / IJsselmeer near Muiden to the Hollandsch Diep (near Moerdijk), the main outlet of the Rhine and Meuse rivers. The *Grebbelinie* (some 25km east of the Nieuwe Hollandse Waterlinie from the Zuiderzee / IJsselmeer north-west of Amersfoort to the river Rhine near Rhenen) was also known as the *Eem-Valleistelling*. Finally, the *Peel-Raamstelling*, in the east of Noord-Brabant Province, was more or less an extension of the *Grebbelinie*. Each of the three defensive lines stretched over a length of tens of kilometres and each today still contains hundreds of casemates and concrete group shelters dating from the 1930s. What is less well known is that the defences also encompassed many other structures: hundreds of (small) waterworks and sluices as well as earthworks, trenches, barriers and anti-tank ditches. Also less known is the fact that the Germans reused and reinforced the *New Hollandse Waterlinie* under a new name, '*Pantherstellung*'. Today, the original context of many of these objects has disappeared. One crucial element of the lines' effectiveness was the inundation of vast areas. These days, only the 'water' in the name *Nieuwe Hollandse Waterlinie* is a reminder of that practice; however, inundations were an integral element of the other defensive lines as well. (fig. 38)

In addition to these (and other) linear defensive works the Netherlands built a series of modern reinforced-concrete batteries and fortifications at strategic locations, e.g. on the Afsluitdijk (completed 1932) and near entrances to Dutch North Sea harbours.

In many modern situations the original function of casemates – to cover open terrain with artillery fire – is no longer obvious, nor is the fact that

38 'Controled' inundations by the Dutch army meant the flooded area was hardly accessible by road nor navigable.

[69] This ca. 85 km long defensive line based on extensive water basins and a string of fortresses was begun in the early 18th century and was modernized and updated several times since then. The last update brought hundreds of reinforced-concrete works.

many concrete structures were camouflaged, whenever possible by an earth cover. In short: the military landscape of the 1940s has largely disappeared and its only recognizable traces today are fragments of bare concrete.[70] Although they no longer dominate the landscape, these linear and other elements still constitute war damage and were a contributing factor in the necessary reconstruction of rural areas.

3.1.1 Dutch airfields

Then there were, of course, military airfields. Because the Dutch coastal defensive strategy was largely air-based, the greater part of its air force was stationed in the west of the country and so most of its (military) airfields were also situated there. Some of the airfields were former private property and had been confiscated and adapted to military use shortly before the war. This involved the construction of barracks and fortifications, storage facilities for supplies, camouflage, and in some cases also a drainage infrastructure. Early in 1940, about 25 (in part) military airfields were operational or ready for use, mostly in the west. With an average size of 125ha for each of the 25 pre-WWII Dutch airfields, this adds up to a total of more than 3,100ha land taken up by confiscated or newly constructed airfields in 1940.

3.2 German and Allied defensive works

Although the German occupying forces definitely regarded defensive works as part of the recovery efforts, initially the general staff did not deem it necessary to make them particularly extensive; after all, the German sphere of influence was destined to expand much further, for example by conquering the British Isles.[71] Only a construction scheme for airfields was initiated from the summer of 1940. When in 1942 it became clear that the German crossing of the English Channel would not materialize and that the eastern expansion was also grinding to a halt, the need for substantial defences became more urgent. They became an integral part of demolition and building programmes, improving (traffic) infrastructure and of spreading propaganda. Four interventions deserve special attention because they took up a lot of space and in the process also caused damage to rural areas: defensive lines, minefields, airfields and airstrips, and preparations for a motorway on Dutch soil. The different types of detention camps should also be briefly mentioned in this context. Towards the end of the war, Allied troops obviously added their own, mostly temporary, defensive structures and other interventions in the landscape. The resulting damage in those final months was comparatively limited, except in cases where buildings (in rural areas) were affected.
In the next sections we will briefly focus on some of these interventions in the landscape.

3.2.1 German defensive lines

The Second World War saw a wide range of (linear) defensive works on an enormous scale. The most important defensive line was the *Atlantikwall* (German; aka Atlantic Wall), which extended along the full length of the European west coast. In the Netherlands, it encompassed concentrated and dispersed fortifications along the entire dune coast and all the islands. The *Atlantikwall* contained thousands of concrete structures with a wide range of functions, which collectively served to protect the coast against an Allied attack or invasion. Besides reinforced-concrete coastal batteries, artillery bunkers and various types of military shelters, other newly built structures included roads, blockades, walls and earthworks, trenches, radar installations, facilities for anti-aircraft defence, for marine vessels and for energy production. (fig. 39)
A string of concrete fortifications sprang up along the coast, some of them covering thousands of hectares. The construction of these defensive works inflicted massive direct and indirect damage to Dutch coastal areas (ranges of sand-dunes), totally regardless if it were within or outside towns and villages. In places like The Hague, Katwijk aan Zee (Zuid-Holland) and IJmuiden (Noord-Holland), thousands of houses were demolished while elsewhere entire villages were raised to the ground, such as Petten (Noord-Holland) and Ter Heijde (Zuid-

[70] Visser & Van Wieringen 2002, especially 29-33.

[71] Van Maasdijk 19462, 203 ff. In the pre-war period the Germans made efforts to devide spheres of influence in Europe between Great-Britain and Germany. The British government refused and was only inclined to do some teritorial concessions. It is not clear if this German policy was comparable to the treacherous 1939 German–Soviet Nonaggression Pact. (see: https://en.wikipedia.org/wiki/Molotov%E2%80%93Ribbentrop_Pact)

39 A series of reinforced concrete barrier blocks near Lage Zwaluwe, Noord-Brabant Province. This German barrier was meant to hinder Allied forces' progress to the Hollandsch Diep bridges.

Holland). On top of that, natural and cultural landscapes near Den Helder, Vlissingen and many interjacent areas and places were either destroyed or profoundly affected.[72]

3.2.2 Minefields

Minefields were (added) components of many defences and were also deployed to close off, or impede access to, open terrain. Laying mines was a strategy used by the German army to render areas inaccessible to Allied forces and light vehicles, and unsuitable as a landing site for parachutists or airplanes. Around 1.8 million mines in total are estimated to have been laid in the Netherlands in the course of the Second World War, in ca. 5,500 to 6,300 (!) different minefields.[73] The various estimates for the total affected area range from 10,000 to 17,500ha; the latter number equals the area of the above mentioned Haarlemmermeer Polder.

3.2.3 German and Allied air strips, airfields and air bases

Immediately after the invasion and the Dutch army's surrender the German forces embarked on the construction of some new airfields and the reparation and expansion of existing ones. While most of the existing airfields were situated in the west, the occupying army concentrated its efforts in the north, east and south while airfields in the west remained operational but were little extended. The large, entirely or partly new airfields (1940) near Leeuwarden (province of Friesland), Havelte (Drenthe; 1942)[74], Enschede (Overijssel), Deelen (Gelderland; See the Box Text on Deelen Air Base), Soesterberg (Utrecht), Welschap, Woensdrecht and Volkel (Noord-Brabant), and Venlo (Limburg) are but a few examples. A common characteristic is the Germans tried to disguise their airfields by fitting them in with their surroundings. (fig. 40, 41) During the war's final phase the Allied forces also converted several locations into larger and

72 See https://www.geschiedenisvanzuidholland.nl/verhalen/history-of-the-atlantic-wall ; http://duinenenmensen.nl/de-atlantikwall-een-verdedigingslandscape ; https://nl.wikipedia.org/wiki/Atlantikwall#De_Atlantikwall_in_Nederland ; Ambachtsheer 1995, *passim*, 258-260; Rolf 1982, 40 ff.

73 See e.g. http://www.cmo.nl/pdf/mijnen_in_nederland.pdf.

74 See e.g. http://www.hlogtmeijer.nl/vliegveld%20havelte/Vliegveld%20Vliegershorst%20Havelte%20V3.pdf.

40 Control-tower of Welschap Air base near Eindhoven, Noord-Brabant Province, disguised as a windmill.

41 Hangar on Leeuwarden Air base, Friesland Province, disguised as a farmhouse.

smaller airfields, a few dozen in total, almost without exception in the south of the country, which was the first to be liberated.[75] The best known of these is Beek Airport near Maastricht (Limburg), but eastern Noord-Brabant in particular had several other airstrips (of short duration).
In the absence of reliable data it is impossible to establish exactly the total area occupied by airfields operational during the Second World War, but it is estimated to have been ca. 15,000ha including the – often substantial – military barracks and defensive structures.[76] The overall area may have been substantially greater however.
Of course, the negatively affected area was less than that: not all terrains were converted into military grounds. Yet in some cases the extension of an airfield was accompanied by a loss of agricultural land. But there were benefits as well, in the form of buildings or infrastructural elements which continued to be useful after the war. On the other hand, Allied (and to a much lesser extent German) air raids in the (immediate) proximity of airfields inflicted much damage, and numerous buildings or other structures that 'stood in the way' when an airfield was to be constructed were raised to the ground or rendered inoperative.
Some of the airfields extended or built during the war are still operational today, or were until recently. Others were decommissioned shortly after the war and the land (usually) returned to the legal owners. Occasionally this was used as an opportunity for land consolidation or reorganization, one contributing factor being the forced demolition of ca. 200 farms.

3.2.4 A German 'Autobahn': Rijksweg 12

An exceptional case of damage to (traffic) infrastructural works in terms of sheer scale was *Rijksweg* (National Road) 12, the modern A12 motorway. As early as May 10, 1940, the German authorities were planning the segment which leads past and through the relatively extensive woodlands of the southern Veluwe, carrying out surveys which allowed them to initiate the construction of this *Autobahn* that same year. It's proposed route can for instance be recognized on several 1942 and 1943 map sheets of the so-called *Truppenkarte*, a (secret) map series (1:50.000) realized during the German occupation. Earlier, Dutch nature conservation organizations had successfully blocked the construction of a road segment through such a sensitive landscape; an extension of the present Amsterdamseweg (N 224) was planned instead. This, however, would have led to near the centre of Arnhem rather than linking up to the German motorway network. This network was one of Hitler's propagandistic *tours de force*; it formed an important boost to his military and economic

75 See https://www.defensie.nl/onderwerpen/vliegvelden-tijdens-de-tweede-wereldoorlog; Grimm, Van Loo & De Winter 2009. The maps and texts of these publications reveal some interesting differences. Moreover, considerable discrepancies exist between them and some other sources, as in the case of Deelen Air Base, which was much larger than the map suggests.

76 C. Munk and J.W. de Wijn draw up an inventory of (historic) air fields in th Netherlands.

strength. Linking the network to the North Sea coast and its harbours was strategically crucial – especially as long as (or: since!) the conquest of the British Isles was a main target. The German preference for the hilly Veluwe variant was undoubtedly also fed by a desire to provide road access to Deelen Air Base, the construction of which likewise started in the first weeks following the Dutch capitulation. A 1941 one track railway connected the airbase to the main line between Arnhem and Utrecht; a tunnel in reinforced concrete still underpasses the A12 motorway. Although due to a building freeze the project was never finished during the war. The far avanced state of road construction is visible on a series of Allied air photographs (September 1944), which show there was hardly a way back.[77] Besides the extensive damage to the natural landscape was irreversible, which is why after the war, when *Rijksweg* 12 was completed, it incorporated this road section and its embankments.[78]

3.3 Non-military, semi-military and collateral war damage

Besides military actions, several mostly non-military factors also inflicted major damage to rural areas. Of course, battles, artillery fire and bombardments caused extensive collateral damage, which was compounded by intentional or unintentional destruction of and interventions in landscapes and society. Here, we will focus on conversions to ploughland, inundations and damage to and destruction of farms, as well as on some aspects of imprisonment camps.

3.3.1 Conversion of grassland

In May, 1940 the Dutch defenders successfully managed to contain the inundations – entirely or partly – within the areas encompassed by the *Nieuwe Hollandse Waterlinie*, the *Grebbelinie* (or *Eem-Valleistelling*), and a few other strategic locations, such as the eastern terminus of the Afsluitdijk (the *Wonsstelling*) and on Zuid-Beveland (the *Zanddijkstelling*; province of Zeeland). Shortly after the Dutch army had surrendered these areas could be drained again and put to agricultural use. This had already been common practice in the Netherlands under normal conditions (e.g. after a military exercise involving inundations), but it was also important to the German occupying forces, who were eager to resume agricultural production because of the anticipated slump in international trade during the war. Self-sufficiency, also with regard to food, was therefore an important element of Nazi ideology. Towards the end of 1941 the German authorities introduced further measures to this effect, including a rapid and extensive ploughing up of pastures in order to guarantee and expand food production for the Dutch and German populations. Numerous meadows were converted into ploughland and in the course of the war the amount of livestock dwindled as the slaughter or confiscation of cattle continued unabated. The total area of cultivated land increased from 942,000ha in 1940 to 1,129,000ha in 1943 (i.e. plus 187,000ha, or +20%), while in the same period the total area of grass land diminished from 1,328,000ha to 1,144,000ha (i.e. minus 184,000ha, or -13%). Data on 1944 and 1945 are unreliable or lacking due to the inundations during that twelve-month period, but there is no doubt that the total area of agricultural land decreased dramatically.[79] Two years after the war, when the partial reconversion of newly created ploughland back to grass was still in full swing, the proportion of ploughland was still 20% higher than it had been in 1939. At the same time, the total area of grassland was 145,000ha less than what it had been in 1939, up from 184,000ha in 1943.[80] Apparently, about 40,000ha ploughland had been reconverted into grass. No doubt the exploitation of the recently completed Noordoost Polder also significantly influenced these numbers.

3.3.2 Large-scale German and Allied inundations

This section addresses one of the most compelling reasons for the post-WWII interventions in the Dutch landscape. Most of the inundations – whether collateral or intentional – were caused by German troops but some, *e.g.* the inundation of the

77 See: https://www.wur.nl/nl/show/Nederland-in-WOII-vanuit-de-lucht.htm

78 Waalewijn 1990, 61 ff., 91 ff., 206; De Pater *et al.* 2005, 256, 395 bottom left (1940); http://www.autosnelwegen.nl/index.php/geschiedenis/5-1940-1945-tweede-wereldoorlog; https://nl.wikipedia.org/wiki/Rijksweg_12.

79 *Statistisch zakboek* 1947, 45; Sleumer 1952, 126 ff., 155.
This leaves a discrepancy between the numbers of only ca. 3,000ha, some of which may have been incorporated in for example defensive works.

80 *Friesch Dagblad*, April 21, 1947, 2.

isle of Walcheren, were the deliberate result of Allied air raids.

3.3.2.1 German inundations

When fuel shortages and material damage started to take their toll and the military situation was reversed, much agricultural land once again drowned. There were not enough functional (steam or motor) pumps and windmills left to keep all the lower areas dry, and difficult choices had to be made. Among the affected areas were thousands of hectares of low-lying fields in the north-west of Overijssel, in Drenthe and in Friesland. The situation worsened when the occupying forces deliberately flooded certain areas, in some cases inexpertly and with brute force. In several hundred polders and other areas where drainage was crucial, river dykes, sluices and pumps were blown up, allowing the water to rush in in an uncontrolled fashion. The flood barriers of a pumping station in Muiden (on the Zuiderzee / Lake IJssel / IJsselmeer shore, east of Amsterdam), for example, were dynamited to speed up the inundation process in the northern parts of the *Nieuwe Hollandse Waterlinie* (from then: *Pantherstellung*). From December, 1944 onwards, much of the land between the rivers Neder-Rijn and Waal (the two main branches of the river Rhine) disappeared under water as a result of such uncontrollable and forced inundations: on December 2, German forces blew up the southern Rhine dykes near Elden (opposite Arnhem), which subsequently caused several (secondary) dykes downstream to weaken and collapse as well. These actions were motivated by a desire to create a water barrier against the advancing Allied forces, but the effect was that broad zones of flowing water now permanently ravaged the land. These uncontrolled inundations are thus equally a manifestation of a 'scorched earth' policy, as well as a symptom of an appalling lack of responsibility.

When, early in 1944, the Germans resorted to inundations as a defensive strategy, they did not follow the same methods the Dutch had done earlier. Under the aegis of the Dutch Ministry of War, and following the implementation of the *Nieuwe Hollandse Waterlinie* strategic inundations had usually targeted the same areas in a ring mainly around the North- and South- Holland and Utrecht provinces, the nation's economic heartland and the area with the highest population density.[81] The German inundations followed a very different pattern, with more and especially larger areas being flooded. Furthermore, the Dutch authorities had exclusively used bodies of fresh water, which did little damage to the soil, and they had carefully controlled the water levels. The Germans were much more radical, letting in salt and brackish water as well, and without exercising any form of control.

As a result, up until 1945 *Wasserstellungen* ('water fortifications' or water line of defence) were positioned in areas which had never functioned as such before, particularly in Noord-Holland, Zuid-Holland and Utrecht. This not only radically altered existing physical-spatial patterns but also strategically deviated from Dutch inundation practices. Traditionally, the nation had relied on inundations to stop an advancing enemy who approached over land. The German inundations, however, were primarily intended to prevent airplane and parachute landings and to stop a potential Allied coastal invasion and breach of the *Atlantikwall*. Apart from these *Wasserstellungen* from the early spring of 1944 onwards the German forces in stages flooded parts of Zeeuws-Vlaanderen (Zeeland south of de Scheldt estuary) and several of the Zeeland and Zuid-Holland islands (together comprising the delta area in the south-west) with seawater, hoping thus to prevent a possible Allied (air) landing.[82] Extensive saltwater inundations were also carried out in the province of Groningen, particularly in the north-eastern regions of Fivelingo and Hunsingo where the strategically highly important port of Delfzijl and the Dollard inlet (with the German port of Emden) were situated.[83] The last extensive and highly destructive German inundation occurred in the above mentioned Wieringermeer Polder, only three weeks before the German capitulation. (fig. 42)

3.3.2.2 Allied forces inundations

Even more destructive and deplorable than the loss of the Wieringermeer Polder was the sudden inundation of most of the isle of Walcheren. When the war reached a critical stage the Allied forces, too, deployed water as a weapon, only this time not for defence but

81 The ring was closed by the former Zuiderzee (IJsselmeer / Lake IJssel) and the fortifications on the Afsluitdijk of course.

82 The island of Walcheren, with the harbour and *Festung of Flushing, was not flooded by the Germans*.

83 Van der Hoek & Van der Klei 1985, 5, 6, 21 ff. The total of inundated grounds in Groningen was ca. 4,150ha, most of it arable. The inundation began September 1944 and lasted until mid-May 1945. Nearly all trees were dead by then.

42 The april 1945 deliberate and senseless German inundation of Wieringermeer Polder could lead to absurd circumstances, such as this bridge in troubled water.

offensively. By flooding the land after bombing Walcheren's sea dykes in four places early in October, 1944, the Allied forces hoped to force a German retreat from the '*Festung Vlissingen*' (Fortress Flushing) and to open up the Scheldt and the Antwerp harbour. Regarding this a special case worth to be mentioned is the village of Westkapelle, that was severely hit by these allied air attacks. (fig. 43) The attempt was less effective than expected, and it would be two months before the Scheldt finally became accessible and the port of Antwerp could function as a supply base for personnel and equipment. The flooding of Walcheren has always fired the imagination and occupied a prominent place in literature, despite the fact that it was an Allied action. This focus on Walcheren probably derives not only from the event itself – which was catastrophic also because the sea covered the island for a relatively long period, killing off most of its vegetation and flattening all micro relief – but also from the region's subsequent recovery. Walcheren's resurrection was swept along on a wave of renewal to a far greater extent than, for example, that of the equally devastated Wieringermeer Polder. To the Wieringermeer, a return to the status quo of 1930 in effect meant the (re-)creation of what was still a modern polder; in other words, business as usual, as if time had stood still. In the case of Walcheren, however, a return to the situation before

43 Tidal gully at Westkapelle, Walcheren island. In order to expel the Germans from Flushing (Vlissingen fortress) Allied bombers destroyed the island's sea defense at four places. Walcheren island was inundated from October, 1944. (Photo late 1944)

44 Inhabitants of Walcheren island shortly before 'liberated' by the Allied forces, but locked up in a no longer existing material world, floating like shipwrecked persons.

October 1944, or rather before 1940, was unthinkable. In 1945, Walcheren 'no longer existed'.[84] (fig. 44) For Walcheren, see the relevant Box Text.

3.3.2.3 The extent of the inundations

Although the maps may seem straightforward, the exact area that was inundated (deliberately or otherwise) in the period 1944-45 is unknown or at least debatable. Even data in contemporary publications display a considerable discrepancy, possibly as a result of differences in definition or in the timing of the surveys. Nonetheless it is safe to assume that at least 200,000ha were flooded and temporarily useless – ca. a quarter of which by salt water.[85] This is comparable to the total amount of land reclaimed in the Netherlands in the first half of the 20th century. But there is an important difference: the reclamations mostly clustered in relatively high regions, on the sandy soils of the provinces of Drenthe, Overijssel, Gelderland and Noord-Brabant. The inundations (deliberate or

84 See Van Blankenstein 2006, 42 ff. Not only the island of Walcheren was flooded, but it's main city, Middelburg, had been severely bombed in May 1940, while Flushing and several villages were heavily struck in 1944.

85 Van Blankenstein 2006, 35-39 compared several publications and sources. Of these, *Feiten en cijfers* 1947 contained the lowest count (206,000ha) while an unspecified but very detailed source contained the highest (259,020ha, 80,360ha of it salt water and 178,660ha fresh water). Van Leeuwen 1948, 420 provides 'averages': 228,000ha (or 9.7% of the total amount of cultivated agricultural land), respectively 77,000ha.

Table 3.1 Inundations in the Netherlands by province, in hectares. Many areas were only flooded for a short period; in 1945, ca. 70,000ha still yielded a harvest.

	Inundated spring 1944			Total inundated, spring of 1945			
	Salt water	Fresh water	Total	Salt water	Fresh water	Total	Percentage of agricultural land
Groningen				3.320	9.400	12.720	6.3
Friesland					13.290	13.290	4.9
Drenthe					400	400	0.1
Overijssel					16.010	16.010	6.5
Gelderland					20.480	20.480	6.9
Utrecht		4.220	4.220		21.250	21.250	22.9
Noord-Holland		10.600	10.600		36.740	36.740	18.2
Zuid-Holland	26.730	14.990	41.720	28.770	18.270	47.040	20.4
Zeeland	26.600	2.610	29.210	43.180	3.210	46.390	31.6
Noord-Brabant	140	2.140	2.280	1.830	12.470	14.300	4..4
Limburg							
The Netherlands	53.470	34.560	88.030	77.100	151.520	228.620	9.7

Sources: Blankenstein 2006, 38; Van Hilten 1949, 124.

45 Map showing the vast inundations in the Netherlands by the end of the war.

otherwise), however, all occurred in the lower parts and around the major rivers.[86] Of course, some of the lower parts of Drenthe, Overijssel, Gelderland and Noord-Brabant appear on both lists.

Overall, the flooded areas in Zeeuws-Vlaanderen and Noord-Brabant could be drained again once they had been liberated in the autumn and early winter of 1944. But most of the other drowned lowlands only fell dry again in or after the summer of 1945, when the liberation of the entire nation had become a fact. The extent of water-related damage was enormous, both directly, to buildings and (traffic) infrastructure, and indirectly, to thousands of hectares of spoiled (sometimes for years) agricultural land. This was particularly true on the isle of Walcheren, where the force of the water had the greatest impact and caused the most serious damage. One of the central topics in this book is the recovery of areas affected by inundations through redevelopment and land consolidation. The extent of the damage obviously influenced the post-war interventions in the rural landscape. (fig. 45)

3.3.3 War damage to farms

As a matter of course the war brought damage to farmhouses and other buildings in the coutryside. As the battle-fronts moved over predominantly rural areas all brick shelters might hide ennemies or might be safe places for defenders. Many farms were demolished by way of precaution or as a result of artillery fire, both in the beginning of the war and in the last

[86] In fact, more or less extensive inundations occurred in virtually every province; only Limburg was spared.

Table 3.2 The number of Dutch farms destroyed as a result of military action in 1940 to 1942, and progress of the repair efforts. Situations on April 1 and September 30, 1942.

Region	Destroyed	Contracted out	Finished 1st time	Finished 2nd time
Situation April 1, 1942				
Amersfoort	147	147	77	58
Deurne	39	39	27	6
Dordrecht	82	70	39	33
Mill	121	114	58	33
Veenendaal	156	156	92	68
Various locations	29	14	10	10
Total	574	540	303	208
Situation September 30, 1942				
Amersfoort	147	147	117	88
Deurne	39	39	39	39
Dordrecht	84	75	62	53
Mill	150	119	103	64
Veenendaal	156	156	155	149
Various locations	52	19	11	10
Total	628	555	487	403

Sources: Van Blankenstein 2006, 21; *Wederopbouw,* Monthly Reports, April and November 1942.

months. The sizes of destroyed farms varied strongly, but show certain congruency with the regionally dominating types of land use and field patterns.

3.3.3.1 Hundreds of farms destroyed by the Dutch in 1940

The first war-related damage occurred just before and during the first days of the war, when the Dutch armed forced cleared areas of all vegetation and demolished buildings in order to obtain a free field of fire. Around eight hundred farms were destroyed in the process, the vast majority along the Grebbelinie in the provinces of Utrecht and Gelderland. The worst affected municipality here was Hoogland near Amersfoort, with 48 destroyed farms. Also the countryside around e.g. the towns of Amerongen (33 farms), Renswoude (23), Woudenberg (15) and Rhenen (34) suffered greatly. Other municipalities severely affected in the first days of the war were Deurne (Noord-Brabant, 25 farms) and especially Mill (Noord-Brabant, 58 farms), both within the area covered by the Peel-Raamstelling.[87] Such damage could be reported to a number of district bureaus located in Amersfoort, Dordrecht, Mill (Noord-Brabant) and other places. Other early forms of war-related damage to farms can easily be identified on fig. 29. The map illustrates the attack and defence patterns of May, 1940. Overall, in 1940 damage to rural areas situated outside the immediate battle zone in the path of the invasion was limited but in individual cases could still be considerable.[88]

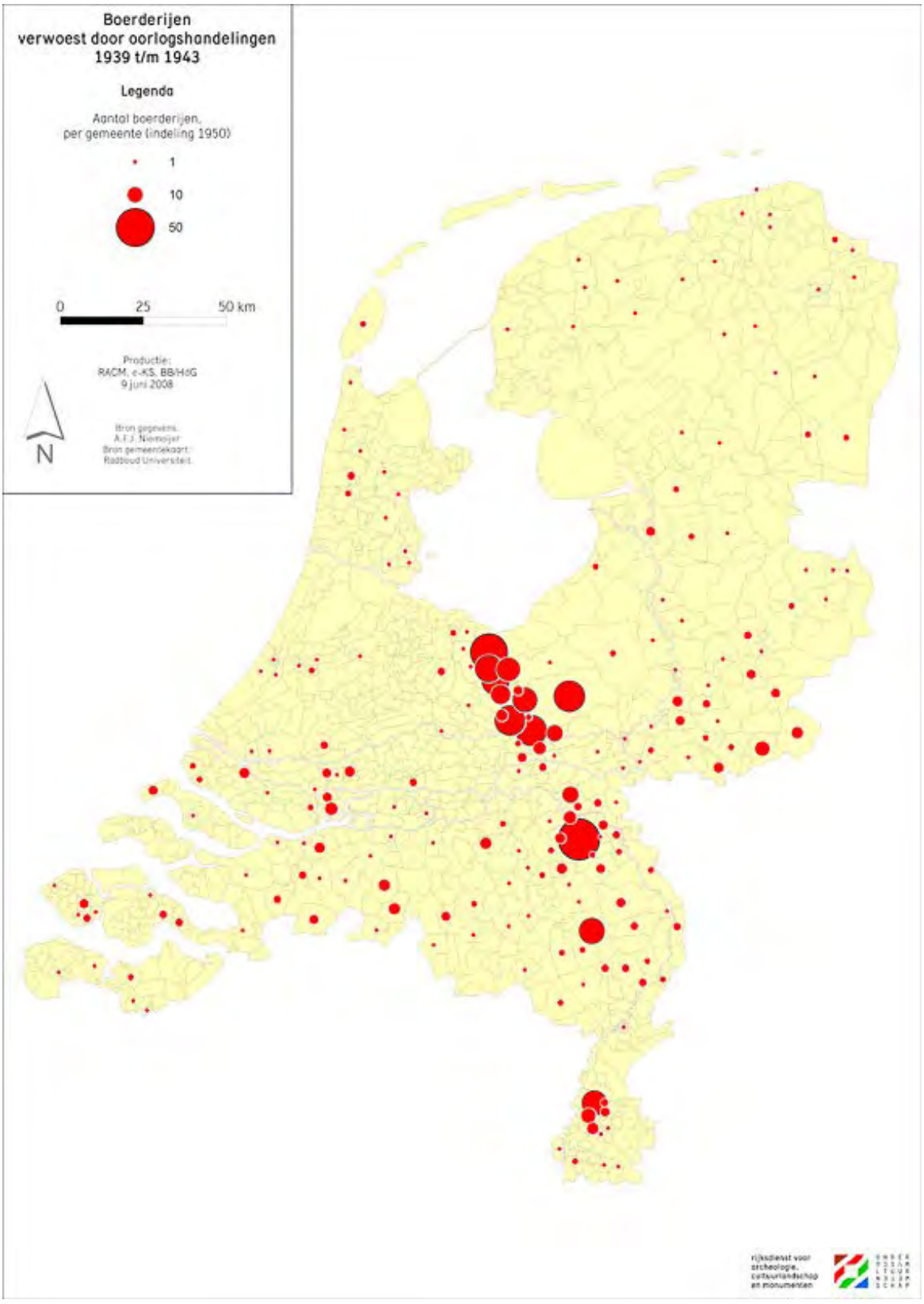
Shortly after German authority was firmly established a damage inventory was drawn up; actual reparations began in 1940, instigated by the *Eerste Wederopbouwbesluit*, or 'First Reconstruction Decree', of May 21 of that same year. Table 3.2 and fig. 29 and 30 give an impression of the number of farms destroyed since early May, 1940 and of the progress of the repairs until the autumn of 1942, resp. 1943.[89] After that, most reparations were suspended due to a moratorium on all construction work. The first years of the war brought even more devastated farms however: Elpers mentions a total number of 808 by the end of 1943.[90] (fig. 46, 47) See also the Box Text on National Interest area De Groep and Surroundings.

87 National Archives, The Hague, Access No. 2.17.03, Inv. No. 2213. The cover contains several documents, which occasionally report different figures.

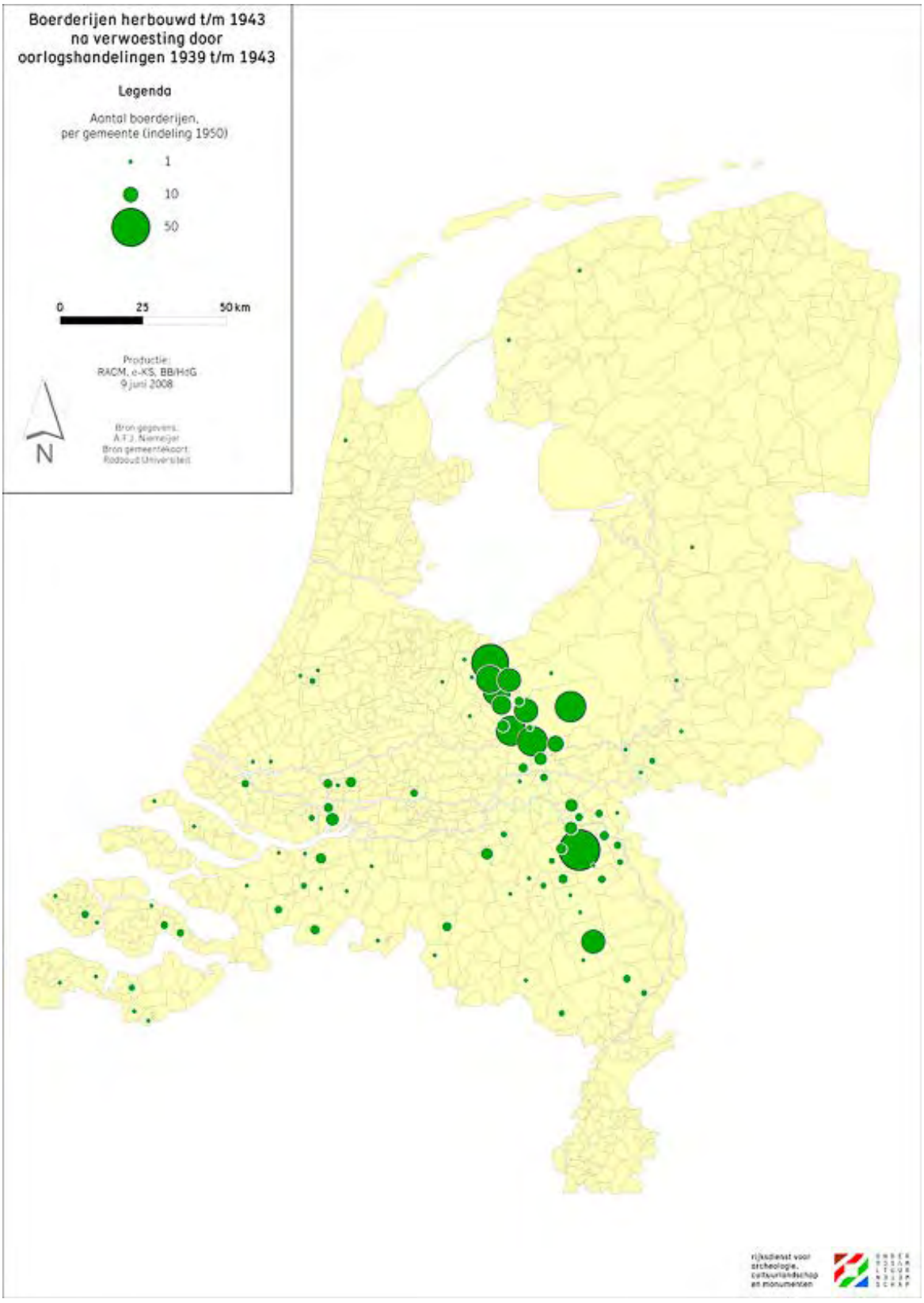
88 Compare Van Oort 2001, 26 ff.

89 Between April 1 and September 30, 1942, the number of farms to be rebuilt after being destroyed during hostilities rose from 574 to 628.

90 Elpers 2019, 28-30. The increase was partly due to German 'punitive measures' and partly by the beginning of the construction of the *Atlantikwall fortifications*.



46 Spreading of farms destroyed by causes of (oncoming) war 1939-1943. There are clear concentrations showing Dutch devastations in advance (Grebbelinie) and German attacks.



47 Spreading of rebuilt farms at the end of 1943 - after having been destroyed 1939-1943. Both maps show a clear congruency.

Table 3.3 Overview of the damage to farms by province, May 1945: the number of damaged or destroyed farm buildings.

Province	Destroyed	Extensive damage	Limited damage
Groningen	203	130	841
Friesland	58	58	250
Drenthe	169	22	491
Overijssel	566	141	1.369
Gelderland	2.307	1.172	4.750
Utrecht	126	69	693
Noord-Holland (excl. Wieringermeer)	311*	193	113
Zuid-Holland	226	190	1.218
Zeeland	775	753	3.352
Noord-Brabant	2.689	1.657	11.755
Limburg	1.191	1.333	8.000
Total the Netherlands	8.621	5.718	32.832

* Damage to Wieringermeer 603

Source: *Feiten en cijfers* 1947, 24.

To the German occupying force, rebuilding farms was part and parcel of the repairs. Not only was it viewed as an opportunity to generate some goodwill among the Dutch population – after all, many of those farms had been destroyed as a preventive measure by the Dutch army – but also with regard to the food supply it was important to restore peace and order.

3.3.3.2 Thousands of farms destroyed in 1944 and 1945

Later in the war, circumstances changed. Massive inundations occurred as a result of farmost German and sometimes Allied actions or arising from the deterioration of drainage capacity. As a consequence thousands of farms remained inundated for months or even years. Moreover, in 1944 and 1945 most of the hostilities were concentrated in rural areas, where the two sides would occasionally do battle for a single farm or seek shelter near or in its buildings. Wherever the front had passed smoking ruins remained, often (almost) touching upon nearby traffic infrastructure. An example is the extensive damage incurred during the military operation Market Garden (September, 1944), a (failed) attempt to quickly proceed in rapid troop movements from eastern Noord-Brabant to Nijmegen and Arnhem.[91] Particularly in places where the front stagnated the consequences were usually disastrous. Prolonged artillery fire, the blowing up of buildings, and rampant fires could result in total devastation. For weeks, sometimes months, the front would remain from places west of the river Meuse in the north of Limburg before cutting right across the plains of the great rivers and veering to the south-east through Noord-Brabant towards Zeeuws-Vlaanderen.[92] In a number of places along this stretched-out battlefield the damage was catastrophic, with not just scattered farms but entire hamlets or villages being raised to the ground. Ultimately the result was the complete destruction of over 8,000 Dutch farms, besides serious damage to ca. 6,000 others and moderate damage to ca. 33,000 farms.[93] The – fairly detailed – damage inventory (Table 3.3 and fig. 31) reveals the most severely affected areas to be all within the provinces of Noord-Brabant, Gelderland and Limburg, followed by Zeeland and Overijssel.[94] Elpers gives slightly differing and in course of time decreasing numbers.[95] Farm repairs were an important component of the post-1945 reconstruction efforts. An inventory was needed of all cases where repair or rebuilding was in order, with associated costs and also the desired location of farms scheduled for rebuilding.

91 More recently, this operation became famous through the 1976 feature film '*A bridge too far*', directed by Richard Attenborough and based on a book by Cornelius Ryan with the same title.

92 For the Second World War in Zeeland, see http://www.oorlogzeeland.nl/index.php.

93 The numbers reported in the different sources that were consulted vary by a few hundred, depending on the moment the damage was reported or assessed. Although the number of 8,000 damaged farms was only a small percenage of all Dutch farm holdings (over 230,000 in 1945) the loss of capital and of course private grief too were enormously.

94 Note that the map records damage in relation to each particular municipality's housing stock.

95 The reason is: partly different literature and/or prime sources. Elpers 2019, 31-35. Elpers' peak number is 8554 (without Wieringermeer Polder, ca. 400); the lowest number (December 31 1956) is 7132. She gives reasons for this decrease too: the differing counting institutions and the interpretation of the regulations, the moment of the counting, the rebuilding or not rebuilding of the farms (only rebuilding counts), the elimination of double countings.

3.3.3.3 Farms destroyed in 1944 and 1945 and size of farms

In the post war period *Bureau Wederopbouw Boerderijen* (BWB; 'bureau farm rebuilding') did a nation wide inventory of the sizes of destroyed farms. As we saw above from the old days areas of farming by far were not equally dispersed over the country, the smaller ones being concentrated in the sandy areas and the fens and moors in the east and the south – as in the clay areas in the south-west and the large river plains.
Unfortunately for them several of these areas came to be part of the heaviest struck battle zones in the last half year of the war. Bombings and artillery shootings in the front zones caused enormous devastations, as did the inundations. As a consequence thousands of farm buildings in these areas were lost and this also meant a fundamental shock to land tenure and land use: destroyed farms lost their 'field connection' and the physical basis of their agricultural activities, which made them more or less outlawed. Many of the farms were rebuilt but because of shortages of money and constructing materials often emergency dwellings and temporary barns were common. And – but it can hardly be verified – there may also have been a vision of making a virtue of need. If upsizing in small scale farming zones were one of the purposes of the 1938 Land consolidation Act one must agree the post war years offered a unique chance for rearrangements in the targeted and above mentioned rural areas. Elpers revealed some aspects of this rationalist vision when she quoted W. Vroom (architect of Nederlandsche Heidemaatschappij). In 1946 Vroom saw benefits of using bad materials because it would force to pull down buildings after tweir having been used. He wrote: "*It must be intolarable to continuate these temporary stables in any form in the future. Their small sized and primitive erection in inferior construction materials [...] would not well example modern technical and operational farm building.*" Several municipalities did not even oppose temporary dwellings, no doubt because they expected their bad and simple construction would wear out soon and would make (spatial) interventions easier.[96] An implicite force for upscaling and if necessary to relocate farms became clear in September 1947, when Minister of Agriculture (Du. *Landbouw*) Mansholt answered members of the House of Representatives (Du.*Tweede Kamer*) that there was only a 'relative difference' between forced relocation within a farmer's own region (e.g. the Island of Walcheren) and forced migration to other parts of the country (e.g. the Noordoostpolder).[97] Yet, two years later one of his collegues, the Minister of Reconstruction and Public Housing (Du. *Wederopbouw en Volkshuisvesting*) J. in 't Veld informed the same political body 'it was not known to him if there were any intention to not rebuilding small farms.'[98] Despite his answer one might suspect many of the small farmers finally became 'victims' of land consolidation projects through a governmental policy of deliberately but not outspoken non-investment in temporary infrastructure.[99]
Elpers figures show there was at least some discrepancy between his statement and tangible facts because she compared the amounts of destroyed farms in differing sizes to the the state of reconstruction. From her figures it might be deducted some 2/3 (68%) of the destroyed farms counted 15ha or less and over 27% even less than 5ha. (See Table 3.4)
The table further demonstrates that ca. 4450 (so over 53%) of all 8352 destroyed farms under 15ha were concentrated in Gelderland, Noord-Brabant and Limburg.
Another of her tables shows the amounts of realised emergency dwellings and temporary stables or barns. At first sight there is nothing particular, but her commentary text reveals especially small farmers in the sandy areas in the south and in the plains of the central rivers complained about slowness in progress of help in the 50s: Noord-Brabant, Gelderland and Limburg! (fig. 48) Bureaucracy and slowness

48 The construction of emergency dwellings near Eindhoven, Noord-Brabant Province. (Unknown location and date).

96 Elpers 2014, 246, 247; Bos 2008, 264 ff.
97 Handelingen Tweede Kamer 1947-1948 30 september 1947, 144; S.L. Mansholt's meaning in the Dutch post-war reconstruction and his functions will be mentioned later. Mansholt himself was a pioneer when he moved from Groningen Province to the Wieringermeer Polder. It might be stated Mansholt's 1947 statement counts for the next decade as well.
98 Kamerstuk Tweede Kamer 1948-1949 kamerstuknummer 1000 IX A ondernummer 14 Rijksbegroting voor het dienstjaar 1949, 29.
99 The 1954 Land consolidation Act was already in its initial phase and trial and error of new methods of farm building and technical and social reorientation were on their way.

within the BWB, problems in communication between architects and small farmers, hot gospelling for modernization and upscaling etc. were main aspects of their repeating complaints. Only after the mid-50s – when the results of modern agricultural life became visible in some of these areas – most complaints vanished.[100] It can be concluded many of them were grateful for help soon after the war, but that they felt ignored for nearly a decade next. The construction of emergency farms ended December 1946.[101] From early 1947 no further emergency farms were erected and 'normal' construction processes were resumed. Yet the affair worsened after the February 1953 North Sea flood, which led to new high urgency restructuring of terrains and farms. (see Table 3.5)

From this point of view war damage to farms – in relation to farm sizes – ranged over a period much longer than 1940-1945: hundreds or maybe thousands of people in devastated areas remained 'locked up' in inferior dwellings – emergency houses and/or houses that were supposed to be pulled down anyway – and had to wait their turn for 10 years or more. For these disprivileged smallholders Mansholt's land consolidation, colonization and rural social improvement projects might finally lead to improvement of living conditions.

3.3.4 German prison and labour camps

A brief mention of the various labour, detention, penal and/or deportation camps is appropriate here. The dozens of camps hardly qualify as war damage, but they did affect the rural areas where they were established between 1940 and 1945, and they moreover deserve to be commemorated. Several German prisoner and labour camps pre-existed since the 1920s or 30s as temporary accommodation for Dutch workers or foreign refugees. The most gruesome example is camp Westerbork in Drenthe Province. The virtually certain death by gassing was a horrible extermination which awaited its over 100,000 almost exclusively Jewish inmates upon deportation makes it impossible to view Westerbork as part of any so-called 'reconstruction effort'. On the contrary, it was part of a destruction effort. In addition to Westerbork there existed as many as forty labour camps for Jewish inmates alone, who were forced to do various kinds of outdoor labour including reclamation. These camps clustered in the northern and eastern provinces, all of them in areas where there was still plenty of room to create new agricultural land.[102] The above mentioned *Heidemij* (Nederlandsche Heidemaatschappij) was again one of the bodies involved in reclamation during the war.[103] The destructive purpose of all of these camps is beyond doubt; the labour forced upon the inmates, such as reclamation work on the Drenthe moors, was usually intentionally and literally exhausting.

It could be argued, however, that some of the other camps were part of a 'reconstruction project', at least from a Nazi perspective. The 'involuntary labour' carried out in them – an euphemism if ever there was one – was part of a perceived future of a new Europe under German hegemony. That future was to be achieved by means of National-Socialist (= Nazist) racist pseudoscience, terror and intimidation, but also through economic growth for which every available workforce was to be deployed, if necessary to the bitter end. The demands of the so-called 'New Order' which gave birth to such practices 'legitimized' drastic social, racial, economic and territorial interventions.[104]

Notorious camps for other targeted groups included those near Amersfoort (Utrecht Province) and Vught (Noord-Brabant), but also about twenty-five smaller camps, again in areas where soil needed to be moved[105]; their inmates were likewise engaged in soil reclamation and the construction or repair of military or infrastructural projects.[106]

A special type of labour camp existed in the Noordoost Polder – dry land since 1942; turning the polder into cultivable land demanded thousands of workers, to whom the occupying forces offered exemption from forced labour (the so-called '*Arbeitseinsatz*'). This attracted many candidates, resulting in 30 to 40 camps in the polder. Thousands of hectares were converted into cultivable land during the war, partly by (mostly anonymous) prisoners and for the rest mainly by men eager to avoid forced labour (usually in Germany).[107]

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100 Elpers 2019, 188 ff. Later in some (other) areas negative attitudes against rural modernization were inspired by traditionalism.

101 Elpers 2019, 226 ff.; Limburgsch dagblad, 13-03-1952, 2: An extreme example shows an agrarian's anger: he demolished his emergency farm. The ministry answered with a plan for suspending the relevant articles of the Housing Act (*Woningwet*) *on housing in substandard living conditions (Du: het bewonen van onbewoonbaar verklaarde woningen); De Volkskrant, 09-04-1955, 5: Ten years after the German capitulation ca. 6600 farms were realized; over 1700 still had to be (re)constructed; De Tijd: godsdienstig-staatkundig dagblad, 08-04-1955: In the north of Limburg Province 623 emergency farms were erected; 110 were still inhabited in 1955; Zeeuwsch Dagblad, 03-04-1950, 2: In Zeeland Province 768 farms were totally destroyed. By December 1949 293 emergency farms and 602 temporary stables were erected as well as 134 completely new farms. 247 were under construction.*

102 See http://www.joodsewerkkampen.nl/overzicht.html

103 See http://www.refdag.nl/oud/bin/980206bin03.html ; http://www.drentheindeoorlog.nl/?aid=345

104 See https://en.wikipedia.org/wiki/New_Order_(Nazism)

105 See https://nl.wikipedia.org/wiki/Categorie:Naziconcentratiekamp_in_Nederland; https://en.wikipedia.org/wiki/List_of_subcamps_of_KZ_Herzogenbusch

106 Other targeted groups included – in random order – members of the resistance, Sinti and Roma individuals (to be exterminated, just like the Jews), homosexuals, prisoners of war, Jehova's Witnesses, psychiatric patients, the mentally or physically disabled (to be exterminated), conscientious objectors, individuals forcibly employed as part of the *Arbeitseinsatz* or those who had attempted to evade forced labour, communists, artists and intellectuals, 'anti-social persons', prominent individuals and numerous administrators and civil servants. Prison camps were built for all of these groups, separately or jointly, from where they were sent into forced labour, used as hostages, and/or transported to camps elsewhere.

107 Sehttp://www.emmeloord.info/geschiedenis/arbeiderskampen/

Table 3.4 Overview of the sizes in hectares of damaged farms by province.

	Sizes of destroyed farms in hectares					
	<5ha	5-15ha	15-25ha	25-35ha	35ha>	
Province	**Numbers**					**Total**
Groningen	24	40	23	27	85	199
Friesland	5	24	5	9	17	60
Drenthe	45	75	30	7	6	163
Overijssel	141	265	73	21	9	509
Gelderland	965	783	254	132	119	2253
Utrecht	47	45	25	7	3	127
Noord-Holland	17	56	50	15	40	178
Zuid-Holland	39	51	42	26	47	205
Zeeland	122	299	144	74	136	775
Noord-Brabant	521	1248	612	205	117	2703
Limburg	382	552	176	43	27	1180
The Netherlands	2308	3438	1434	566	606	8352

Source: Elpers 2019, 61.

Table 3.5 Numbers of emergency farm dwellings and temporary stables / barnes (1947).

Province	Farms destroyed	Emergency dwellings realized 1-1-47	Temporary stables / barnes realized 1-1-47
Groningen	161	67	63
Friesland	46	24	32
Drenthe	128	54	77
Overijssel	510	355	436
Gelderland	2406	1292	1440
Utrecht	205	83	108
Noord-Holland	169	28	68
Zuid-Holland	209	43	118
Zeeland	775	293	602
Noord-Brabant	2713	1596	1838
Limburg	1233	644	707
The Netherlands	8554	4479	5519

Source: Elpers 2019, 227. [108]

[108] Het nieuws: Algemeen Dagblad, 01-07-1947, 4; Also see: Leeuwarder koerier, 19-11-1946, 2: This newspaper mentions ca. 5,500 emergency farms and 4,500 temporary stables.

All camps have in common that the reclamations were to a significant extent carried out by people who had little or no experience with this type of work and who found it highly tiring. Another common aspect of prisoner camps and the products of forced labour is that their impact on the Dutch landscape to a certain extent remains invisible, because part of the war period and its physical remains were deliberately erased and/or forgotten as quickly as possible. This counts especially for military projects, such as sections of defensive lines, mine fields and trenches. Shortly after the war, it was 'business as usual'. Camps soon became accommodations for labourers or refugees again (e.g. former residents of the Dutch Moluccas – now part of Republic of Indonesia) and for holiday camps (!) or they were removed altogether. Reclamations were integrated into larger projects without being separately recorded, and defensive works which had come about through forced labour (or by using 'accommodating' Dutch firms) were demolished if they posed a visible or functional obstacle. This means recognizable remainders in the countryside became relatively scanty or can be easily overlooked or misinterpreted. War demolition is believed to have been most extensive in built-up areas, but several rural regions were much affected more than towns. It is therefore worthwhile to zoom in on some of these rural areas.

3.4 Examples of rural disaster areas

In general, this book focuses on rural recovery. This chapter deals with war damage as one of the factors behind reparations and recovery. To provide some idea of the extent of the war damage in rural areas we will briefly present four regional examples, followed by a general overview of the damage and of aspects of the first reparation efforts. The chapter concludes with two more detailed Box Text descriptions of disaster areas and their recovery: National Interest area De Groep and Surroundings, and Type area Deelen Air base. (fig. 49)

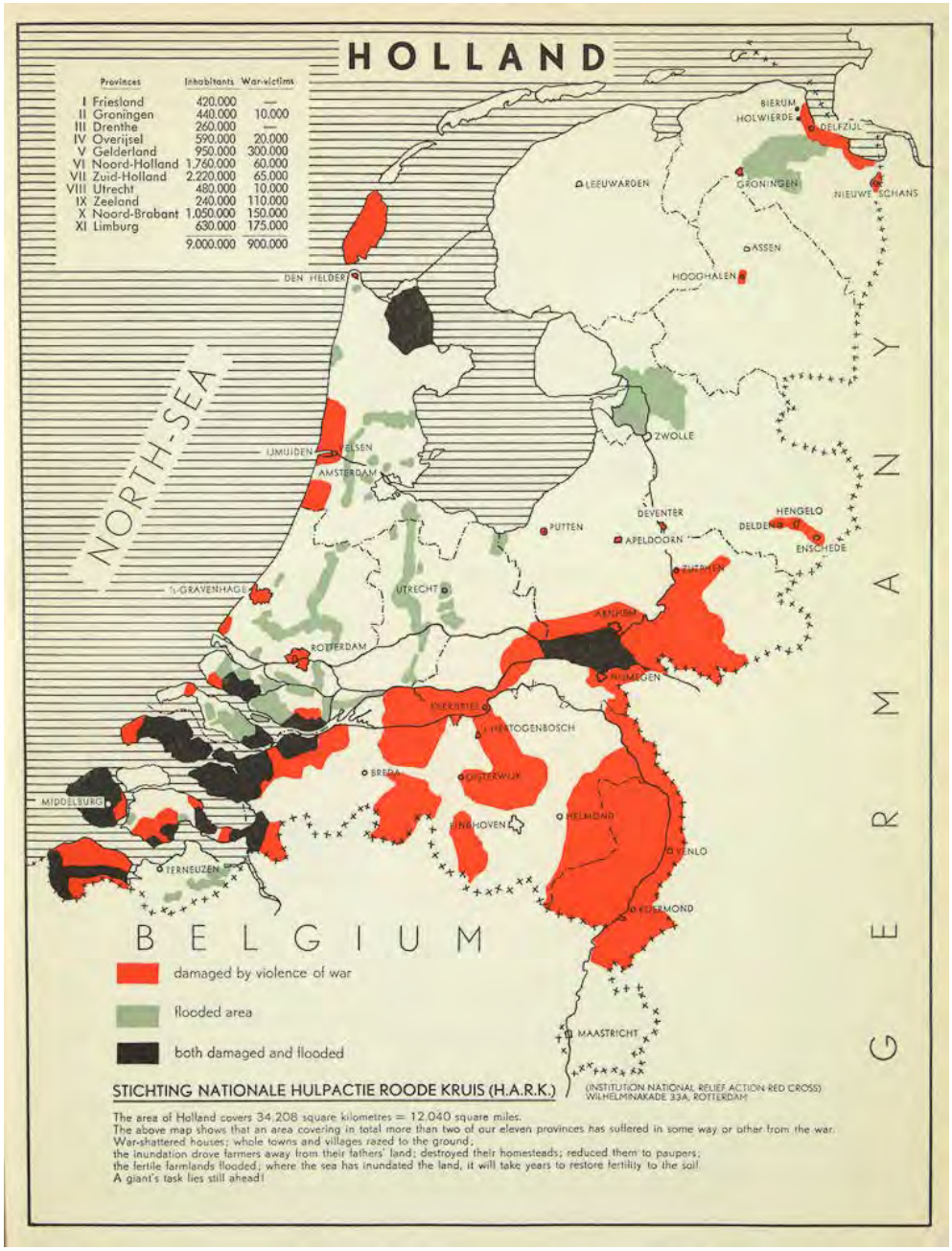
3.4.1 Disaster area Noord-Limburg

Some of the worst affected places in northern Limburg Province were villages like Overloon, Gennep, Vierlingsbeek and Venray, but also towns like Roermond and Venlo were hit hard. In the final stages of the war the German army turned the river Meuse into a defensive line and offered fierce resistance. At that location the Allied troops were stationed west of the Meuse and October, 1944 saw some intense fighting (including a tank battle) near Overloon. Virtually the entire area between Middelaar (above Gennep) and Susteren (south of Roermond) was evacuated and of the urban population only a few escaped a similar fate. An estimated 80,000 to 90,000 people became refugees.[109] When they returned after the war virtually everything of value was gone, particularly in the zone between Middelaar and Venlo and also in the area south and south-west of Roermond.[110] Some of the villages listed above as well as many of the neighbouring farms were raised to the ground and had to be completely rebuilt. In the years after the war, the entire area was radically overhauled. See also Box Texts De Scheeken and (to a certain degree) Maasplassen.

3.4.2 Disaster area western Zeeuws-Vlaanderen (Zeeland Province)

Another region which suffered greatly during the Allied approach was western Zeeuws-Vlaanderen (or the southern bank of the river Scheldt). After the port of Antwerp had fallen into Allied hands virtually intact on September 4, 1944, the German army was desperate to at least maintain control of Antwerp's point of access, the Scheldt estuary between Flushing (Vlissingen) and Breskens. For surrounded German detachments, the harbour of Breskens was the only remaining link to the German troops on Walcheren, which explains the heavy bombardments carried out by the Allies on this small port and on Flushing on the opposite shore.[111] A successful Allied attempt to cross the so-called Braakman passage was followed by bombardments on a number of small but important traffic nodes, such as Oostburg and

[109] Cammaert 1983, 92 ff., 134-135.
[110] *Ibidem* 136-137; Kemp [1948], 15 ff.; compare also Blondel 1950.
[111] Goossens 1997, 40, 90-135, 243 ff., 321-493.



49 A map giving an incomplete but striking impression of the severestly struck areas in the Netherlands It was published by the Foundation National Help action Red Cross (Du: Stichting Nationale Hulpactie Roode Kruis). (Date unknown, ca. 1946)

Sluis. Besides Zeeuws-Vlaanderen, Walcheren also sustained extensive damage, particularly as a result of the inundations (to be discussed later in more detail). All these places and the surrounding countryside were severely damaged and therefore required extensive repairs after the war.

3.4.3 Disaster area Gelderland and surroundings

Having had already more than their fair share in the period 1939-1940 (construction of defensive works, inundations and demolition of farms), towards the end of the war the province of Gelderland and adjoining areas in Noord-Brabant and Utrecht were hard put to it again. The attack on the bridges of Arnhem and Nijmegen as part of operation Market Garden in September, 1944 was only one aspect of it. When the operation failed, the frontline ground to a halt along the large rivers for the duration of the entire winter along a zone extending more or less from the Hollandsch Diep (in the west) along the rivers Meuse and Waal up to the Maas-Waal Canal (near Nijmegen). At the (northern) frontline artillery fire went back and forth, destroying large parts of several villages and towns and many farms too. Gelderland places and municipalities like Tiel, Wageningen and Maasdriel but also Brabant towns such as Wijk-en-Aalburg and Dussen were badly damaged. As was – again – Rhenen in Utrecht, shortly before the end of the war. The uncontrolled German inundation of much of the river plains was also highly destructive.[112] The overall damage in the Gelderland section of this area became an additional reason for large-scale interventions. A lot of farms in the whole area were reconstructed or replaced in the post-war period. See also Box Texts De Groep and Surroundings and Maas en Waal-West.

3.4.4 Disaster area Wieringermeer Polder

Wieringermeer Polder occupies an ambiguous place in the Dutch collective consciousness. On the one hand, this 1930s icon of modernization typified the extent of the war damage inflicted on rural areas and of the post-war repairs. On the other hand, it was an atypical case. Ultimately the war left few visible traces, for the reconstruction largely followed plans and specifications drawn up in the 1930s. In fact, and uniquely, in the 20,000ha Wieringermeer Polder the interruption of the 1940-1945 war had much less of a lasting effect than did the overall continuity of the period 1930-1950. The near absence of conspicuous traces of the Second World War in the polder makes it difficult to pass on the story of the war and the inundations to younger generations. To do that, such traces are essential.
While the first act of terror, the onslaught on Rotterdam, is still remembered as an early example of 'total war', the pointless drowning of Wieringermeer Polder – just three weeks before the German capitulation – has slowly faded from the Dutch collective memory. Is it, perhaps, because a 'new Rotterdam' arose from the ashes while the 'old' Wieringermeer Polder was reconstructed? The levels of destruction of buildings and crops approached 100% but repairs were given absolute priority, so that already by mid-1946 both farming and life in general picked up again. The construction of hundreds of new farms, barns and (emergency) homes made it possible to quickly return to normal. In this particular polder, the resumption of agricultural production after only a minimal delay was possible because the waters which had flooded the fields came from the IJsselmeer instead of the sea, in which case the damage would have been far more extensive.
Nonetheless, at about 100 million guilders in 1945 (today ca. 550 million euros) the repairs cost almost half of what had been spent on the original reclamation. These huge secondary expenses on behalf of the polder give some idea as to the extent of the war damage in relation to the 'replacement value' of these cultural landscapes, yet they fail to convey the full extent of the damage to the polder, if only because the associated human suffering cannot be expressed in numbers.

3.5 Post-war recovery and modernization in the Netherlands

The accuracy of the various calculations of the total damage in the Netherlands is equally uncertain, but rough estimates provide some

[112] See e.g. Datema *et al.* 2001, 263 ff.

indication. The human cost is impossible to express in financial terms, but shortly after the war the total material damage was estimated at 21,4 to 25 billion guilders (roughly 120 to 140 billion euros in today's currency),[113] which is the size of the claim filed by the Netherlands in compensation from Germany.
One aspect of the reconstruction effort involved setting to rights as quickly as possible large swathes of the long-suffering countryside, in part because of the need to feed the population but to a considerable extent also driven by a desire to modernize. The Netherlands were eager to quickly and efficiently return to self-sufficiency with regard to agricultural products, which also on the international market were expensive and in short supply, and it was further motivated by a desire to accumulate credit through the export of such products.
In other words, two seemingly opposite phenomena went hand in hand: recovery and innovation. In the following decades these opposites were reconciled; pre-war structures were literally restored while at the same time phenomena such as 'modern' housing, living and working paved the road to the future, also in rural areas. The dilemma of the first post-war years is perfectly illustrated by the contrast presented in the 1947 publication *De kunst van het wonen* ('The Art of Living'). Its editors posited a sharp distinction between recovery (continuity) and modernity, which they discussed on the basis of the experience of shape, space and materials.[114]

3.5.1 Recovery and modernization in Dutch rural areas

Specifically in the context of rural areas and agriculture, retrospects to the pre-war period were common until well into the 1950s, alternating with brief previews of what was yet to come. All these publications share a degree of uncertainty as to how the Netherlands in that future would redefine itself as an agricultural nation.[115]
In any case, the resumption of land consolidation and land development and the repairs to infrastructure and farms were able to proceed simultaneously. In the early 1950s, when the engine of the economy was again in full swing, ongoing modernization was unstoppable. Rapid infrastructural improvements, agricultural rationalization and upscaling, more free time and a demand for recreational facilities, a countryside increasingly under pressure from rapidly growing population centres, and even an awareness – after the first frantic years – of the value of nature and landscapes are only a few of the processes and developments that were going on in the post-war nation.
Progress suffered another setback, however, as a result of the North Sea flood of February 1, 1953 – the subject matter of next chapter.
Undoing the war damage was only one of many motivations in the Netherlands after the war for designating sections of the countryside as suitable candidates – with or without priority – for land consolidation and additional interventions. Any correlation between prioritization and the extent of the damage in specific rural areas was weak at best. Of great significance to the process were not only the attitudes of those directly involved (owners, institutions) but also the perceived urgency and the state of completion of any pre-existing land consolidation projects. Situations in which drainage sufficed for the time being received no priority. More urgent were instances of extensive infrastructural damage where agricultural production could not be properly resumed without intervention. Occasionally, however, different interests and interest groups collided. Agricultural interests were almost irreconcilable with soil removal activities in the context of the extraction of raw materials, e.g. clays, sand or gravel, or with the demand for land for new urban extensions. Nonetheless, the rival factions in the struggle for land shared a common goal: the reconstruction of the Netherlands.

3.6 Post-WWII perceptions of war damage, relics and recovery

The definition of war damage and the question as to which spatial developments in rural areas may ultimately be considered positive outcomes of the Second World War are all open for debate. Does a more direct motorway connection with Germany outweigh the loss of nature in the Veluwe region? Were the German air bases

[113] See e.g. Siraa 1989, 43; Damsté & Cocheret 1955, 19; Van Blankenstein 2006, 51; http://www.iisg.nl/hpw/calculate2-nl.php
[114] Kuyper 1947.
[115] See e.g. Sleumer 1952, 94 ff.

50 At several places traces of (German) World War II constructions have become 'places of interest' or even 'lieux de memoire'. There are museums and locations worth visiting to keep the memory alive. This picture shows the Atlantik Wall museum at Hoek van Holland, Zuid-Holland Province. (January, 2015)

detrimental to the agricultural or natural landscape, or did they improve the military and civil traffic infrastructure? Opinions on these matters vary greatly, and the contrast between 1940-1945 views and more recent opinions is particularly striking.

It must be emphasized at this point in our discussion that not all variations on our theme of war damage can be further payed attention to in the next chapters. It suffices to say many if not all of them played their accelerating role in reasons for modernisation of agrarian business circumstances and rural problems. For instance defensive lines or air fields will hardly be mentioned hereafter, but their destroying effects on short-, middle-, and even long-term rural land use is evident anyway. Several war destroyed or affected terrains had become unfit for use for years and some others have become real 'relics of destructive dynamics'.

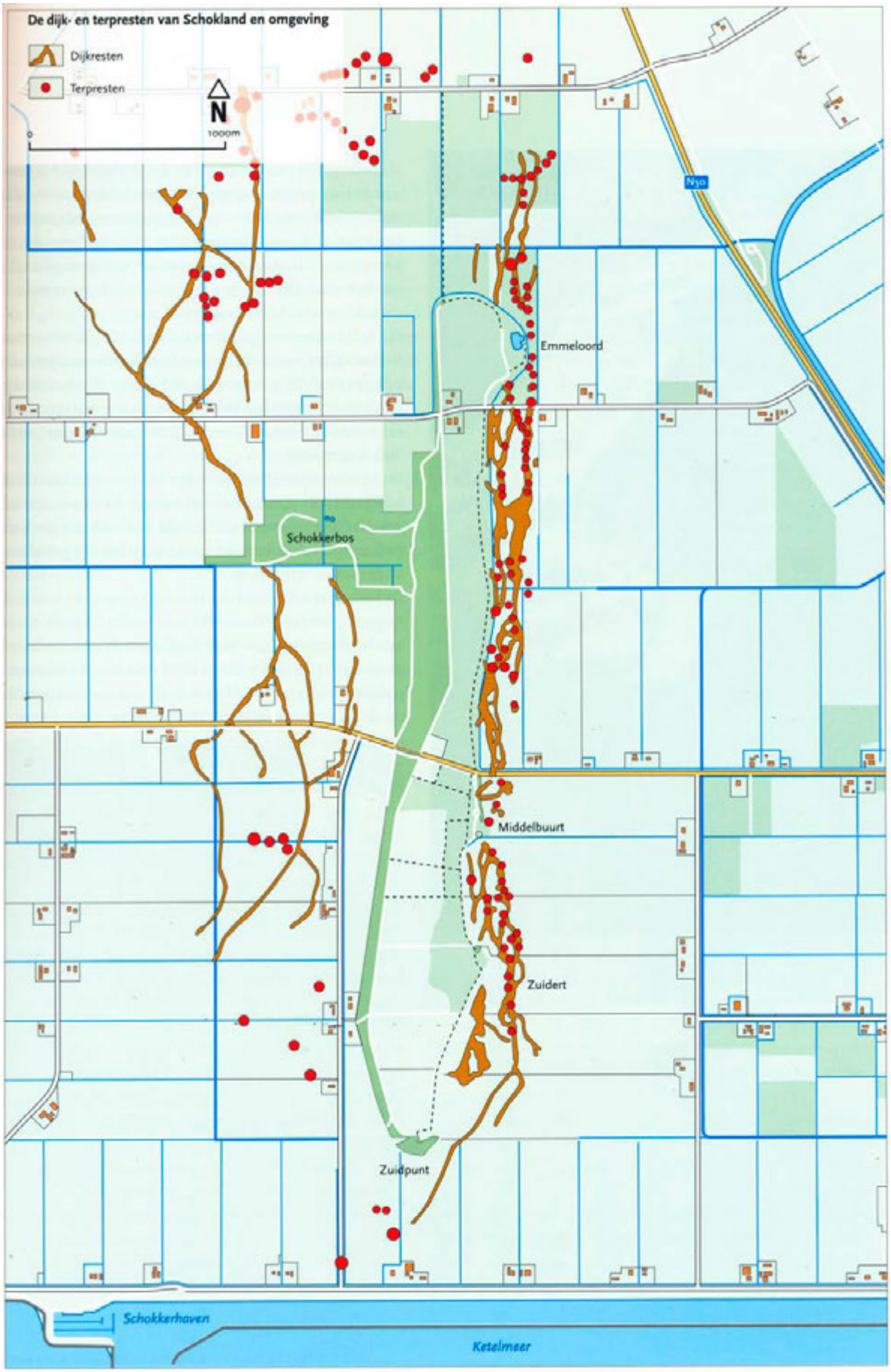
3.6.1 Appreciation of civil and military WWII heritage

In the 1990s the Dutch nation started to become more interested in its German heritage and by extension in that of the post-war recovery era.[116] However, interest in the characteristics and qualities of the recovery of rural agricultural areas during the years 1940-1945 lagged behind. This was undoubtedly related to the limited appreciation for land consolidation, land development and recovery in general, as mentioned earlier in this publication. A change was marked by an inventory by Lamberts (2007) and also by Elpers' work (2008, 2014). Today, appreciation of the results of the recovery and development of rural areas in the German occupation is growing on a par with that of the recovery of the Netherlands during the Marshall Plan era. Several farms from that period now have the status of national or municipal monuments and some areas can boast national interest.

3.6.1.1 Appreciation of military heritage

Appreciation of the military relics of (preparations for) the Second World War is also a relatively recent phenomenon. In the past three decades it has led to the scheduling as national monuments of three 'defensive line' landscapes originally created for the defence of Dutch territory. Both the individual objects (for their assemblage value) and some of the space-defining functional structures (e.g. inundation canals and dykes) have been listed. In addition to these Dutch defensive lines a number of

[116] W.H. Tiemens and R. Rolf are some of the pioneers regarding military structures.



51 The former island of Schokland and its surroundings. Map showing a series of relics of former and/or fossil dwelling mounds (the red dots) and fossil relics of former dykes (the brown lines). Besides this the Noordoost Polder still hides lots of ship wrecks and crashed air planes.

German structures and assemblages from the period 1940-1945 have also been (partly) scheduled, specifically Deelen Air Base and segments of the coastal defences, the *Atlantikwall*.[117] A representative part of the material military heritage and surrounding landscapes from (the prelude to) the Second World War has thus been preserved for the future. (fig. 50) The stories behind their genesis are told in brief in the descriptive texts of the monument register, which frequently also contain information on the monuments' post-war history. (See the Box Text on Deelen Air Base)

3.6.1.2 Appreciation of WWII and post-WWII rural heritage

While the historical importance of mid-20th-century military landscapes is now slowly being realized and farm buildings dating from these years are being recognized as cultural heritage, civilian rural landscapes from the same period are still for the most part being overlooked.[118] The recovery and redevelopment of rural areas damaged or (re-)created during the Second World War has received little attention, unlike war-damaged urban areas. This is true not only for relics of the post-war recovery period but also for interventions dating to the war years 1940-1945. Now that the landscapes of the land consolidations, reclamations and the more recent drainage projects have become objects of long-term studies of the historical-cultural landscape, this has all changed. Thus, these recent landscapes have become part of the Dutch tradition. They are much less a manifestation of an interruption in Dutch landscape development than was previously thought. On the contrary, they are part of a continuum stretching from the medieval period to the present. From that perspective, the five years of the Second World War were no more than an incident, no different in essence from some years during the 17th century, when drainage projects were booming business, or the early 19th century, when reclamations were greatly encouraged. Even organizationally and systematically, the similarities between those periods are striking.[119]

Yet it can hardly be denied that in (maybe too) many cases highly important landscapes containing historical-geographical or archeological features have been erased or destroyed in the flow of post-war optimism. But even this loss taken into account, it must be remembered that a good deal of our knowledge on these features was gathered thanks to investigations preceding and following landscape (re)construction, such as in the former Zuiderzee. (fig. 51)

[117] Consult the Monument Register for access to hundreds of descriptions: http:// monumentenregister.cultureel-erfgoed.nl/php/main.php. In addition to the *Nieuwe Hollandse Waterlinie*, the *Grebbelinie* (both also containing much older elements) and the Peel-Raamstelling, other scheduled national monuments include the two bridgeheads on the Afsluitdijk.

[118] Elpers 2019, 95-239. She revived contemporary discussions on traditionalism vs. modernisation in farm building and rural heritage.

[119] See e.g. C. van der Wal 1997, *In praise of common sense: Planning the ordinary. A Physical planning history of the new towns in the IJsselmeerpolders;* F. Egmond 2002, *Nederland in de maak: Landschap tussen verleden en toekomst*. A recent example of continuity in the reclamation of arable land is the combined Belgian-Dutch serial nomination of seven so-called '*Kolonies van Weldadigheid*' ('Colonies of Benevolence'), dating from the first half of the 19th century. See: https://www.kolonienvanweldadigheid.eu/sites/default/files/CofB_I_NominationFile.pdf.

De Groep and Surroundings, 1940-1942 (-1970)

Farm rebuilding after (early) WWII damage, Woudenberg, Renswoude and Utrechtse Heuvelrug Municipalities

Identification

- The area is situated near the southern section of the Grebbelinie.[1] Relatively isolated and rural, it surrounds a hub of infrastructural features. Traditionally it was characterized by mainly small, scattered farms.
- In the area, dozens of farms were rebuilt, attempts were made at landscape restoration, and a partial redevelopment took place (ca. 1,600ha). A land consolidation under the supervision of *Nederlandsche Heidemaatschappij* was planned. Rebuilding of the farms and houses occurred between 1940 and 1942 under the supervision of *Bureau Wederopbouw Boerderijen* (BWB).

52 Some (preventively) destroyed farmhouses in the De Groep and Surroundings area had a ghostly and frightening appearance. This could not prevent the German march against the Dutch defenders and their quick conquering of the country however. (Exact location and date unknown)

Problems

The countryside around the hamlet of De Groep also comprises the hamlets of Overberg and De Haar. De Groep and surroundings are situated on the border between three Utrecht municipalities: Woudenberg, Renswoude and Utrechtse Heuvelrug (previously Amerongen). In the south-east the area borders on Veenendaal municipality (Gelderland Province); the landscape character and several of the mentioned qualities and values continue there.
Around 1940, the situation of De Groep and Surroundings was as strategic as it was vulnerable, near a junction of the railway lines Arnhem-Utrecht and Nijmegen-Rhenen-Amersfoort which provided access to the heart of the nation. This is one reason why De Groep was also near the defensive line of the Grebbelinie. In that context it was partly inundated in 1939, while just prior to and in the first days of the Second World War from May 10, 1940 onwards, Dutch troops in their efforts to defend the nation razed (almost) every building and many trees to the ground to create an unobstructed field of fire and without hiding places for the enemy. The residents and the cattle had been evacuated in advance. (fig. 52) Although actual fighting in this area was of short duration (until the Dutch capitulation on May 15) the damage as a result of the hostilities along much of the Grebbelinie was considerable. This was also true of the wider area around the railroad junction near the three hamlets. They had been virtually wiped off the face of the earth, in consequence of Dutch military powers as set out in e.g. the 1853 *Kringenwet* and the 1896 *Inundatiewet*. The Acts which had allowed these devastations (including the two aforementioned) contained provisions for compensation, and consequently requests for compensation were soon filed.
The damage to this area went beyond what had been inflicted in the early stages of the war. In the last few months before the end of the war (May, 5, 1945) the German army again put the Grebbelinie in a state of defence. Yet more damage ensued, also to buildings that had already been repaired or rebuilt. The process therefore had to be repeated and a new wave of requests for repairs followed. The situation was taken as an opportunity to improve access to the area.

Realization

Many of the first claims had been granted in 1940-1942, resulting in the rebuilding of dozens of farms and houses. Many of these can still be identified by a commemorative plaque on the front façade, showing flames, a rampant lion and a year. (fig. 54; also see fig. 55) During those years the work was commissioned by *Bureau Wederopbouw Boerderijen* (BWB), established in 1940. The reparation efforts in the Grebbe area continued until mid-1942, when an almost total moratorium on all building activities was implemented in order to reserve all available resources, materials and energy for defensive purposes.
Another important aspect of the area's development was the continuation of the pre-war national-road scheme. The Germans declared the construction of National Road 12 (today the A12 motorway) as *kriegswichtig*, i.e. important to the war effort. As a motorway, the road was to link up to the German *Autobahnennetz* (motorway grid) so as to connect the Dutch coast – especially its ports and defences – to the hinterland (see 1970 map). To accomplish that, the Germans modified the original course as planned by its Dutch architects to the effect that the road would instead pass Arnhem kilometres to the north rather than nearly grazing the town. This also would improve access to Deelen Air base, which was under construction since June 1940. However, matters did not quite work out as planned, and the motorway was completed after the war (see also Box Text Deelen Air base).
Handling all the damage was a lengthy process and some of the replacing structures were not finished until years after the war. Most of the farms, barns and houses built between 1940 and 1942 and between 1945 and 1965 were designed by a large team of (local) architects and structural engineers, during the war led by W. Gerretsen and supervised by A.D. van Eck. As a result, the

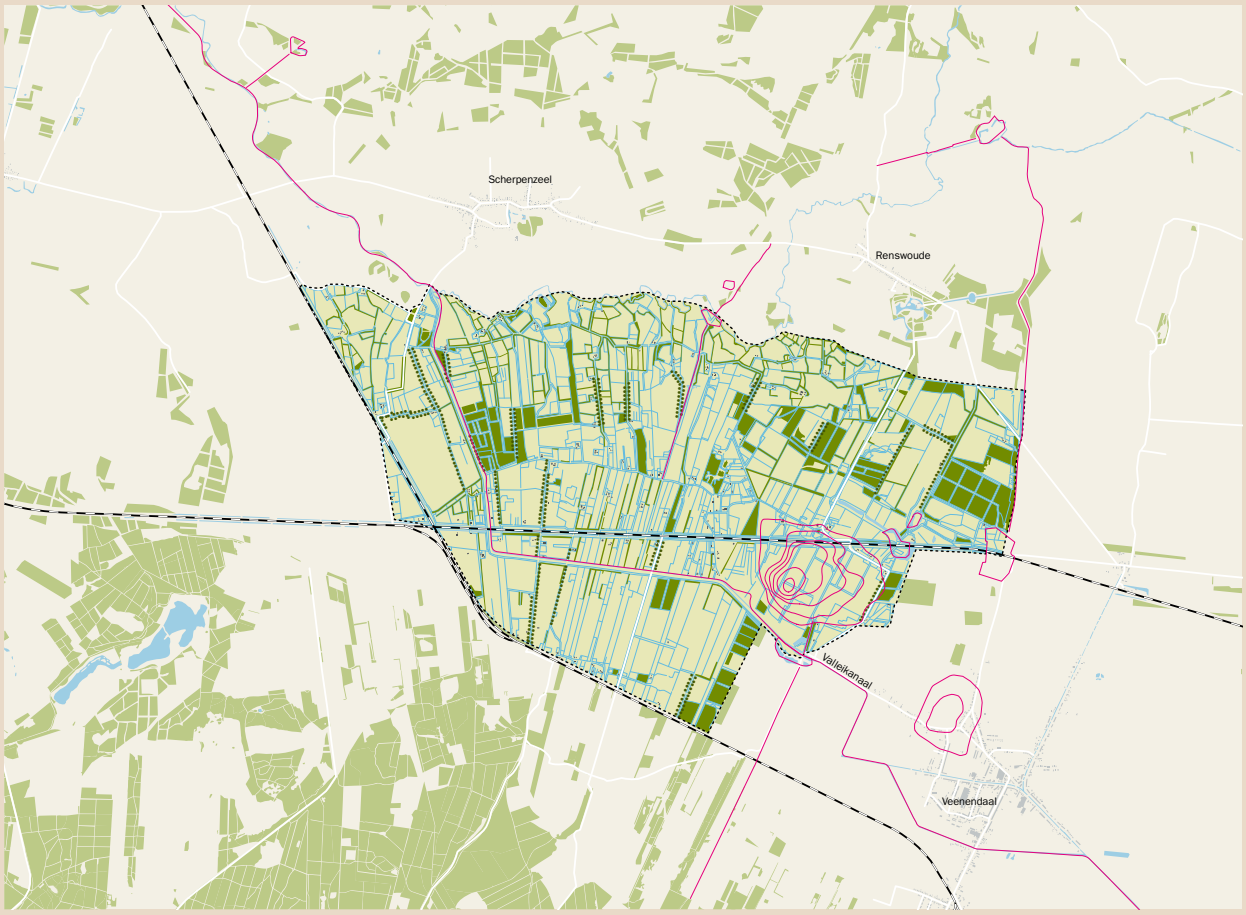
55 An example of a plaque showing flames, a rampant lion and a year in De Groep and Surroundings.

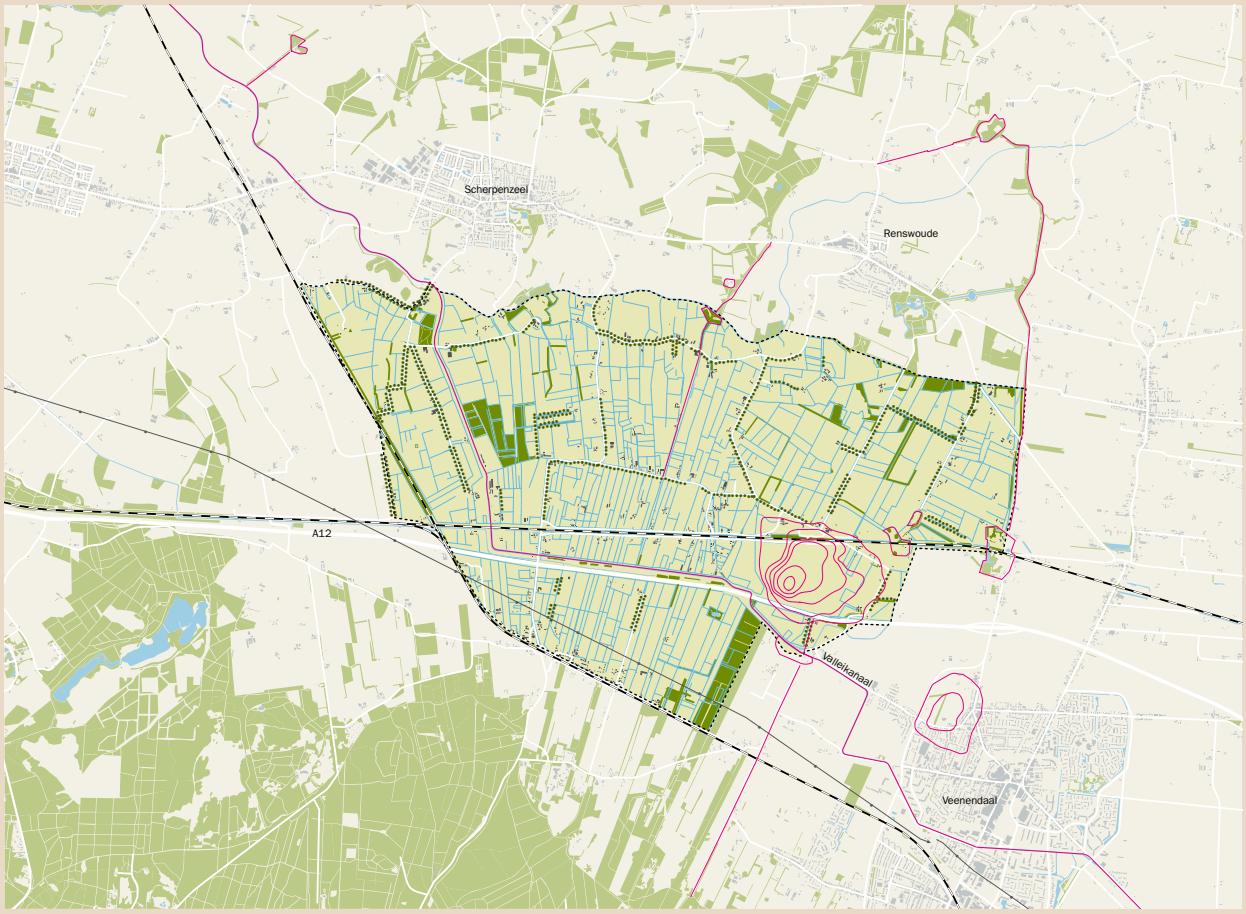
56 A + B Reconstruction Period farms in De Groep and Surroundings and both provided with a 1940 memorial plaque.

buildings from the first period vary in form and style. Repairs were conducted on the principle that replacement should avoid excessive costs, and most extensions and/or major modernization were therefore deemed undesirable, unless paid for by the owners. Elpers adds that modernization of farms and agriculture were part of reconstruction programs but that govermental subsidizing was strictly regulated in more than once adapted rules. However, many owners preferred the type of building they had been used to, only slightly modernized daylight openings in barns, etc. Most buildings are therefore fairly sober in character, but some of them show rich detailing or the use of modern construction materials such as reinforced concrete.

The restoration of inundated meadows and arable fields in the area De Groep and Surroundings was supervised by agrarian engineer N.H.H. Addens from July 1940. The speed at which farms and barns were being rebuilt proceeded from government commissioner for reconstruction Ringers' order to make compensation conditional upon reconstruction starting as soon as the plans had been approved. In practice for the greater part he delegated his authority at farm reconstruction to government commissioner for foodsupply in wartime, S.L. Louwes. That is why BWB in fact ressorted under Louwes, who was responsible for agricultural recovery and the revitalization of this vital region. The redevelopment plan for the affected area was later incorporated in the land consolidations (called 'reconstructions') Heiligenbergerbeek I to IV, involving ca. 5,500ha and extending eastward along a large section of the Grebbelinie between Veenendaal and Amersfoort. Preparations for this land consolidation in stages took place in 1955 and in 1964. Some of the landscape plans (1966) were drafted by J. Boon and N.M. de Jonge, who worked for *Staatsbosbeheer*. When the reconstituted appearance of the landscape of De Groep and Surroundings was complete it still preserved the contrast between its original rectangular plots – approximately north of the road Groeperweg – and the (short) narrow strips which characterized the area to the south. In a subsequent modest (re-)consolidation, the holdings were rationalized but the layout remained largely intact; there was very little upscaling (see 1930 and 1970 maps). The railway line Amersfoort – Rhenen remained in use for freight transports until 1972 and its section from the junction to Rhenen has been available again for passenger traffic since 1982, leaving the northern embankment as a valuable cultural feature and gradient. The railconnection to Nijmegen was never restored after the bombing of the Rhine bridge.

De Groep and Surroundings
Top: Simplified map image ca. 1930. Scale: ca. 1.75.000
Bottom: Simplified map image ca. 1970. Scale: ca. 1.75.000





53 An overview of the spreading of Reconstruction Period farms in De Groep and Surroundings, many of them dating from 1940 to 1944.

54 Design for reconstruction of a farm in the Veenendaal district (= De Groep and Surroundings) (October 29, 1940)

57 A field impression of farm rebuilding and landscape restoration area De Groep and Surroundings. (Photo 2006)

Key qualities

The reconstruction area De Groep and surroundings is a testament to the reparation of war damage to – in this case – farms, barns and dwellings. The area is characterized by scattered farms, industrial buildings and houses from the periods 1940-1942 and 1950-1965/1970. Most are small to mid-size. The buildings form an ensemble with the very 'causes' of their destruction, as they are situated near an important hub of military and traffic infrastructure. Its constituting features and their relics are still extant in large numbers. The entire Grebbelinie is now listed as a national monument.

Today, De Groep and surroundings form a varied, semi-open to open landscape of bocage and (linear) elements and scattered buildings. By the time the area became part of the land consolidation Heiligenbergerbeek in the 1960s, some of the buildings had already been replaced. Some landscape reconstruction took place; more conspicuous, however, is the compaction effect of new farms, an ongoing process which to some extent detracts from the landscape's unique character. (fig. 57, 58)

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58 Aerial impression of landscape restoration area De Groep and Surroundings. The north is left. (Photo May, 2013)

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Note

1 The *Grebbelinie* was one of the operational Dutch defensive lines in 1939-1940, extending from IJsselmeer (Lake IJssel) north of Amersfoort to the river Rhine near Rhenen. It comprised an entrenchment, embankments and a canal, casemates and inundation zones.

Deelen Air base 1940-1945

Reclamation and development (on behalf of a military air base; also war damage), Arnhem and Ede Municipalities

Identification

- Deelen Air base was a military air base on an elevated stretch of heath surrounded by forests near Schaarsbergen in the Veluwe region.
- Deelen Air base was built by the German *Luftwaffe* and of considerable size (ca. 4,000ha). Construction started in June 1940. The air base comprised a system of runways and taxiways and hundreds of buildings, after a German design and executed by Dutch (unemployed) workers – among others – supervised by ComBA (*Combinatie Bouw Arnhem*), and by convicts.

Problems

Prior to the invasion of the Netherlands the German occupying forces searched for suitable locations which might accommodate air bases for planned attacks on Great Britain and the defence of German air space. One of the selected locations was the Kemperheide near Schaarsbergen. The terrain had to be levelled to be able to construct completely flat, metalled runways. While there was ample space, the supply of materiel and personnel was problematic. The nearest railway line was that between Arnhem and Utrecht, and no two-lane motorways yet existed east of Utrecht. In other words, suitable connections *mit der Heimat* (= Germany) or to the Dutch coast were lacking. In the last pre war years it was Dutch safety policy not to connect the fast upcoming German *Autobahnnetz* (motorway network) to the Dutch network. (fig. 59, 60)

Realization

Perhaps in May, 1940 but probably earlier, the German occupying forces spotted the Kemperheide as a suitable location for a so-called *Fliegerhorst*: the future Deelen Air base.[1] Deelen was part of a strategy to conquer the British Isles. Long before the Second World War, air shows had been held there and it was a military training ground with a simple infrastructure. The fact that the heath itself was already fairly level allowed runways and taxiways to be built on it, but moreover the forested area provided opportunities for cover and camouflage. Finally, an elevation to the north-east formed a perfect site for an observation tower and command post. Overall, the situation conformed perfectly to the German ideal for a military air base as formulated and drawn in 1939.

Work on the air base began immediately after the Dutch capitulation on May, 15 1940. Three runways were built which intersected so as to form an isosceles triangle (capital A) when observed from above, allowing the various types of planes to approach or start off depending on weather conditions.

When it became clear that England could not be easily conquered and even engaged in counter-attacks, the plans were adjusted and Deelen became one of the main air bases in the German defensive strategy, and the largest in north-western Europe. The total area in use by the Luftwaffe and its affiliated organizations comprised ca. 4,000ha, including a section of National Park De Hooge Veluwe which had been annexed for the purpose. (fig. 64)

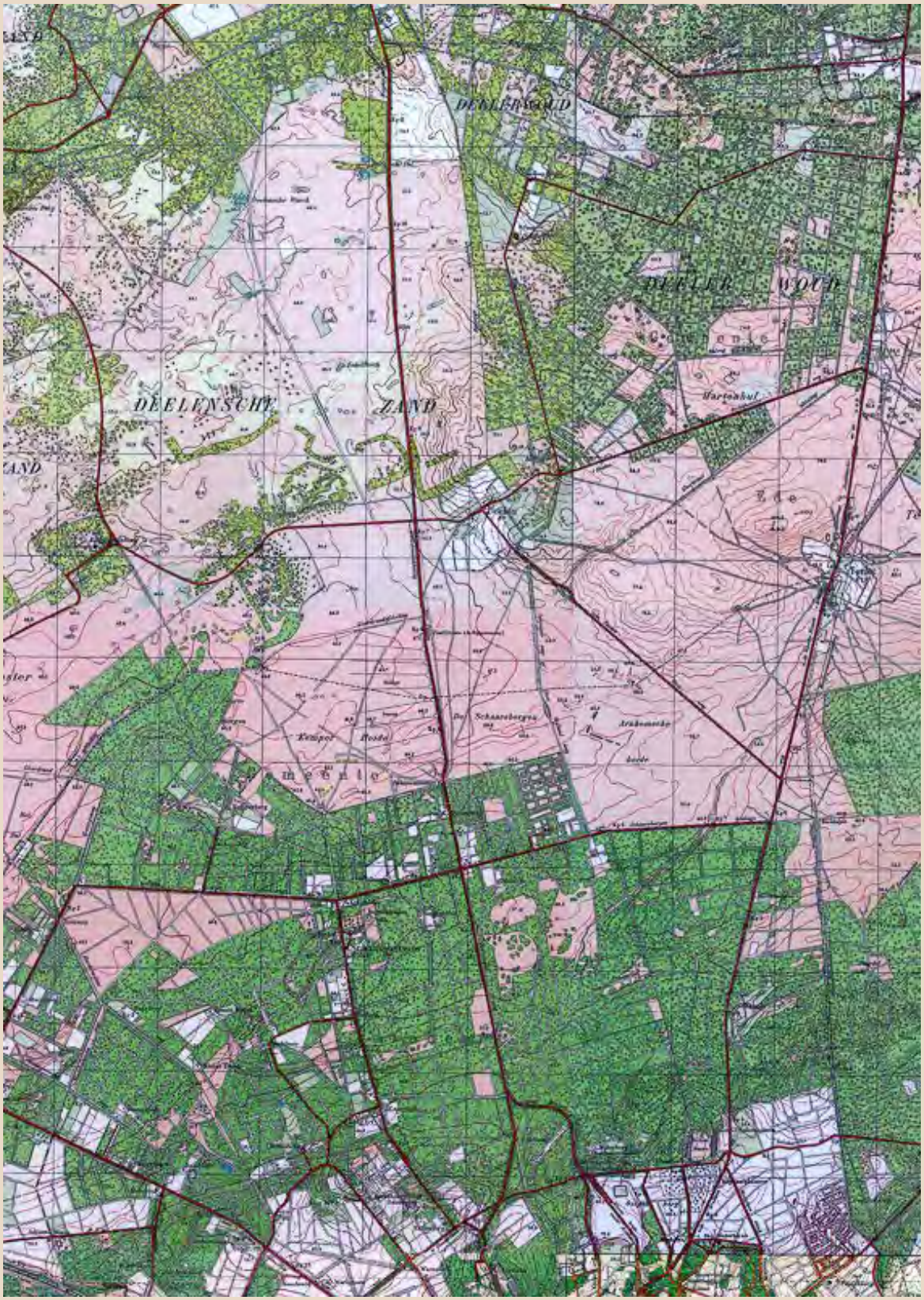
Building materials were initially transported by road, but this method was inefficient. The problem was solved in the summer of 1941 with the construction of the so-called 'bomb line', a branch of the main railway line which began at Wolfheze, and there were also plans to divert National Road 12 (*Rijksweg*, today the A12) so that it could be more easily accessed from the air base. The course of this road as originally planned can be traced on the 1951 map; that same map does not yet show the 1940 modification, which passes Arnhem to the north. Both the original plan and the modification were eventually executed, the latter coinciding with the modern A12.[2]

The air base was largely surrounded by woodland. Along the forest edge, around the perimeter, was a so-called '*rolbaan*', a taxiway where airplanes could also be parked in the open. Hangars for one or several machines arose, some of them camouflaged as farms or barns. (fig. 38) On the above mentioned elevation (called Kop van Deelen; Du.: kop is: *head or top*) was a command centre. Gradually, several camps for ground personnel and flight staff were built in the surrounding forests, of which the most attractive are camouflage 'Veluwe hamlets' Klein-Heidekamp and Groot-Heidekamp. The existing forest was cleared to build them and other (infrastructural) elements, although new plantations for the purpose of camouflage were also part of the plans. At its peak, the entire complex probably numbered ca. 700 larger and smaller buildings. Besides hangars and personnel quarters these also comprised numerous bunkers and anti-aircraft batteries, ammunition depots and fire stations. A command bunker (called Diogenes) was built near the air base, the *Luftwaffe's* gigantic air control centre for all of north-western Europe.[3]

There was even a small pumping station for drinking water and for irrigation of the complex' arable fields, which produced actual crops but were also part of its camouflage. Remarkably, the heath was reclaimed and divided into arable fields in a pattern which made the runways blend in with the field system. Even the runways themselves are said to have been painted in appropriate camouflage colours. Ultimately, however, not even the addition of wooden cows and other means of deception (German: '*Tarnung*') was effective. The Allied forces saw through them and bombed the air base several times. When Operation Market Garden started (September 17, 1944) the German forces panicked to the point where they dismantled Deelen including its giant command bunker, in the process largely destroying their own defensive capabilities in the region. (fig. 61, 62)

After the war, many of the buildings were demolished but ca. 200 of them made it to the 21st century, as did many of the original runways and taxiways of which most are now listed as national monuments. Since ca. 1950, some of the hangars disguised as farms have actually been functioning as real farms, having been converted into four modern reconstruction-era farm buildings of a generic type, each named after a main character of a well-known medieval Dutch folktale. The original plots that were intended to

Deelen Air Base
Right: Topographical map with situation around 1933, composed of maps 33 W, Zutphen (1934) and 40 W Arnhem (1933).
Scale: ca. 1:55.000
Left: Topographical map with situation around 1951, composed of maps 33 W, Zutphen (1951) and 40 W Arnhem (1951).
Scale: ca. 1:55.000



Maps showing, waste land reclamation and war damage caused by the laying out of Deelen Air base. Left: situation ca. 1933, pre-war situation; right: post-war situation ca. 1951, with, for example, the air base lay out, military (housing) facilities and the German planned course of National Road 12.

59 German bunker 'Diogenes', camouflaged in the woods at Deelen Air Base. Diogenes was head quarters or flight control centre – first intended for coordination of German air raids on Great Britain, later for air control of the German self defence against being bombed.

obscure the runways have been modified but are still being worked as farmland. The air base itself and many of its buildings were used by the Dutch Royal Airforce until 1996, after which they served a number of civilian purposes. In 2010, a section of the runways also became a base of operations for the Defence Helicopter Command, while new residential sections and other buildings were added for the use of the Dutch Airmobile Brigade.

Key qualities

In size, representativeness and state of preservation, Deelen Air base is an exceptional military feature from the period 1940-1945. Its construction is a good example of war damage as it entailed a loss of cultural and nature values. Ultimately, the wasteland reclamation on behalf of the air base's construction in 1940 benefited the Dutch, post-war military infrastructure as well as enabling the agricultural exploitation of this small piece of Veluwe sandy soil. Both the actual damage and the inherent qualities of the area's ensuing development are still visible today. Deelen Air base is thus a typical example of the many German interventions

60 After WW II Deelen Air Base functioned as a so called 'army dump'. This is a Sherman tank, but there were thousands of army trucks as well. Many of them were bought by Dutch firms and farmers and used during the following decade. (Photo May, 1947)

in rural areas at the start of the reconstruction period. Its authentic qualities are recognizable in, among others, its metalled runways and its various airplane facilities such as the camouflaged hangars and the so-called 'splinter boxes', earth walls originally equipped with camouflage nets to protect parked airplanes. Other noteworthy but often overlooked WWII-related features in the terrain are the so-called 'villa hamlets' or Veluwe hamlets in the nearby forest, groups of randomly placed army barracks which were difficult to identify as such. A palimpsest layer at Deelen Air base that adds to its dubious reputation as an example of war damage are the AHN (*Actueel Hoogtebestand Nederland*; DEM, *digital elevation model*) pictures that show lots of traces of the Allied bombings. (fig. 63) Further interesting features are some former military structures which after the war were converted into four farms, the modernised motorway A12 and some relics of the wartime railroad, the 'bomb line', such as a 1941 railway tunnel under the A12.

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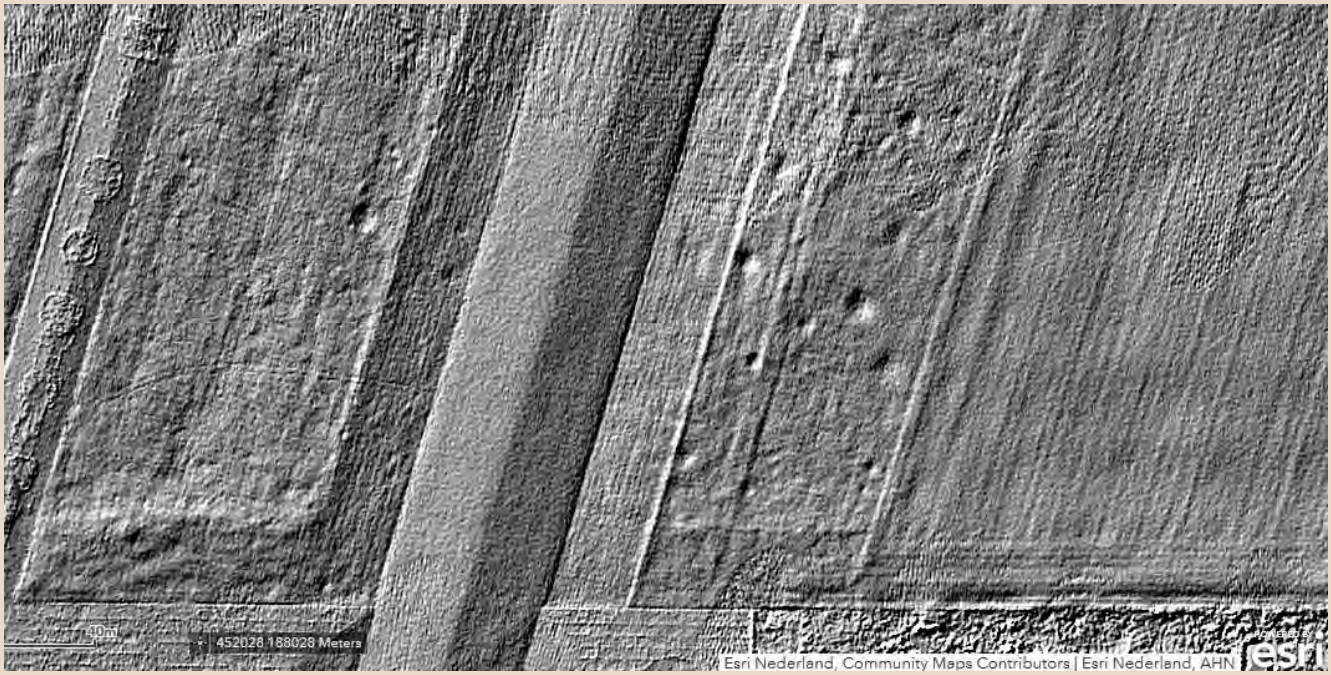
Notes

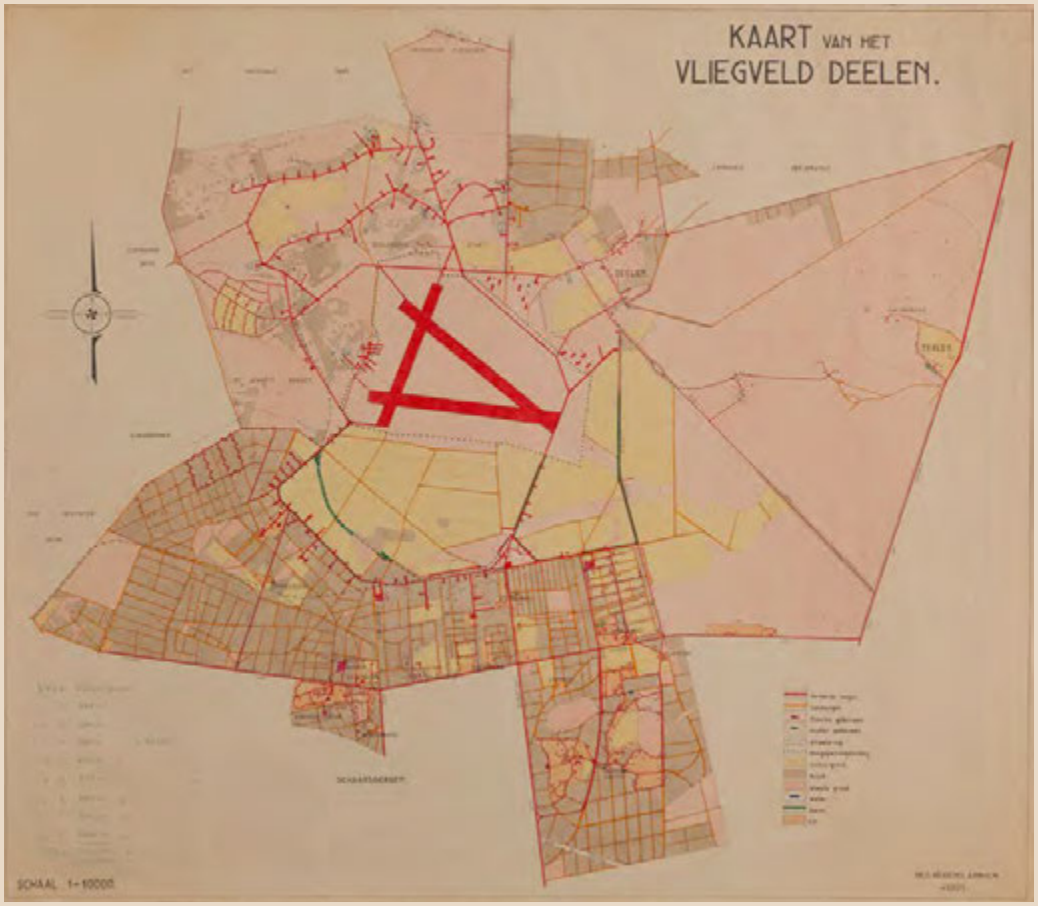
1 In pre-war years there were some Dutch military facilities already.
2 The 1951 map is a rare, in part updated version of an edition based on surveys conducted around 1930. The contemporary official version omits the air base but includes the new planned course of Rijksweg 12. The Arnhem-Utrecht railway line is just visible in the lower left-hand corner. An Allied map from the year 1944 shows part of the 'bomb line' with two branches; the main branch starts in the west and ends at a point where the word 'Schijvenloods' is printed on the map. Although these railway lines were decommissioned and removed in 1946, their courses are still visible in the landscape.
3 Compare e.g. Vossebeld 1997a; Kuipers 2005, 64 ff.; Derks *et al.* 2007, 102 ff., 121 ff., 194 ff., 216-217, 250-251.

61 Two examples out of several hundreds of accomodations for military purposes at Deelen Air base: lodgings and equipment shelters, etc., most of them camouflaged or disguised as agrarian farmsteads or concentrated in 'Veluwe hamlets' like Klein-Heidekamp. (Photo ca. 1941)

62 About 200 lodgings and equipment shelters at Deelen Air base have survived and today the whole 1940-1945 German military structure is classed as a national monument. Notice the walls over 50cm thick and the 20mm steel shutters with farm-house camouflage painting. (Photo 2009)



63 DEM / AHN pictures of Deelen Air Base show many bomb craters and tell the story off the Allied forces intention to destruct this 1940 German infrastructural work.



64 Deelen Air Base was far more extensive than its three air strips. It included accomodation for aircraft, men and materials, as well as bombs and defensive facilities - comprising in total ca. 4000ha.

4 The 1953 North Sea flood as an incidental cause of interrupted continuity

65 February, 1953, probably the village of Nieuwerkerk, Schouwen-Duiveland. Davastations after the flood, but yet a surviving proud windmill as a sign of hope.

This chapter focuses on the second catastrophe to hit the Netherlands in the mid-20th century, the February 1, 1953 North Sea flood. This Sunday night flood was a reason on itself for major interventions in the landscape of the south-west of the Netherlands and the island area in particular. This chapter briefly addresses the causes, course and immediate consequences of the flood, followed by a short discussion of the repairs. Most other aspects of rural and agricultural development in the south-west and the Delta Works will be more coherently discussed in a later chapter.
The natural disaster of 1953 may be regarded as a repetition on a larger scale of the consequences of the deliberate inundation of Walcheren in 1944 by the Allied forces. Likewise, Walcheren's recovery at that time can be viewed as a blueprint for how to deal with the impact of the North Sea flood. This is why we will zoom in on that island, even though it was only little affected by the 1953 flood. Taken by itself the 1953 disaster is best represented by developments of the isle of Schouwen-Duiveland. (See the Box Texts for Walcheren and Schouwen-Duiveland)

4.1 Context and causes

Once the Netherlands had somewhat revived after the disruption and physical devastations of the Second World War, the nation's recovery seemed to be imminent at last. From 1948 onwards, American goods, funds and loans kick-started the economy to the point where, on January 27, 1953, the Dutch government decided it was time to end the Marshall Plan aid, after which the nation once again stood on its own legs.[120]
However, four days later the Netherlands again received a heavy blow: a severe hurricane in combination with spring tide caused floods throughout the entire south-western delta, resulting in casualties and damage. The impact of the flood was particularly severe on the islands of Goeree-Overflakkee (Zuid-Holland), Schouwen-Duiveland (Zeeland) and Tholen (Zeeland) and in the north-west of the province of Noord-Brabant.[121] (fig. 65)
Besides the (foreseen) weather conditions and the tide, other direct and indirect factors

[120] Between 1948 and 1953 the Netherlands received 3,5 billion guilders in financial support and borrowed another 600 million. (respectively ca. 13 billion and 2,2 billion euros in today's currency; http://www.iisg.nl/hpw/calculate2-nl.php).

[121] Worst affected was Schouwen-Duiveland, not only in terms of victims but also materially. Lives were also lost on the north-eastern tip of the island of Texel and in Zijpe (Noord-Holland) – seven in total.

contributed to (the scale of) the disaster. Despite the age-old Dutch reputation on water management the period before and immediately after the disaster was characterized by carelessness, dereliction of duty and obstruction of intervention. Moreover, many sluices, culverts and coupures in dykes had not been closed in advance, and communications proceeded far from smoothly. One sometimes overlooked reason had to do with local calvinist fundamentalism, which not only forbade radio, but also prevented Sunday's labour and then, to cap it all, explained the disaster as God's punishment. The main problem, however, was the fact that in many places dyke maintenance was in arrears and that many dykes contained weaknesses, both shortcomings partly due to a lack of funds. Also, the German wartime inundations of the islands in 1944 and 1945 had left the delta more vulnerable since the water had weakened both sea dykes and inland barriers, and associated constructions (sluices, coupures, pumping stations and such) had been inadequately maintained.

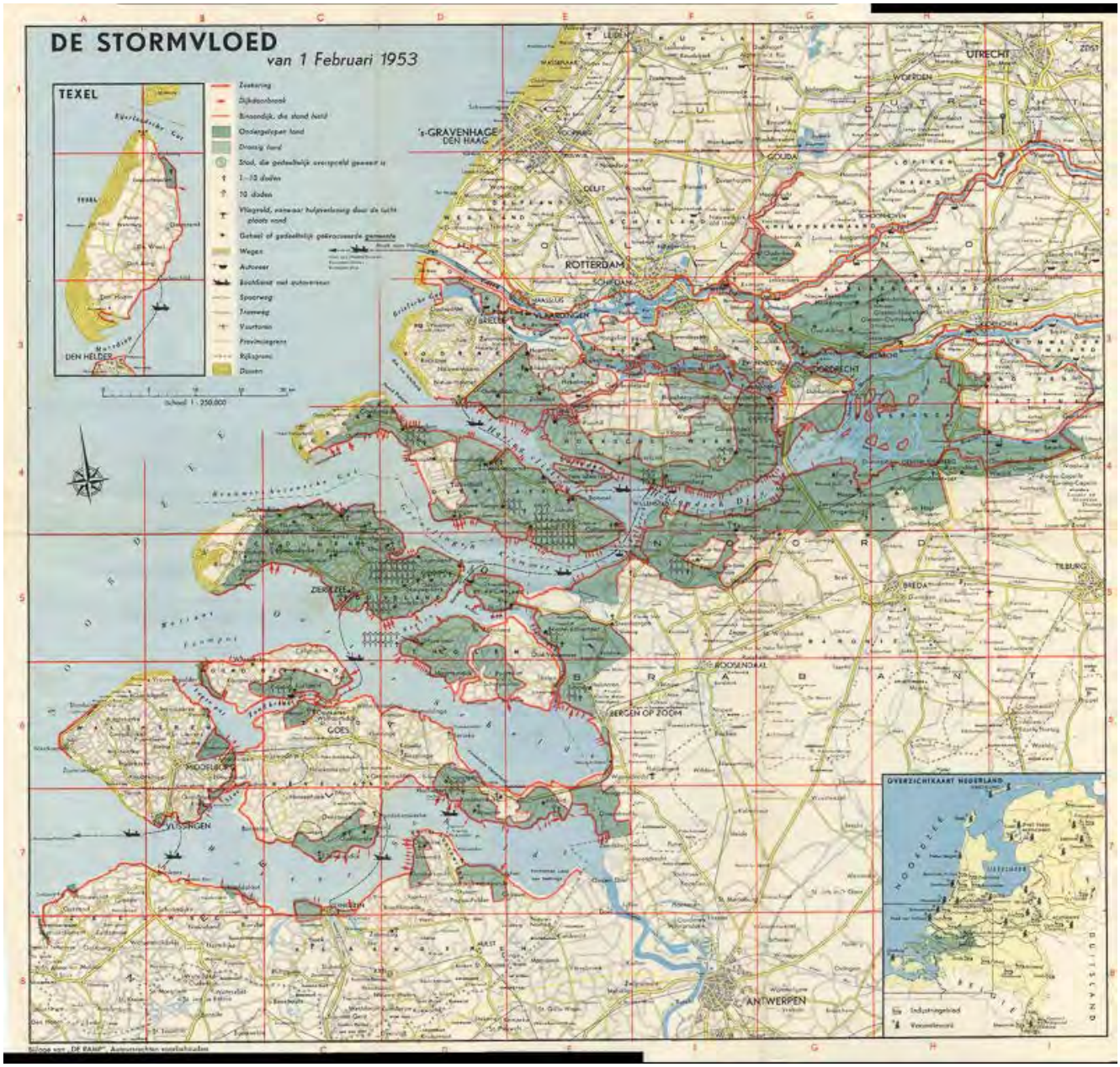
4.2 Consequences

Due to this combination of factors and the uncomfortable circumstance that the disaster occurred at night, many were caught completely at unawares and hundreds of people died immediately.[122] Many more followed over the next few days. Of the 1836 fatalities in the Netherlands, over 875 individuals died in Zeeland, nearly 700 in Zuid-Holland and over 250 in Noord-Brabant. Tens of thousands of people, and possibly hundreds of thousands, had to be evacuated for a shorter or longer period of time, and tens of thousands of cattle and numerous other animals died.[123] Once again, the level of destruction was gigantic. Yet, despite unimaginable personal suffering, in financial terms the damage seemed insignificant compared to that of the Second World War. Then, total costs amounted to 21,4 to 25 billion guilders, while the damage caused by the 1953 North Sea flood was 'only' 1 to 1,5 billion guilders or 3,5 to 5,3 billion euro.[124] The overall costs, including a more than 10 billion euro investment in the Delta Works, were therefore significantly higher, probably well over 15 billion euros.[125]
The 1953 North Sea flood struck within a few hours and had catastrophic consequences for widely scattered areas along the entire coast of the southern North Sea and the Channel.[126] The Dutch islands and fluvial landscapes were particularly vulnerable, for their extremely low situation relative to the sea made it necessary to protect them entirely and on all sides with dykes against high tides. Moreover, this region is in effect the delta of three major West European rivers: the Rhine, Meuse and Scheldt. The fact that the spring tide coincided with a relatively small discharge volume of those rivers was a minor piece of good luck, as it prevented further incursions and even higher water levels. Even so, the combination of spring tide and a heavy north-western gale brought on an extreme surge which exceeded earlier known storm surges by several decimetres.[127] Sea and inland dykes collapsed in dozens of places and ultimately entire dyke segments were swept away, even in the days following February 1. Several of the islands and vast stretches of land in the region between Rotterdam (in the north), Gorinchem and Geertruidenberg (east) and Bergen op Zoom (south) as well as many polders along the Westerschelde (Western Scheldt estuary) were flooded as a result (see Table 4.1).[128] Ultimately only parts of the highest situated villages and a few more or less random locations were mostly spared.
A 0.5 x 0.5m map in a hastily prepared 1953 publication for the general public called *De ramp* (The Disaster), presents a reasonably clear picture of the dyke breaches, the amount of victims and the scale of the flood. A small reproduction of this map has been included here.[129] (fig. 66)

4.3 Damage to the landscape, infrastructure and buildings

Data on the 1953 North Sea flood are often conflicting. Quoted numbers for the amount of flooded land range from 141,000ha to almost 200,000ha and more.[130] In 1953, the above mentioned national publication *De ramp* published the highest number by far:

122 Slager 1998, 25 ff., 50 ff., 155 ff., 311 ff.
123 Zwemer 2005, 35. Some of the official lists mention 1835 victims; however, one newborn baby had not yet been registered when it drowned, bringing the total up to 1836.
124 The site http://www.iisg.nl/hpw/calculate2-nl.php provides a tool to convert this sum to euros. With regard to the actual costs it is important to realize that the purchasing power of 1 billion guilders in 1955 roughly equalled that of 3,6 billion euros in today's (ca. 2016) currency.
125 See e.g. https://www.ensie.nl/peter-timofeeff/deltawerken . The sum of 10 billion euros as the total cost of the *Deltawerken* has not been corrected for inflation, which means that in terms of current value it probably further exceeded 11,5 billion euros.
126 Winkler Prins Encyclopaedia (6th edition), Volume 18, 383-385: Belgium, northern France and England were also severely affected.
127 Mulder 1954, 478; Stuvel 1962, 28 ff.
128 Schouwen-Duiveland, Goeree-Overflakkee, Sint-Philipsland and Tiengemeten were (almost) completely flooded, but also Tholen and the north-west corner of Noord-Brabant, from the Western Scheldt estuary up to Waalwijk, were transformed into vast sheets of water completely exposed to the tides. Other 'drowned' areas include the western part of Alblasserwaard; the entire Biesbosch wetlands and large sections of the Eiland van Dordrecht, IJsselmonde, Voorne-Putten, Hoeksche Waard and Rozenburg; parts of the islands of Noord-Beveland and Zuid-Beveland ('Wolphaarsdijk', 'Zak' and 'Waarder') and the east of Walcheren, as well as several polders in Zeeuws-Vlaanderen and the Eendrachts Polder on the island of Texel. The one section of Walcheren not inundated in 1944 and 1945 was now flooded. In addition, dykes and quays in and near a number of towns and villages were also inundated, as were sections of Maassluis, Vlaardingen, Schiedam, Rotterdam(-Zuid), Dordrecht, Vlissingen, Veere and Terneuzen, among others.
129 The map can be consulted and enlarged online at http://4.bp.blogspot.com/-XdRoSu2UcV0/UQZwlz3Y6GI/AAAAAAAARBQ/-MNorkXUM6E/s1600/1953+%25281%2529.JPG+panorama.jpg
130 Zwemer 2005, 35; Slager 1992, 5; Van de Ven 1993, 262.



66 Map showing the during the Februari 1, 1953 North Sea flood inundated areas and the spreading of its deadly casualties.

'Two hundred and fifty thousand hectares – that is the size of the area directly affected by the storm surge; 7.8% of our entire country.'[131] This much is certain: the size of the flooded area matched that of the wartime inundations, the difference being that in 1953, most of the water (more so than in 1944-1945) was salt or brackish, i.e. highly detrimental to agricultural soil.[132] The temporary loss of land in both episodes combined – the war and the flood – amounted to roughly the total of all reclamations during the period 1900-1940, i.e. ca. 320,000ha.

4.3.1 Damage to the landscape and infrastructure

Other forms of direct material damage in 1953 were also on an enormous scale. The dynamic

131 *De ramp* 1953, pages not numbered

132 In 1944-1945 all vast inundations in the plains of the major rivers were sweet water floodings; most other inundations in the war period (e.g. in the south-western delta, where the 1953 flood struck) were salt or brackish.

Table 4.1 Inundations during the 1953 North Sea flood and the flooded parts in relation to the total affected area in February and on July 1, 1953. All inundated areas were dry again by December 31, 1953.

Province	Region / Island	Surface (ha)				
		Total	Flooded February (ha)	% of Total	Still Flooded July (ha)	% of Total
Zeeland		169.970	37.800	22.2	15.155	8.9
	Schouwen-Duiveland	21.871	16.216	74.1	13.765	62.9
	(agricultural land)	19.200				
	Tholen	12.000	6.500	54.2		
	Sint-Philipsland	1.780	1.624	91.2		
	Noord-Beveland	7.990	2.173	27.2		
	Zuid-Beveland	35.390	7.090	20.0	1.390	3.9
	Zeeuws-Vlaanderen	70.608	2.569	3.6		
	Walcheren	20.331	1.628	8.0		
	(Walcheren 1945)	20.331	16.000	78.7		
Zuid-Holland		314.100	53.488	17.0		
	Goeree-Overflakkee	20.940	17.190	82.1		
	Voorne-Putten	22.000	6.262	28.5		
	Hoeksche Waard	32.370	5.900	18.2		
	Rozenburg	2.990	1.520	50.8		
	Tiengemeten	1.050	1.050	100,0		
	Alblasserwaard	21.818	9.435	43.2		
	IJsselmonde	10.500	3.685	35.1		
	Eiland van Dordrecht	8.000	4.000	50.0		
Noord-Brabant		490.483	45.680	9.3		
	West, North, Land van Heusden en Altena, & Biesbosch		45.680			
Noord-Holland		287.370	250	0.1		
	Texel	17.000	250	1.5		
Total		1.261.923	136.512	10.8	15.155	1.2
Wet but not flooded			16.815			

Source: *Verslag Stormramp*, 1961, 225.

interaction of the marine and tidal forces was so powerful that in large sections of the delta the landscape was completely obliterated. The entire vegetation of hedges, shrubbery and trees, including those growing on dykes and dyke remnants, died. The salt water killed the roots, leaving treeless plains behind once the breaches had been closed again. Any vegetation that had survived the brackish waters of the 1944-1945 inundations or perhaps had already been replaced, in 1953 finally – or again – succumbed and died.[133] The additional damage to roads, waterways, tramways, railroad tracks, polder dykes and other infrastructure was immense. Railroads and tramways on Eiland van Dordrecht (Isle of Dordrecht), in western Noord-Brabant, in parts of Zuid-Beveland and elsewhere had been washed away or been undermined by the water, sometimes over a length of hundreds of metres. Public utilities such as gas and water pipes and electricity wires (to the extent these had already been installed on the islands) had become useless.

The soil was saturated with salt to the point where, without concentrated efforts, any form of agriculture would be impossible for years to

[133] Mulder 1954, 490.

67 Dyke-burst near Alblasserdam, Zuid-Holland Province. (Photo 1953)

come. Salinization had been a known problem before as salt and brackish (sea and ground) water percolated through the soil, but after the North Sea flood the situation was desperate. The soil ecosystem had been upset in other ways as well. As before on Walcheren, larger and smaller ditches had filled up with sandy residue while layers of clay and sand up to several decimetres thick had been deposited on fields and meadows. In some of the worst affected areas the characteristic mosaic of tiny fields (resembling a 'craquelure', judging by old maps) was completely obliterated and many of the historic micro relief qualities were flattened. The island of Schouwen-Duiveland, which had been exposed to the tidal forces longest, suffered the greatest loss in this respect.

4.3.2 Damage to buildings

The damage to built structures was extensive and many houses and farm were rendered uninhabitable, sometimes for a long time, so that tens of thousands of people had to be evacuated. As with flooded areas, however, it is difficult to compare the various published data on destroyed and damaged buildings, in part because they derive from inventories that used different criteria or were carried out at different points in time. For example, the quoted data on the total number of destroyed buildings vary widely, ranging from 2,500 to 8,250 severely damaged or destroyed houses and farms (see below too). Fortunately the overall numbers for 'damaged buildings' are more consistent than those for destroyed ones: between 40,000 and 50,000.[134]

4.4 Overall damage

The 1961 publication *Verslag van de stormramp 1953* summarizes the total damage as follows: *'The total damage, in terms of money, caused by the storm surge is estimated at ca. 1,5 billion guilders, over four hundred million of it for agricultural recovery. Drowning victims of the storm surge include ca. 20,000 cows, 12,000 pigs and 1,750 horses. 47,300 buildings were destroyed or seriously damaged, 10,000 of them severely or irreparably. The total estimated damage to buildings amounts to ca. 160*

[134] Siraa 1989, 96; Van de Ven 1993, 262; Bosch & Van der Ham 1998, 177; Winkler Prins encyclopaedia (6th edition), 383: destroyed *and* severely damaged. No good explanation was found for the discrepance between destroyed and heavily damaged houses on the Isle of Goeree-Overflakkee. Most probable it has to do with the use of criteria.

68 After the 1953 disaster Norway helped the Netherlands by giving circa 325 pre-fab timber emergency dwellings for the severely struck village of Stavenisse, Tholen, Zeeland Province. Norwegian King Haakon and Dutch Queen Juliana are nrs. three and four in the procession.

million guilders. The damage to the main flood defences in the south-western disaster area over a length of more than 160km was considerable, ca. 42km of it severe; in addition, 89 breaches occurred in the area. Ca. 153,000ha of the south-western disaster area were inundated; included in this number are ca. 17,000ha which were merely waterlogged.'[135]

The actual extent of the damage will always remain conjectural, partly because individual and personal losses, or for example ineffective claims, were largely unrecorded. What is certain is that there were considerable differences and contrasts both between and within areas. The most extensive damage to flood defences and other water management structures occurred in the polder Waterschap Schouwen, where much of the southern sea dyke was washed away. Also Goeree-Overflakkee (18km new sea dykes on the south side alone), Noord-Beveland (the sea dyke around Jonkvrouw Annapolder) and Zuid-Beveland (the sea dykes of Waterschap Baarland and Reigersbergse Polder) stood out in this respect. In the province of Noord-Brabant, damage was particularly severe in places like Nieuw-Vossemeer, Raamsdonk and Raamsdonksveer, in part because adequate flood defences had been lacking there.[136] In several villages soon emergency dwellings were built, most of them presents from abroad. Many of them are still in existence and some have been classified as monuments. (fig. 68) Published sources and literature more or less agree on the total damage as expressed in (contemporary) guilders. The lowest estimates amount to less than 1 billion guilders but 1,5 billion guilders is more commonly mentioned.[137] (as mentioned above: 3,5 to 5,2 billion euros) Initial estimates seem to have been fairly conservative but for example repairs to the dykes on Schouwen-Duiveland turned out to be more costly than anticipated. (See also the Box Text on the island of Schouwen-Duiveland)

4.5 The start of the repairs

The 1953 North Sea flood was a short but violent setback in the post-war recovery. Much matériel which had been deployed elsewhere in urban and rural repairs was hastily sent to the south-west, and for a while especially land consolidation

135 *Verslag* 1961, 14.
136 *Ibidem*, 175 ff.
137 Heslinga 1953a, 281: 860 million guilders in repairs; to this should be added at least 125 million for emergency assistance, funded by the so-called *Nationaal Rampenfonds* (National Disaster Fund); idem, 1953b, 425, 426: 895 million plus additional costs. The Winkler Prins encyclopaedia (6th edition), Vol. 18 (1954), 383: 'The total damage is estimated at ca ƒ 895,000,000,-.' Heslinga based this sum on *Statistische en econometrische onderzoekingen* 1953, 47. The ENSIE ('*Eerste Nederlandse Systematisch Ingerichte Encyclopaedie*', or 'First Dutch Systematically Organized Encyclopaedia') 1946-1960, Vol. 12 (1960), 216 reports: 'The total damage amounted to over 11 billion guilders'; a comma should probably be inserted here.

69 Closing the dyke-burst at Schouwen-Duiveland island, November 6, 1953, near Ouwerkerk village. Four 1944 Phoenix caissons were used to subdue this last tide way.

projects and other forms of land development came to a halt. (fig. 69)
The *Rijksdienst voor de Uitvoering van Werken* (DUW), established in 1944, provided much of the manpower, and by a concerted and combined effort of people and equipment all breaches were closed before the year of the disaster was over. Powerfull American army trucks left behind after 1945 were a welcome addition to the mechanic equipment – they were used for transport and earth-works. (fig. 70)
First, emergency repairs were carried out so as to be able to get the least physically affected areas, such as the mainland of Noord-Brabant, Zeeland and Zuid-Holland and some (parts) of the islands, back on their feet again. After that, final repairs to the dykes and the deeper gullies were taken in hand. Hage (2015) presents a clear overview of the damage and the first attempts at repair, including the exact dates when the gaps were closed and the various flooded areas were dry again.[138] The earliest drainage efforts benefited from the large number of people and extensive equipment made available by, among others, the American and French military corpses

70 Left behind American army trucks were welcomed as powerful mechanical assist in the davastated areas. This picture shows the clearing of a former house place along the adjacent dyke burst in the village of 's-Gravendeel, Zuid-Holland Province. (Photo probably Spring, 1953)

[138] Hage 2015, 25-155.

71 The closing of the last tidal gully by sinking Phoenix caissons near Ouwerkerk village, Schouwen-Duiveland island. (Photo Autumn, 1953)

72 Gratefully accepted Canadian Red Cross help for agrarian victims of the 1953 North Sea flood. Probably about 250 Cockshutt tractors were shipped and mainly used in the archipelago area.

of engineers, and from pumping equipment accompanied by its own German and Italian personnel. During subsequent efforts it was possible once again to draw upon native Dutch expertise in hydraulic engineering. Also the *Waterloopkundig Laboratorium* ('hydrodynamic laboratory') in the brand-new Noordoost Polder rendered excellent service. Here, several planned extensive projects could first be simulated and tested in tiny detail by means of a number of scale models, as for instance happened prior to the closure of the breach near Schelphoek (Schouwen-Duiveland). As will be explained later several so-called Phoenix caissons were used here in the dike repairs here. The hydrodynamic laboratory practice continued long after the inlets and breaches had been sealed and the Delta Works begun.[139] (fig. 71)

4.6 Post-North Sea flood perceptions and recovery

Scattered over the disaster area several memorial sites, museums and inscriptions help keeping the history of the February 1 North Sea flood alive. Besides this anyone visiting the area with attentive eye can easily perceive (post-) flood damage and recovery marks: discoloration in walls, partly reconstructed farms and last but not least: traces of re-allotments. Social, infrastructural and agricultural and recovery would never have been as fast and thorough without foreign help and many are still grateful for that. (fig. 72)

Together with the Second World War the 1953 North Sea flood was by far the most significant incident leading up to the interventions in the Dutch cultural landscape in de period 1940-1965. Apart from these two major incidents the above already mentioned Dutch pre-war history of structural rural and agricultural arrears, fragmentation and stagnation were the main motors for modernization and acceleration. The next chapter mainly focuses on these structural issues as motives for change and developments. First we will zoom in on a number of physical problems affecting agricultural areas, such as their often inadequate drainage and inefficient parcellation. Secondly we will focus on social-economic and societal issues, such as the disadvantaged position of the rural population both in absolute and in relative terms, and on the consequences of post-war European and global market developments.

[139] ENSIE, 1946-1960, Vol. 11 (1959), 523-525. See the relevant sections on Schouwen-Duiveland and the Noordoost Polder.

Schouwen-Duiveland, (1945-) 1953-1965

Re-consolidation (following the 1953 North Sea flood), Schouwen-Duiveland Municipality, Province of Zeeland.

Identification

- Schouwen-Duiveland is a rural island in the Dutch south-western archipelago, bordering on the inlets of Grevelingen (to the north) and Oosterschelde (Eastern Scheldt) to the south.
- After the 1953 North Sea flood the emergency law *Herverkaveling Noodgebieden* came into force, damage was repaired and the area was redeveloped. A consortium of contractors headed by *Nederlandsche Heidemaatschappij* and *Grontmij* carried out the work. After 1945 (war damage, including inundations) and in the 1950s (flood damage) and 60s, the *Bureau Wederopbouw Boerderijen* (BWB) was responsible for land re-consolidation and reconstruction and for the establishment of new farms.

Problems

Before the North Sea flood the landscape on the island of Schouwen-Duiveland displayed a typical mosaic of small fields, but at the same time it was also a very open area, probably even more transparant than the lower parts of Walcheren. A few trees lining the roads (and the sparse inland dykes) created some minimum degree of compartmentalization. For some months towards the end of the Second World War, the island was deliberately inundated by German forces with both fresh and salt water, causing serious but little lasting damage.

However, eight years later, Schouwen-Duiveland was flooded again during the North Sea flood of January 31/February 1, 1953. It was one of the worst hit areas, not only in terms of lives lost but also materially. Of all the objects destroyed or seriously damaged during the disaster a significant proportion was situated on this island, as were thousands of hectares of ruined or severely affected soils and structural elements. Only the dune landscape on the island's west coast was spared. Because of the intensity of the North Sea flood the emergency law drafted in 1947 for the benefit of Walcheren was applied virtually unaltered to Schouwen-Duiveland and several other areas. (fig. 74, 75)

A problem specific to Schouwen-Duiveland was that the process of closing off the inlets turned out to be lengthy and complicated, which partly explains the high degree of salinization of the island soils. Not only the sea dykes were damaged but also the (historical) inland dykes around the so-called '*oudlanden*' and '*aanwassen*'; in some cases they were completely swept away.[1] The sea water had killed off virtually all vegetation, leaving behind a landscape that was even emptier than it had been before the disaster. Salinization was a severe endemic problem from the old days upon all of the south-western delta islands however and as a remedy through the ages thousands watering holes for cattle were dug in the marine clays. The island of Schouwen-Duiveland lost nearly all of them after 1953 – which means a great loss of cultural-historical relics and of spatial information as well.[2]

The island of Schouwen-Duiveland was never involved in a rural improvement programme after the 1953 flood. An 1966 application was turned down because the island's agricultural potential was believed to have sufficiently recovered by then. (fig. 73)

73 Saving his probably most valuable agricultural equipment: punting a post-war tractor. (Schouwen-Duiveland island, 1953)

Realization

After the North Sea flood had receded and the aid programmes were underway, the repair efforts concentrated on Schouwen-Duiveland. Closing off the breaches took hundreds of pieces of heavy equipment and the last breach, near Ouwerkerk (east of the island's capital town Zierikzee; which is just outside the 1951 and 1972 maps), was closed off many months later, on November 6, 1953. Some gaps were so wide that in places huge scour holes or kolks formed which were not subsequently drained and reclaimed but designated as nature preserves. Caissons were used to seal the breaches at both Ouwerkerk and Schelphoek; some are still (partly) visible in the terrain or on the foreshore.

At Schelphoek, the repairs involved removing the dyke to a new location further inland, leaving a section of the kolk lake on the foreshore intact and foresting the surrounding area. Today, it is a nature preserve (Schelphoek is situated to the south of Serooskerke; see the 1972 map, centre-west).

Even before the North Sea flood, plans had been prepared for the reconstruction of, and land consolidation on, the island, which was seriously affected by a high degree of fragmentation in land ownership, poor access and drainage, and rural social-economic deprivation. After the disaster, one of the starting points for the reconstruction of Schouwen-Duiveland was to either dissolve or upgrade its many tiny hamlets and to condense its built-up areas. Farm rationalization was also deemed to be crucial, but salinization curtailed the agricultural options. Re-establishing good-quality soils by deep ploughing and by adding huge quantities of lime to neutralize the salt was therefore given priority. Immediately next in line were re-consolidation, drainage and improving access. In order to remedy the problematic water-management situation, several existing pumping stations were renovated or new ones built.

The redevelopment of Schouwen-Duiveland on the basis of a *landscape plan* occurred as soon as the 1954 Land Consolidation Act came into force. The experience gained during the land consolidation Maas en Waal-West also contributed to the process.


ROUWERSHAVENSCHE
GAT
Scharendijke
Kasteel Moermond
Oudendijke
Elkerzee
Looperskapelle
Brouwershaven
Brijdorpe
Noordwelle
SCHOUWEN
POLDER
Serooskerke
Nieuwerkerk
Moriaanshoofd
Kerkwerve
Reigerskerke
oggenplaat
Zierikzee

Schouwen-Duiveland

Left: Topographical map with situation around 1950, map 42 O, Zierikzee (1951). Scale: ca. 1:55.000

Right: Topographical map with situation around 1970, map 42 O, Zierikzee (1972). Scale: ca. 1:55.000

Maps showing details of re-consolidated area of Schouwen-Duiveland island. Left: situation ca. 1951, the island 'craquelurely' parcelled before the North Sea flood; right: the situation ca. 1972, after re-consolidation and during realisation of Brouwers Dam, etc.

74 Besides an extended country house and its park and forests vast territories of Schouwen-Duiveland were nearly treeless in the pre war years and both inundation periods. Note the round sweet water ponds for cattle. (Photo 1920-1940)

These two factors explain why the planting scheme for Schouwen-Duiveland encompassed more green zones than just those along roads or on farm yards, since the natural and human forces to which the island had been exposed had almost completely obliterated the landscape that had existed before the disaster. Much more than Walcheren, however, within a few years Schouwen-Duiveland was transformed into a landscape of vast and open vistas with few remaining clues as to its past.
A moderately geometric, rational field system on a grand scale with matching straight roads prevailed, only here and there interrupted by a few lines that still hint at historical features. (fig. 76) The road patterns on Polder Dreischor and Bruinisse Polder (both in the island's east, not shown on the maps) had always been more or less rational and medium or even large-sized too; these were retained and may have been an additional source of inspiration besides land consolidation Maas en Waal-West. Most farms line the new roads and many of them form a characteristic combination with the newly consolidated landscape. On Schouwen-Duiveland no standard farm type was used, although the island features one socalled *model farm*, Friesland Hoeve near Serooskerke.[3] Nonetheless the new farms in their construction hark back to traditional, but not necessarily Zeeland forms; only the barns are no longer wood-built but executed brick. Numerous farms from the reconstruction period still survive although several others have been drastically modified or were demolished.[4]
At several locations on Schouwen-Duiveland, facilities for passive and active forms of recreation were established such as holiday parks, camping grounds, marinas, swimming pools and golf courses, some of them dating back to the 1960s.[5] Occasionally in association with these but also independently, space was set aside or preserved for forests, as near Kerkwerve and Schuddebeurs. A few thoroughfares were constructed across the island, some linked to the dykes and other elements and structures of the Deltawerken (see 1972 map, showing a partly completed motorway).

75 Aerial impression of a re-consolidated part of the island of Schouwen-Duiveland. Picture taken in north-west direction from a churchtower in Zierikzee. (Unknown date)

In 1965 the island received a direct link with Goeree-Overflakkee (to the north-east) and Noord-Beveland (to the south-east), followed in 1978 and 1986 by further connections to the west of both islands. The complex of the Haringvliet sluices, the Oosterschelde barrier, and the Zeeland Bridge – all three integral components of the road infrastructure – are engineering masterpieces.

Key qualities

Within a short period Schouwen-Duiveland was hit twice by brackish and salt-water flooding. Application of the emergency law contributed to the unique character of the island's landscape development in the 1950s and 60s. Farms built shortly after the war are easily identifiable, especially those who came about in the context of the island's complete overhaul after the 1953 flood. This represented a radical break with the past and translated into a largely rational field system which stands out on maps and in the actual landscape. In this process, historical and geomorphological (structuring) elements were secondary except when directly (e.g. as relics of a breach or of dyke repairs, e.g. at Schelphoek) or indirectly (e.g. the forest near Schuddebeurs) associated with the 1953 disaster. The area therefore contains both building and landscape assets which are particularly associated with the period 1944-1965. Some are even more recent, such as several elements of the Deltawerken or some

recreation parks. Of historical interest, and an important local tourist attraction, are the four caissons near Ouwerkerk. They are listed as a national monument and house a museum dedicated to the 1953 disaster. (also see fig. 76)

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Notes

1 *Oudlanden* originated as islands, often in the medieval period, and are often easily identifiable by their circular dykes and specific field patterns. Due to soil consolidation the land surface on these former islands sank below that of the nearby *aanwassen*, land formed at a later period as a result of shore accretion and subsequently dyked in. Due to this phenomenon, *oudlanden* are sometimes described as 'dish-shaped islands'.

2 An expression of thanks to Mr. Ad de Klerk for information on this subject; Maas 2003, 86 ff.

3 On a model farm, modern techniques, practices and machinery can be demonstrated to interested visitors. The name Friesland Hoeve was a reference to a donation to the island made by farmers from the province of Friesland. The Friesland Hoeve concentrated on cattle farming although traditionally, Schouwen-Duiveland had been dominated by arable farming. Soil damage was assumed to be so extensive that a switch to dairy farming would be inevitable, in which this model farm could perform an important function.

4 Van Dijk 2003, 168-171.

5 A former camping ground near Ouwerkerk (1960s) and a former lido near Zierikzee are no longer identifiable as such on the map.

76 Aerial view of the the four caissons near Ouwerkerk, where the last tidal gully closing took place, in November, 1953. The four Phoenix caissons are now a national monument and they host a North Sea flood museum. (Photo September, 2006)

5 Structural physical issues as motives for change and development in rural areas

Traditionally the Dutch countryside had several vulnerabilities which tended to worsen through time. To some extent these vulnerabilities proceeded directly or indirectly from natural conditions relating to factors such as soil and relief; examples are limited fertility and stagnating or insufficient drainage. Other physical limitations and impediments were the result of human intervention in the natural conditions. Besides these restrictions there were economic and socio-economic and economic factors limiting or stimulating(!) chances for modernisation, such as the social deprivation of much of the agrarian population. This chapter focuses on physical issues; chapter 6 on economic and socio-economic factors.
This chapter addresses these physical and spatial issues in relation to the post-war redevelopment of the landscape by first zooming in on the most typical of them in a Dutch context: 1. *drainage problems*. The next item will be: 2. the *inadequate traffic infrastructure* and we will finish the chapter with remarks on 3. *impractical field patterns*.

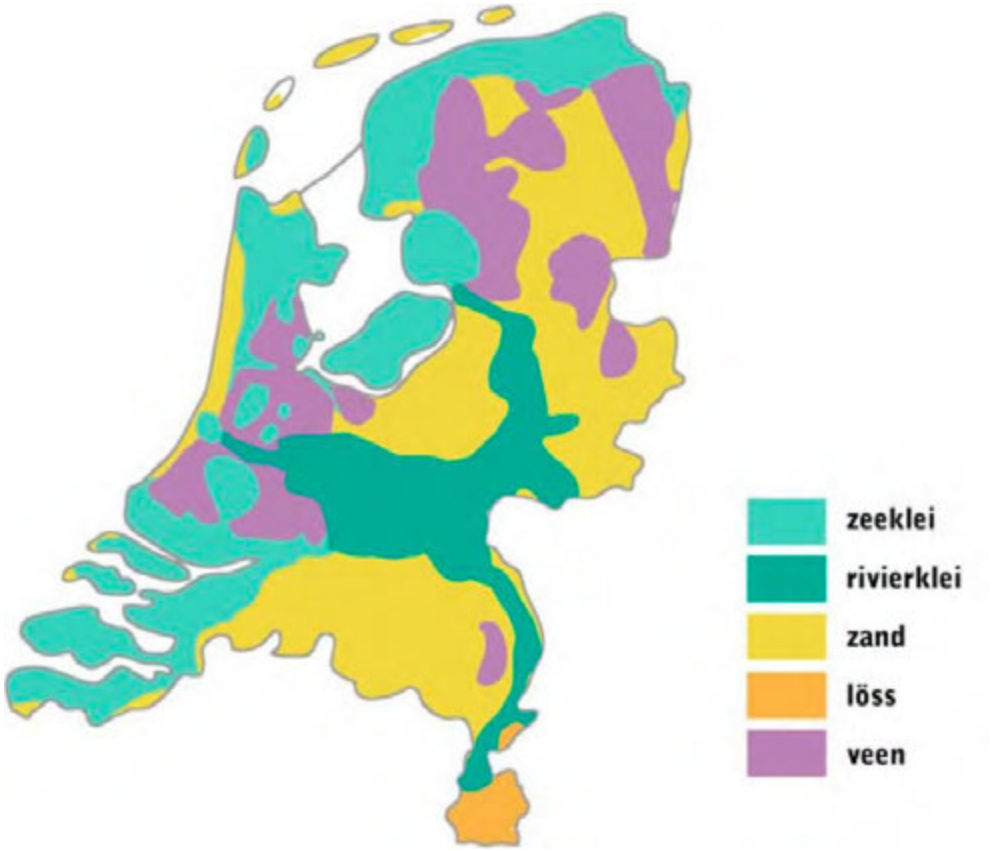
5.1 Drainage: the perpetual Dutch problem

Nederland-waterland. It is the title of several books, films and television programmes – and with good reason. Situated on the North Sea coast and in the estuary of some of Europe's major rivers, with inlets which since time immemorial stretched inland for many miles. And with an inland sea which for centuries had formed the very heart of the nation, a maze of natural water courses, vast marshes and everywhere lowlands regularly threatened by the waves, much of the Netherlands for most of the time was considered uninhabitable. In the Roman period, Pliny compared the residents of its coasts to either sea pirates (at high tide) or castaways (at low tide), while Tacitus called the Batavians 'islanders'. In the twenty centuries since the start of the Christian era, however, the inhabitants of this 'sinkhole of western Europe' managed to turn the – inland and open – sea, the inlets and the inland waterways to their advantage. By trial and error – or rather, by draining and occasionally drowning – but ultimately with astonishing success. Dykes were built, thousands of kilometres of drainage ditches were dug, sluices and polder mills installed, and from the 16th century onwards lakes of all sizes were converted into dry land. Thousands of waterboards and their joint ventures coordinated the efforts but were hampered by so-called particularism, a tendency to allocate ever more power to local authorities. Meanwhile, until the 20th century, progress was driven by social and economic processes and technological improvement; there was a keen awareness that optimization of water management was the key to Dutch success.[140] From the mid-19th century powerfull pumping stations became the following up of windmills although in some areas small iron wind driven pumps still function as a cheap substitute. The fact that water-related issues have been a recurrent theme throughout Dutch history explains why they were considered a structural element of the nation's post-war spatial development.
The next section presents a much simplified overview of what is in fact a highly complex pedological configuration. Drainage of only three main soil types is distinguished here: 1. peat soils, 2. clay soils and 3. sandy soils. Clay soils can be subdivided in marine clays and fluvial clays. Loess will hardly be mentioned hereafter. More detailed data on the subject is accessible via internet.[141] (fig. 77)

5.1.1 Drainage of peat soils

The Dutch peat soils have been intensively utilized for centuries. Yet, this intensive exploitation contained the seeds of its own demise. Once drained, peat soils lose volume, in part due to a process called compaction. Furthermore, a dry surface allows oxygen to permeate the top layer, oxidizing the carbon which then evaporates in the form of carbon dioxide. As the peat, which consists of plant remains mostly composed of carbon, is broken down its volume is reduced. Progressive drainage allowed this process to continue; in many places it has been going on for centuries, since the first medieval reclamations. By this process the surface level could subside by up to 1m in a century. As a result, (natural) drainage

[140] See e.g. Van der Ham 2009; Steenbergen *et al.* 2009.
[141] See e.g.: http://pdokviewer.pdok.nl/ , layer: BRO – *Bodemkaart 1:50.000*.



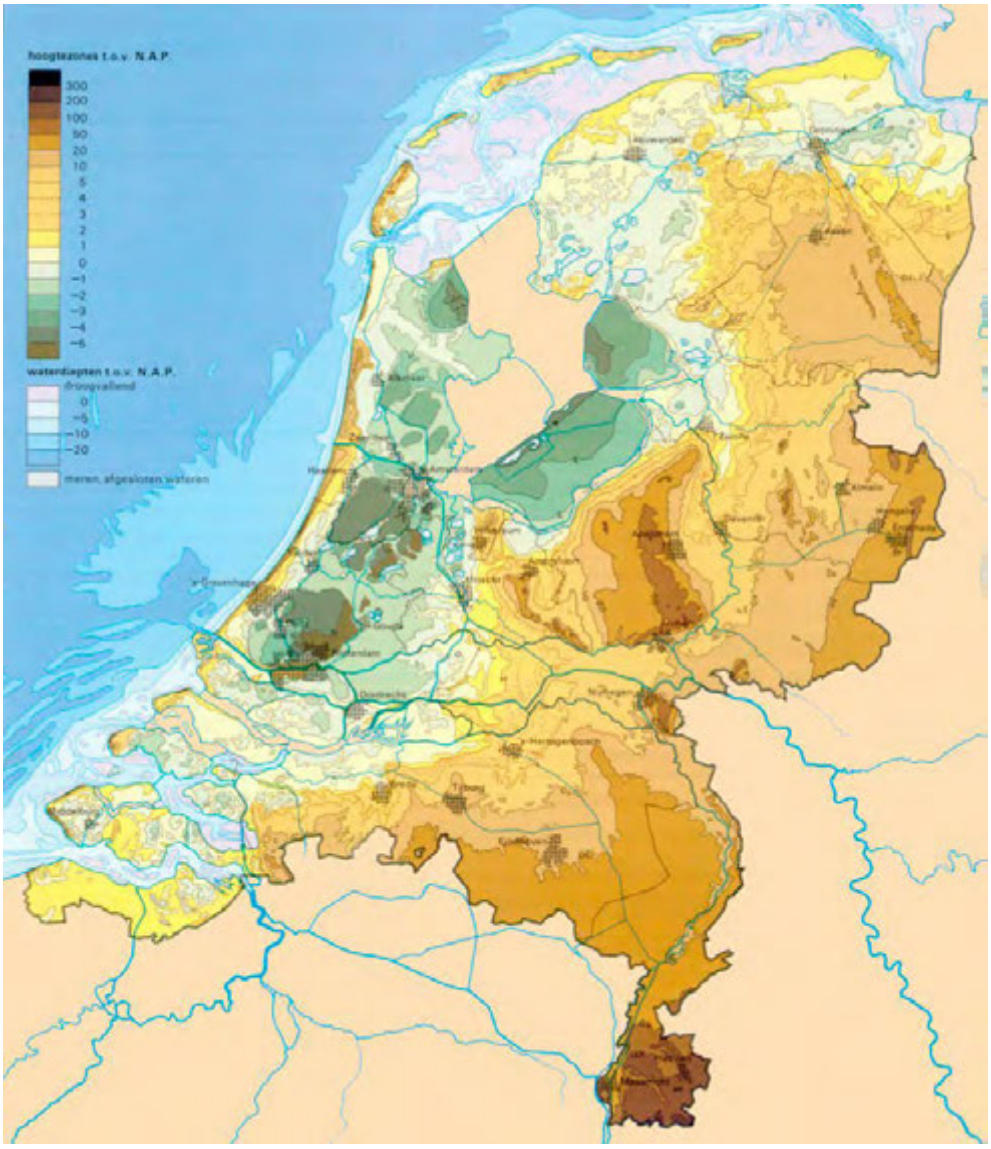
77 Survey soil map of the Netherlands. Rough spreading of the five main soil types, respectively: Marine Clays (zeeklei), Fluvial Clays (rivierklei), Sandy Soils & Boulder Clay (zand), Loess (löss), Bog Peats, Marshes & High Moors (veen).

ultimately became impossible and local residents had to invest ever more energy and effort in pumping out the water and getting rid of it. The paradox of drainage, in other words, is that you have to keep at it and that it becomes increasingly more difficult to drain down to a deeper level. Subsidence is a problem on for example the island of Walcheren, where the middle section is lower than the subsequently silted up and less compacted sections or the sand-dune coasts. The subsidence problem was compounded by the fact that in many places the 'peat sponge' had been removed, thus speeding up the process.

Areas where compaction, oxidation and occasionally peat digging occurred include large parts of Holland, the north of Overijssel and sections of Friesland (e.g. Haskerveen Polder; see Box Text). The problematic drainage of these areas was directly linked to a process in which the land surface first subsided down to sea level and ultimately sank even below that. (fig. 78)

Drainage problems were subsequently made worse by at least two other factors. First, the constantly rising sea level, a phenomenon which also increasingly impedes fluvial discharge; and second, the reduction of the landscape's water retention capacity by the drainage of lakes and former peat quarries. Surplus water could be temporarily stored in these areas, but their drainage in effect progressively reduced the storage capacity. As a result, once inland bodies of water had been drained an ever greater discharge was needed to prevent waterlogging or flooding. A similar problem might arise if a fine-meshed network of drainage ditches was partly filled in, diminishing the retention capacity. This problem could also affect areas situated well above sea level, such as Vriezenveen (see the relevant Box Text) where the projected landscape reorganization had to take the pumping stations' capacity into account.

Expertise on this rapid subsidence accumulated – more or less haphazardly – as the



78 Elevation of the Netherlands surface level related to asl (above sea level; = Dutch NAP) in meters + or -. Note many polders in the north-west third of the country are below sealevel or within reach of the tides.

reconstruction process unfolded. At the start of the reconstruction period, the effect was completely unknown. The first publications on peat oxidation, compaction and its unpleasant consequences appeared around 1945.[142] Whether they immediately led to a different drainage strategy is doubtful – probably they didn't. But once the consequences started to sink in the technology was rapidly adopted and the strategy adapted by abandoning maximum drainage as a target.

5.1.2 Drainage of clay soils

In the Netherlands, marine clays occur in many places. They naturally surface especially in parts of the provinces of Groningen, Friesland and Zeeland, and they are the main soil constituent of much newly acquired land in the west and centre (particularly the IJsselmeer Polders) (see the Box Texts on Walcheren, Schouwen-Duiveland and Noordoost Polder). Fluvial clays are found mainly in and near the streambeds of today's major rivers, in the middle of the country.

[142] Borger 1975, especially 195 ff.

Clay soils are affected by a similar phenomenon as peat soils are when they dry out: the fine clay particles coagulate which results in compaction accompanied by subsidence and increasingly problematic drainage. Specifically in the case of fluvial clays, the presence of fossil river channels poses an additional problem as it results in a complex mosaic of compacted and non- or semi-compacted soils. The ensuing drainage problems are equally complex. Examples are the drainage situations in Maas en Waal-West (see Box Text) and Tielerwaard-West. Similar problems occur in a number of marine clay areas like some of the Zeeland and Zuid-Holland islands, where these poorly drained acid-sulfate soils are called '*katteklei*'.[143]

5.1.3 Drainage of sandy soils

In the central Netherlands (Veluwe) as well as in the east and south, sandy soils and boulder clay soils are common.[144] Unlike the peat and clay areas, these landscapes tend to be slightly undulating with elevations up to a few dozen metres above sea level. Large sections of these Dutch sandy and boulder clay landscapes are facing yet another issue. Here, the natural drainage provided by smaller streams and water courses might be insufficient, due to their meandering course and the presence of dams, water mills and similar structures, which impeded the discharge of surplus water. The undulating landscape and other irregularities in the terrain in addition caused stagnation and the formation of meres and marshes. These water courses were streamlined and later canalized from the 19th century onwards.[145] Interventions such as these in effect marked the start of their reclamation and ongoing transformation into cultivable land. The conversion of wet soils into useful agricultural land did not mean that all land was reclaimed, or that all reclaimed land was exploited efficiently. Soil water content was a major factor. Sometimes, particularly wet soils were suitable only as hayfields or osier beds, while very dry soils were hardly worth the effort to reclaim them and extensive exploitation (e.g. grazing by flocks of sheep) was the most logical option. Some transitional zones, however, were irrigated by diverting water courses from higher grounds in order to create grazing grounds.[146] (see for sandy areas e.g. Box Texts Beltrum, De Scheeken and Peelsche Heide and Rijtsche Heide).

5.1.4 20th-century developments in drainage

In the 20th century, a wide range of more powerful tools for landscape interventions and water management became available. After the 19th-century steam pump, diesel and electrically powered pumps now substantially contributed to the regulation of the water table, often with micro-precision thanks to an intricate system of culverts, sluices and dams. Another essential aid in the form of an underground network of drainage pipes made possible a quicker and more consistent transportation of ground water, a system already applied in the 19th century. With the water table now precisely calibrated, irregularities in the surface terrain such as ditches were increasingly perceived as disruptive elements.[147] By a reverse process, mitigating the effects of draught also became easier, either by digging water courses to supply water or by means of local irrigation or sprinklers.[148] Usually, however, the main problem was excessive water, even in the higher parts of the country. There, water might stagnate due to the unevenness of the surface and locally poor soil permeability. An adequate drainage infrastructure demanded an efficient, planned network of ditches and canals as well as canalized rivers and occasionally sluices. In lower parts, all that was needed was precise regulation of the ground water table to bring or keep it at the desired level. Usually, the necessary infrastructure was implemented at the start of a reclamation or polder formation. It was a complicated task, also because the water table might fluctuate when peat, sand or clay were dug away. This was the case in Holland, where the removal of the inner row of dunes had resulted in an increasingly problematic water situation due to a diminished retention capacity, and drainage was equally difficult in areas where compaction had created a bowl-shaped surface. Examples of the latter can be found on the islands in the delta, the alluvial clays in the large

143 See https://en.wikipedia.org/wiki/Acid_sulfate_soil
144 Large parts of the provinces of Drenthe, Overijssel, Gelderland, Noord-Brabant and Limburg, as well as smaller sections of Friesland, Utrecht and Noord-Holland. Boulder clay is a compacted mixture of stones of various sizes, sand and loam; it is a moraine deposit formed during the last glacial period but one. Sandy soils can originate in various ways: washed out of moraines, transported by rivers, the sea, wind, etcetera. See e.g. Jongmans 2015, 207-344.
145 Van Balen 1936, 115 ff.
146 See e.g. Baaijens *et al.* 2011.
147 E.g. Blink 1929, 98.
148 E.g. Berkhout 1954.

river plains, and the lower section of Friesland, where numerous small, privately owned polder mills kept the meadows accessible.

5.1.4.1 An increasingly dirigistic government

In the course of the 20th century, a more tightly controlled water resource management increasingly became the ultimate goal. Since the first Land Consolidation Act of 1924, strategy documents for land consolidation, reclamation and polders always included a plan for an efficient watercourse infrastructure to ensure water drainage and – if necessary – supply. The installation of pumping stations had become an essential precondition for the (re-)organization of agricultural landscapes. The traditional system of locally or regionally-based drainage by means of windmills could only be retained piecemeal, as a curiosity. Without engine-powered pumping stations, much of the Netherlands would be uninhabitable today, and not just the lower coastal regions or the larger river plains. Those same soils would also be agriculturally useless. If an upgraded drainage system had not been an integral component of the post-war land development processes, later challenges would have been far more daunting if not downright impossible to handle.
This explains why water management technology gained in importance when, in the post-war reconstruction period, the Netherlands engaged in land development projects on a much larger scale than before the war. The engineers who were involved were able to draw on the expertise and experience gained during the *Zuiderzeewerken*, but there was also a much greater focus on agricultural production (i.e. the economic aspect). Farming, water management and safety, which until then had been handled mostly by private entrepreneurs and the waterboards, increasingly became matters of national and even international concern. The outcome of this process was a dirigistic government which controlled and regulated water management at all levels, a process which still continues today in the form of a steady stream of Delta Acts, Dyke Acts, river policies, etcetera.
The product of centuries of ongoing perfection of drainage was the progressive transformation of the natural Dutch landscape into a cultural one that to a high degree was controlled by its inhabitants.

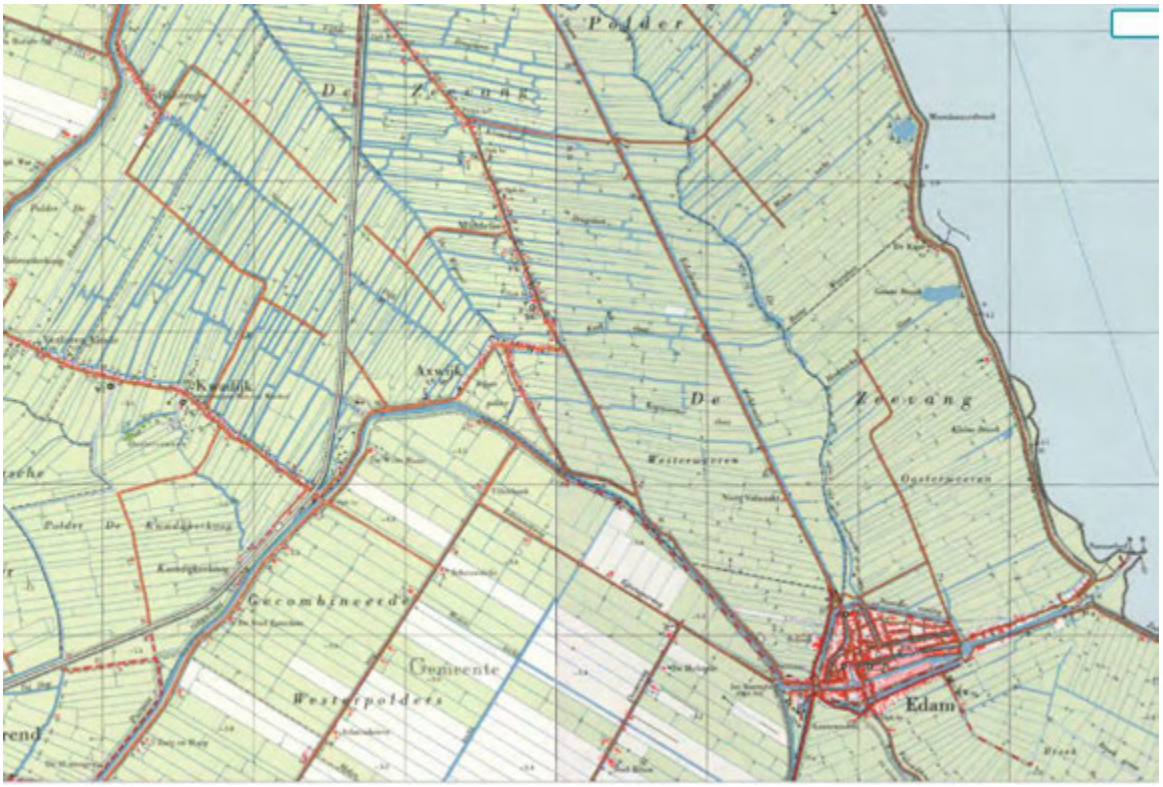
5.2 Issues relating to traffic infrastructure: another structural problem

The Dutch countryside was facing another structural problem, which provided yet another argument for intervention: limited access. Many farms were poorly accessible as a result of the poor quality and insufficient capacity of roads and waterways, relating not only to a lack of adequate metalling but also to issues involving right of way and other complicating factors, such as the construction of railways and canals. Some of these issues are discussed in more detail below.

5.2.1 Inadequate water-based and land-based transportation

For centuries, the traffic infrastructure in much of the Netherlands was mediocre to downright. Many country roads were little more than traditional tracks, unmetalled, where horse-drawn wagons had to carefully pick their way. Water-based traffic was therefore preferred; bodies of water – whether natural or artificial – were the most reliable transportation routes in the landscape, especially in the lower part of the country. From the 16th century onwards, waterways ensured regular communications between towns and villages situated along ongoing water courses (rivers, canals, ditches) and in watery landscapes. Over time, these forms of traffic developed into unorganized as well as regular services, from the 17th century onwards also in the form of towed passenger barges.[149] A similar system existed in the higher former marshlands in the north and north-east, which were criss-crossed by a maze of waterways and adjoining tow-paths.
Until the 19th century, all land-based traffic was struggling along on roads that were either too wet or too dry. Most were unpaved, and mud or loose sand made all progress difficult and slow. The thousands of smaller and larger water courses, lakes and meres that had to be crossed,

[149] See e.g. De Vries 1981.



79 A + B Polder Zeevang, north of Edam, Noord-Holland Province. Originally a punting polder as shown in the top (map 1948); after a land consolidation the polder was disclosed by several (dead end) access roads and partly colonized, as visible below (1961).

the almost impassable marshes and the desolate sand drifts and heaths made the situation worse. Until well into the 19th century, the national road network was rudimentary, did not penetrate the entire country, and completely avoided private properties around and near towns and villages. In the wettest areas, such as the lower parts of Friesland and Overijssel, much of the Holland provinces and in the major river plains, there might even be no roads at all. Much agricultural land – which in Holland amounted to most of the peat and clay areas – was only accessible by water. This is where the so-called *vaarpolders* could be found, 'punting polders', with a reclamation history dating back to the medieval period. Country lanes or embankments formed the only land roads from which the fields branched off in long strips that were only accessible by boat. North of Edam (Noord-Holland province) Polder Zeevang was a punting polder until 1961 when a series of access roads were realized as part of a land consolidation. (fig. 79)

Access problems were also common in the sandy central, eastern and southern Netherlands and in the Limburg loess area, although traffic in those regions also used unmarked routes and, in the case of Limburg, river Meuse valleys.

A characteristic of roads and other routes that have formed spontaneously, i.e. without deliberate planning and construction, is that they don't follow a straight, 'rational' course but adapt to whatever features the local terrain presents. Where there is plenty of room they tend to shift course.

These problems were associated with yet another phenomenon: as a result of repeated subdivisions many plots could only be accessed by crossing the land of another owner, necessitating some form of right of way.[150] In some areas, private cul-de-sacs posed yet another challenge; parts of Noord-Brabant were riddled with them. All in all, the poor to mediocre rural traffic infrastructure made traffic and transportation a highly time-consuming affair. In practice, it meant that some areas could not or hardly be exploited efficiently.

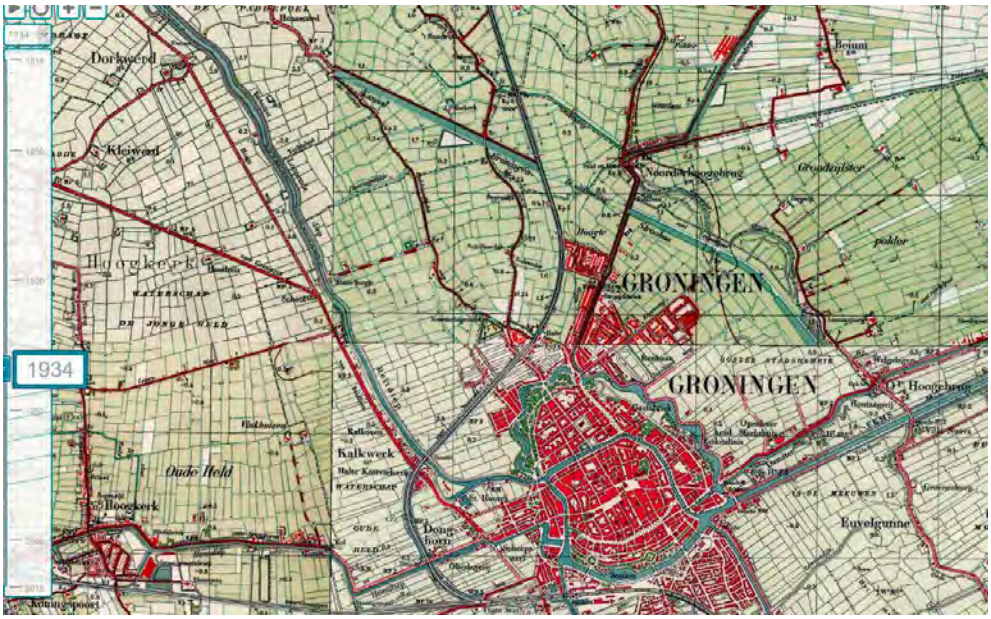
5.2.2 Improving access: the first attempts

In peripheral areas, such transportation problems tended to result in closed and small-scale economies. First with the arrival of regional railroads and tramways were these areas integrated into an expanding (market) system and ultimately the national economy. Yet, even today, sandy regions such as Twente (Overijssel province), Veluwe and Achterhoek (Gelderland) and Noord-Brabant still feature long stretches of unmetalled road, and some local secondary access routes to hamlets or farms are likewise unpaved.

The first initiatives to improve conditions in these areas met with little success, but once the areas had been put on the right track towards modernization some progress was achieved. With a growing urban population and the introduction of railroads, industries could now thrive outside urban areas as well. In some respects, however, railroad and waterway construction was counterproductive. Unlike existing small roads and local water courses, the tracks and canals further fragmented landscapes which in many cases were already cut up or messy, and they formed yet more obstacles. (fig. 80) Also, trains were not always the best form of transportation for local farmers and their small trade. Yet the process was unstoppable. As regional agriculture and cattle farming became more productive, a need for better roads, crossings and bridges in addition to the railroads was increasingly being felt.

80 Often new infrastructural modernization obstructed local transport and further devided and scattered land ownership and land use. (surroundings of Venlo, Limburg Province, 1911)

[150] E.g. Van der Woud 2006, especially 327 ff., 367 ff.



81 During the 1930's the Groningen landscape became ever more fragmented by existing and newly to be developed infrastructural works. Note fragmenting railways, and 'seemingly dead end' canals and roads.

Examples of problems related to fragmentation are evident on the black-and-white plan maps of Type area Dalfser Hooislagen and Nieuwleusen[151] and on the maps of National Interest area De Groep and Surroundings. (see both relevant Box Texts) These seemingly paradoxical developments were an inevitable side-effect of the opening up of the country in the 19th and 20th century. As towns and villages became more interconnected, many rural areas and holdings became more fragmented.

5.2.3 Modern means of transportation

Traditionally, rural transportation was based on non-mechanized vehicles. Until 1900, horse-drawn wagons, barges, handcarts and sometimes wheelbarrows (and after 1880 occasionally a horsecar) dominated local traffic. Metalled roads were relatively rare and those who used them had to pay toll. Larger barges and, after the mid-19th century, steam-powered trains and boats provided additional and more efficient transportation and opened up new markets for customers and suppliers alike. On a smaller scale, handcarts (after ca. 1800) and (transport) bicycles (after ca. 1900) also played an important role.

But a truly new era dawned with the introduction of mechanized vehicles – busses, cars, lorries and tractors – as they made the farmer less dependent on hired transportation: farmers now held their own steering wheel. Especially tractors suited the transportation needs of individual farmers. The Netherlands saw a fast growing amount of mechanical means of communication, although traditional horse-drawn wagons, wooden and iron punted barges and handcarts, etcetera remained common phenomena well after WWII – in the countryside and in towns too.
However, modern forms of transportation, even if non-mechanized, had specific requirements: a coherent rural networks of waterways and primary and secondary roads. Until the First World War, such road networks could be created relatively simply by applying a form of metalling able to withstand incidental and local traffic. From the late 1920s onwards, however, more was needed. The road network materialized at breakneck speed, and the total length of paved road kilometres reflects this: in 1814, national roads had been paved over a length of 450km. Around 1900, it was 1200km and the number continued to rise steeply; around 1925, the network encompassed ca. 18,000km of paved roads. In addition, a distinction between national and provincial

[151] The *Lichtmis Kanaal* was constructed ca. 1825-1850; the railway line ca. 1850-1875.

roads was introduced in the 1920s and from 1927 onwards a series of national road plans were drafted, followed by plans for provincial and local roads.[152] In the first decades of the 20th century the countryside was opened up by new waterways as well, but many of these mainly served the national level and not in the first place local or regional purposes: they cut through thousands of cadastral units. Examples to be mentioned here are Wilhelmina Kanaal (Noord-Brabant province; 1923), Twente Kanaal (Overijssel; 1935) and Van Starkenborgh Kanaal (Groningen, 1938). Evidently, the familiar problem mentioned above was bound to surface again as further fragmentation of rural properties and landscapes was unavoidable. Meanwhile, (main) road and canal density grew by several factors. (fig. 81)
In this context it is understandable why traffic streams and occasionally even traffic safety became integral elements of plans for new reclamations and polders from the start. The land consolidation project Nieuwleusen (completed in 1928) may be an early case in point; its roads approach each other obliquely but make an abrupt turn just before the crossing, which they reach at a straight angle. The result is a 'traffic-friendly' road pattern (see maps in the Box Text on Type area Dalfser Hooislagen and Nieuwleusen). More or less the same applies to National Interest area De Groep and Surroundings, which is intersected by the *Vallei Kanaal* and *Rijksweg* (National Road) 12. (see maps in Box Text De Groep and Surroundings).

5.2.4 Implementation: from private concessions to state involvement.

In the first half of the twentieth century, roads were often built by mobilizing the great mass of the Dutch unemployed, which expanded or contracted with the economic tides. As early as the start of the First World War the government stated its intention to link road infrastructural improvement and the fight against unemployment.[153] Implementation of these plans started around 1920, and particularly during the economic crisis of the 1930s the government enlisted many unemployed persons, directly or indirectly, in public works, building long stretches of paved roads in areas where until then the infrastructure had been inadequate. These projects – to a considerable degree executed as part of unemployment schemes – were the first infrastructural projects carried out between the two World Wars.[154]
Social needs were not a main issue in the Netherlands government during the 19th century and social legislation lagged behind social conditions both in the towns and in the countryside. Apart from this many canals, roads, bridges, railways, etcetera were in private concession, possession and exploitation since the old days.

5.2.4.1 The dawn of modern legislation

But from the late 19th and the beginning of the 20th century the Dutch government started to extend power over social and economicic inconveniencies and infrastructural works.[155] Social, medical and safety laws paralelled the rise of growing governmental interest in (traffic) infrastructural matters. Soon many rural areas and agrarians benefited by their opening up and became part of extending economies. But several already relatively remote areas ended up even more 'distant'. Many of these areas had no option but to await their turn – and sometimes their inhabitants not even desired to being opened up and modernized through statutory measures.
In the late 1930s the unlocking work was still far from completed. On the contrary; with the arrival of more and bigger agricultural machines and other tools and vehicles the demand for improved access became more urgent.
Moreover, it was no longer voiced exclusively by the agrarian sector: the interests of recreation also made better access to rural areas highly desirable. During the ensuing reconstruction period, land consolidation projects, reclamations and, of course, new polders were eagerly embraced as opportunities to build adequate roads of sufficient capacity and to end situations in which land could only be accessed by water or by invoking right of way. This is why all land consolidation acts prescribed road construction to improve farming efficiency. The explanatory memorandum to the first *Ruilverkavelingswet* (1924) explained the purpose of such measures: '[In situations] *where rural properties are scattered over a wide area, are of a shape that is impractical for*

[152] Mom & Filarski 2008, especially II, 55-235.
[153] *De Kampioen*, October 23, 1914, 878-879. The Dutch title speaks for itself: '*Wegaanleg en wegverbetering ter bestrijding van werkloosheid.*', 'Road construction and road improvement to combat unemployment'
[154] Van Balen 1936; Hermans [1945] 171-181.
[155] Brugmans 1961, 365 ff, 403 ff, 505 ff.

farming, or contain inadequate access routes or drainage, [the purpose is] *to achieve a more economical organization, which will enhance soil productivity.'*[156] This would benefit not only the individual farmer but the nation as a whole. These goals are still relevant today. Specifically roads may have to be adapted to 21st-century needs.

5.3 Impractical and inefficient field systems: the third structural problem

The above mentioned issues with respect to water management (drainage) and access (traffic infrastructure) which affected many agricultural areas were usually accompanied by a third structural problem: impractical and uneven field systems. Together, these three factors constituted the main physical and spatial problems rural areas were struggling with. Solving only one of the three would hardly constitute a structural improvement of what was being perceived as a challenging situation. As we saw earlier, the Netherlands can be roughly divided into regions where one of three soil types dominates: peat, clay or sand. These three types are usually associated with more or less comparable forms of traditional reclamation. In other words, there is some correlation between soil type, reclamation type and parcellation type. Local variation in problematic situations however outweighted any national trends, and inefficient field systems or parcellation were often the main agrarian issues. Since not all regions and cultural landscapes were therefore affected by the same problems, we will zoom in on a few specific forms of parcellation and their associated problems.

5.3.1 The Netherlands: an anthropogenic heritage

Around 1940, existing field patterns in many parts of the Netherlands had formed 'organically' through time. They were the product of factors like local soil conditions, relief, functionality, and local and regional (reclamation and cultivation) traditions. Additional constraints included (natural) drainage, available expertise, and current forms of land ownership. With regard to the latter, the wide-spread system of agricultural tenancy played a major role. While a limited supply of holdings might stimulate field fragmentation, yet at the same time large tenant holdings were the rule in the new, state-owned polders; there, fragmentation was negligible.[157] The end result was that the Netherlands in the mid-20th century were characterized by a bewildering variety of plots, fields and field blocks, forming a veritable mosaic of shapes, sizes and structures.[158] (fig. 82)
Besides organically formed field systems – which when first established and throughout their ongoing development were obviously based on rational considerations – there are also other types which show signs of having been pre-planned and to some extent designed from the start. Here, as in other publications, we call such systems 'rational field patterns'. Some such 'rational' patterns have in common that they occupy relatively large areas, each having been developed at once and usually according to a pre-defined system or module. Rational field patterns occur in different types and gradations of planning, from the medieval, highly regular long strips of the so-called *cope* reclamations in the western Dutch peat areas to the modern field systems of the mid-20th-century, newly formed polders.[159]
Some may find it hard to believe that a small country like the Netherlands boasts such a diversity of landscapes. But it may be helpful to recall the famous saying: 'God made the world, but the Dutch made their own country.'[160]

5.3.2 Field pattern types

Out of this motley mixture of man-made landscapes it is possible to distil a few main categories, four of which will be addressed in more detail below:[161] We will focus on: 1. Linear field patterns, 2. Field patterns on sandy soils, 3. Field patterns on the Zeeland and Zuid-Holland islands and the northern clays, and 4. Pre-planned field patterns.[162]

156 Quote taken from http://www.gahetna.nl/collectie/archief/pdf/NL-HaNA_3.11.13.ead.pdf (p. 7); italics AFJN.
157 Boerendonk 1960, 282: The percentage of tenant holdings increased from 48.3% (1921) to 49.0% (1930), 53.4% (1940) and ultimately almost 57% (1948). This increase was linked to the formation of the Wieringermeer Polder and Noordoost Polder, where tenancy was the rule. A decrease first occurred when the major land consolidation projects were already well under way: down to 55.9% (1950) and finally to 53.0% (1955).
158 Several of these categories may occur side by side, showing marked contrasts and abrupt gradients.
159 In-between, chronologically as well as morphologically, are the reclamations in the 17th and 19th-century so-called *Veenkoloniën* ('peat colonies') in the provinces of Groningen, Drenthe and Noord-Brabant and elsewhere.
160 The saying can be ascribed to the Scottish nobleman James Fraser of Kirkhill (1634-1709), who commited it to paper before ca. 1670.
161 See on this subject also the first chapter of this book.
162 See e.g. Jongmans *et al.* 2015; Barends 2008. Various field classification systems exist, some of which include geomorphological and anthropogenic or morphogenetic factors; https://nl.wikipedia.org/wiki/Verkaveling.

82 In pre-war years (1933) the central parts of the Netherlands show a great variety of lot types.
This map has been deliberately turned 90 degrees to the left to gain a broader survey.

As was mentioned earlier, several more landscape types exist. Some authors even mention dozens of (sometimes local) varieties. In 2017, the Cultural Heritage Agency of the Netherlands introduced a digital map layer showing 78 Dutch landscape types.[163] For the purpose of this book and to non-Dutch readers, however, the four types listed above suffice, although they obviously do not represent the entire country.

83 An aerial view of the open field pattern in the plains of the major rivers. Long narrow strips of land separarated by equally long ditches and water courses leading to polder mills. (Exact location unknown, July, 2007)

5.3.2.1 Linear field patterns

Linear or other field patterns pre-planned on the basis of – from our perspective – 'rational' principles were composed of regularly shaped plots. Although such patterns existed in the Netherlands for centuries, they were always relatively rare on a larger scale. One noteworthy exception were the so-called *cope* reclamations in their various manifestations, all medieval in origin. This specific form clustered in the peat areas of provinces of Noord-Holland, Zuid-Holland and Utrecht, but reclamations in long narrow strips are also known from the northern and eastern Netherlands (Overijssel, Friesland and Groningen) and the plains of the major rivers. (fig. 83) These field patterns have in common that the individual plots are (extremely) long and (extraordinary) narrow. Usually, the reclamation itself progressed from a long base line, and many individual plots were 'cut up' lengthwise: the plots were fragmented, in other words. As a result, land belonging to an individual farm, whether in tenancy or in ownership, might have become (and usually was) progressively more scattered over a wider area.[164]

5.3.2.2 Field patterns on sandy soils and boulder clays

A second important field pattern was typical of the (higher) sandy soils and boulder clay areas as well as the northern Dutch islands (the so-called '*Waddeneilanden*'). Sandy soils are common in

84 An aerial view of the field pattern in eastern sandy area along the River Overijsselsche Vecht. Scattered farms within a variety of plot shapes, plot sizes and hedgerows. (Photo July, 2015)

[163] https://landschapinnederland.nl/bronnen-en-kaarten/panorama-landschap; many other interesting cultural, geographical, historical and natural phenomena can be found on this website as well.

[164] Van Balen 1936, 106 ff. Van Balen specifically discusses the need for and the first phase of land consolidation in Staphorst.

many parts of the country but particularly in the provinces of Overijssel, Gelderland and Noord-Brabant. Further the dune landscapes along the western coasts also contain sandy soils. Boulder clays (a mixture of stones, sand and loam; see above) occur in the glacial soils and ice-pushed ridges in the provinces of Groningen, Friesland, Drenthe, Overijssel, Gelderland and Utrecht.
The natural fertility of sandy soils and boulder clays is limited, and boulder clays are moreover difficult to work. Those living in such areas were thus forced to be selective, and their options for making a living by farming were limited. Reclamations were scattered, and other forms of exploitation were extensive. Field patterns depended to a great extent on random variations in the local terrain, featuring a bewildering variety of plot shapes, sizes, organizational strategies, functions, boundaries, and so on. (fig. 84) Some fields or field complexes lay isolated within a woodland environment (*kampen*) while others extended far into the open plain (*essen*, *enken*, *engen*). Again, self-owned land and fields held in tenancy were often scattered and spread far apart. Partly as a consequence of this varied field pattern but partly leading to it as well, was the mixed farming system (Du. *gemengd bedrijf*). This was not exclusively found in sandy areas but was it was at least endemic there. *Gemengd bedrijf* usually meant some cattle breeding and keeping sheep (on the commons) and/or pigs in the service of agriculture – in some cases together with additional small scale local economic activities.[165]

5.3.2.3 Field patterns on the Zeeland and Zuid-Holland islands and in the northern clays

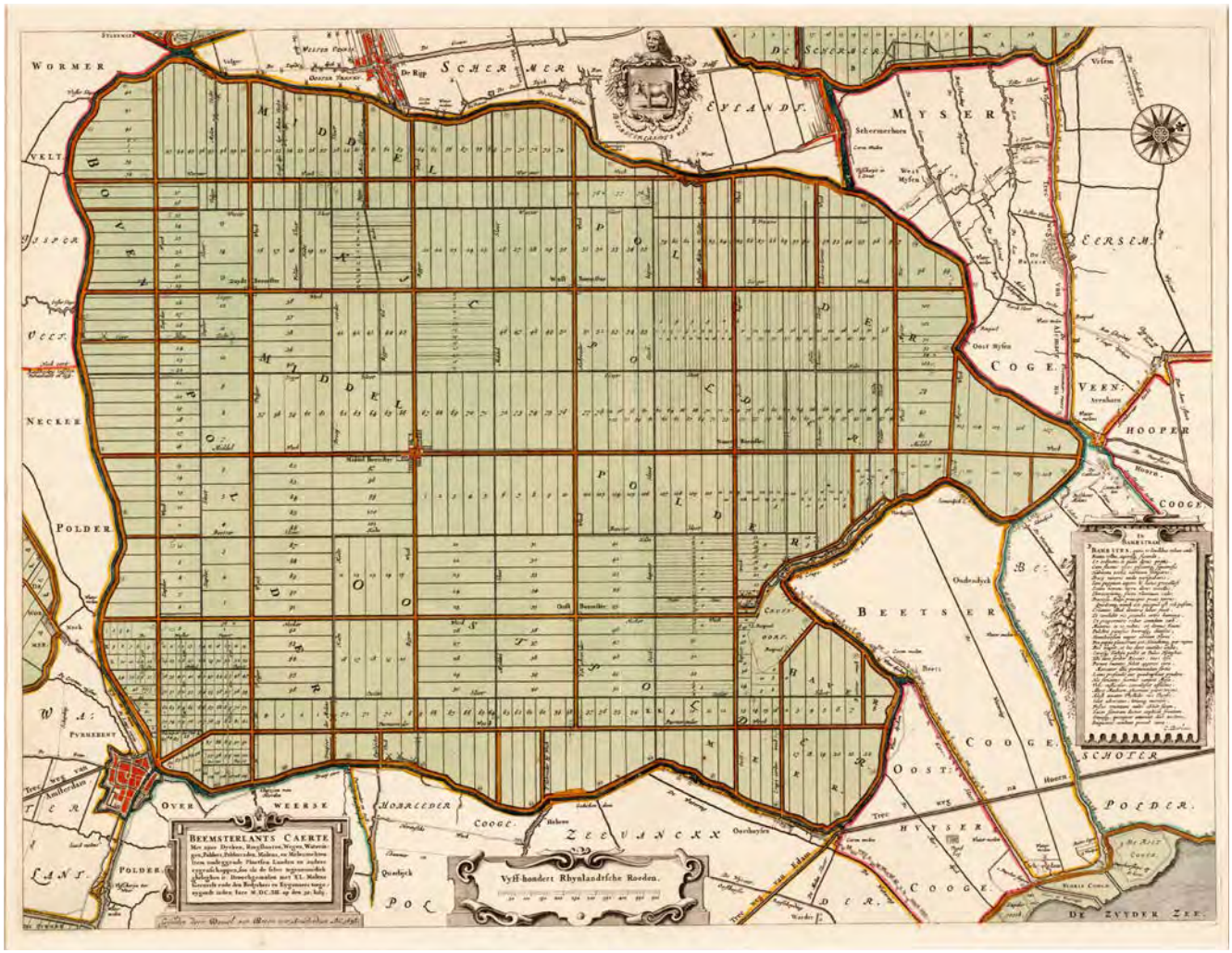
An exceptional but in the context of this book important field pattern could be found on (parts of) the Zeeland and Zuid-Holland islands. There, a mosaic of tiny fields dominated the landscape until the mid-20th century. In the islands' central sections, which in the medieval period had been turned into polders, many hundreds of miniscule plots fit together like pieces of a jigsaw puzzle.[166] Individual fields, whether owned or held in tenancy, were not always easily accessible and the numerous privileges and obligations had become entangled into a confusing knot. Similar field patterns existed in the northern clay areas, albeit slightly less irregular in shape.
Occasionally, traces of embankments (enclosing dykes), or and a certain regularity in field patterns can still be recognized. These configurations, too, were sometimes medieval in origin or in other cases were formed between the 16th and the early 20th century. (fig. 85, 86)

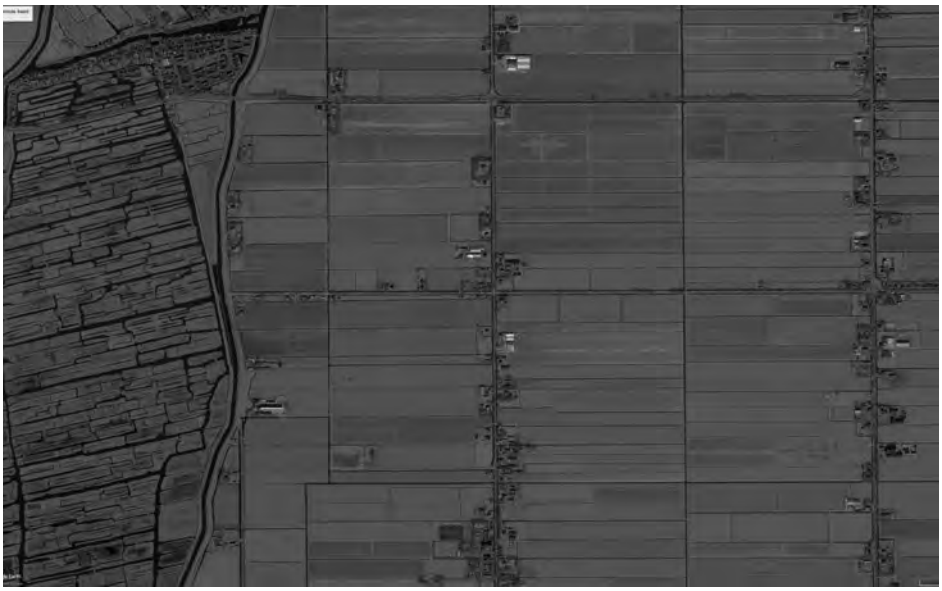
85 + 86 Yerseke Moer (Zuid-Beveland, Zeeland Province) still shows medieval patterns in parcellation.

5.3.2.4 Pre-planned field patterns

Pre-planned field patterns were the last to be introduced. They were mainly used in polders, the main examples being the Beemster (dry in 1613) and Haarlemmermeer Polder (dry in 1852), but there are dozens of them. Both feature a geometrical field pattern with only along the outer perimeter a ring of irregular fields. (fig. 87)
This form of partitioning also became common in the northern peat areas from the 17th century, and in the border zone between Noord-Brabant and Limburg (De Peel) in the mid-19th century. The individual plots in these field complexes were relatively large. Often, a fine-meshed network of ditches and canals was essential for drainage, which could lead to scattered land ownership. If holdings were small, this might result in further fragmentation.
These historical pre-planned and thus 'rational' field complexes may be considered prototypes for the many 20th-century reclamations and polders, and also for some radical land consolidation projects. The planning could start

[165] Van den Ban & Bauwens 1988, 215-223.
[166] Earlier in this book compared to 'craquelure' in paintings and china-ware.





87 Beemster is the iconic example of a 17th century polder. On top a 1658 etching (the North is right).
88 At the bottom a 2015 Google Earth photograph that still clearly shows the rational square parcelling. Today Beemster is a UNESCO World Heritage site.

on the drawing board, long before a spade went into the ground or even before the future fields had become dry land (i.e. the so-called 'modern-rational' type). Sometimes pre-planned field complexes were not even realized the way they were planned in advance.

5.3.3 Towards a structural approach in field patterns

Between the wars, field fragmentation, increasingly smaller holdings and the resulting low productivity were all arguments for a more structural approach of land consolidation. Crucial in this regard was the fact that the new 1938 Land Consolidation Act did not place the initiative for such undertakings exclusively with the landowners but also allowed other legal persons to file a request; even the government itself might, in the public interest, enforce land consolidation.[167] This meant the new law gave birth to an active role for legal institutions.
On the eve of the Second World War, few areas were without significant problems. Deficiencies in drainage, land access and field systems, whether or not interconnected, were the rule rather than the exception, certainly with the benefit of hindsight now that at least three-quarters of the country has gone through a land consolidation cycle at least once. The few (nearly) problem-free areas mainly clustered in the large-scale reclamations on the northern clays and in the polders; the problematic cases were concentrated on the sandy soils and elsewhere in places where small fields were the rule. In the early 20th century, the *Nederlandsche Heidemaatschappij* had good cause to state that over 500,000ha land qualified for consolidation, mostly in these very same areas. (fig. 92)
Eventually this figure proved to be a conservative estimate. Around 1945, ca. 265,000ha had involved in applications for land consolidation, ca. 60,000ha of which were either completed or in progress. As early as 1955 ca. 260,000ha were completed or in progress, and applications for 830,000ha were still pending. Ten years later – by the end of the reconstruction period – these numbers had radically changed. In 1965, completed land consolidations amounted to ca. 225,000ha; ca. 435,000ha were in progress; ca. 400,000ha were at the preparation stage, and applications for 1,300,000ha were pending – over 70% of the total surface of the country.[168]

89 Lantern-slide showing Dutch regions where land consolidation might be realized. The map is by Nederlandsche Heidemaatschappij. The total sum is 531,000ha. (Unknown date)

A concluding remark could be that maps showing the dispersion of areas where land consolidations took place first and/or in most drastic way show concentrations on many of the soil type and field pattern areas mentioned above, most of them to be characterized by their extremely scattered land use features.
This chapter addressed structural physical and spatial problems affecting Dutch agricultural areas before the Second World War. Together with the two incidental causes of a radical overhaul mentioned earlier – World War II and the 1953 North Sea flood – they were a main impetus for change from ca. 1940 onwards. Two other structural problems also played a significant role however: the social deprivation of much of the agrarian population, and economical factors. How these two issues were dealt with is the subject of the next chapter.

167 1938 Land Consolidation Act, Sections 22, 36 and 37; ENSIE 1946-1960, III (1947), 485.

168 Andela 2000, 178, 179; http://cultureelerfgoed.nl/sites/default/files/publications/gids-18-cultuurhistorie-land consolidation-2011.pdf. By 1985, 1,5 million hectares had been involved in land consolidation while the procedure for another 450,000ha was still pending. As of today, over 75% of the total territory of the Netherlands (ca. 3,200,000ha) has undergone land consolidation once or multiple times.

Vriezenveen, 1954-1969

Land consolidation (and reclamation), Twenterand Municipality

Identification

- A mixed agricultural area encompassing one historical and several more recent ('colonization') linear settlements; it contains – and borders on – areas of natural interest.
- The land consolidation Vriezenveen (ca. 4,330ha) was planned and implemented by *Nederlandsche Heidemaatschappij* under the supervision of *Staatsbosbeheer*. Preparations started in 1942 and the implementation took place in 1954-1955. The project was completed in 1969. Architect of the landscape plan was H.W. de Vroome while several farms were designed by architect E. Kiestra and by Bureau Agrobouw. The area of land consolidation Vriezenveen extended beyond the boundaries of the present National Interest area.

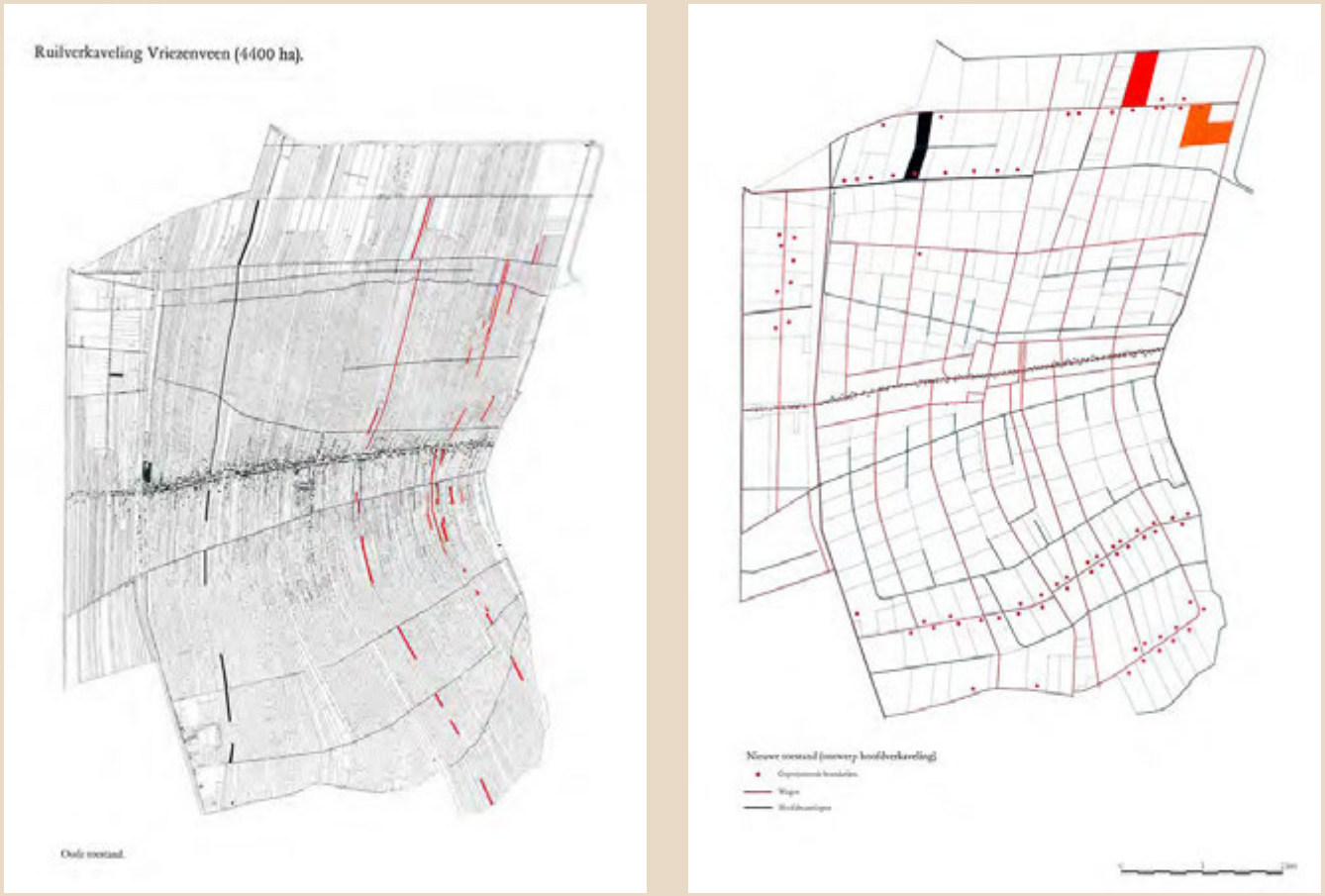
Problems

The land consolidation Vriezenveen (north of Almelo, Overijssel Province) was one of the first to be implemented under the 1954 Act. The proposal was put to the vote in September 1954; work in the field began in 1955 and continued for about twelve years.
Vriezenveen was characterized by a field pattern and village layout that were unusual for the eastern sand and peat regions; with its countless narrow strips of land it had more in common with the so-called '*cope*' parcellation found in Holland and Utrecht.[1] Starting at both sides of Vriezenveen's single village street, the individual plots extended far into the peat marsh. They were the final outcome of centuries of reclamation and peat digging operations. Originally, these north-south oriented plots were 112m wide (converted from medieval units of measure), but over time most of them were split in half at least once as each estate was divided among successive heirs, resulting in plots that were 56, 28 or 14m wide – and occasionally as little as 7m! Lengthwise – each plot could be up to 4km long – subdivisions were equally common. In other words: land ownership was hugely fragmented, and much cultivable land was lost in the process.
The plots were separated by dry boundary ditches or narrow footpaths, many of them serving as access routes. Most plots could only be accessed after walking long distances and crossing countless culverts and bridges, a situation compounded by the degree of fragmentation. Much time and energy were wasted on inefficient transport. An interesting aspect of the area's water management system was the utilization of some of the field complex' westernmost ditches and adjoining lands in the construction of the Overijssels Kanaal Almelo-De Haandrik around 1850.
In the first half of the 20th century the roadside village of Vriezenveen, subdivided into Westeinde ('West End') and Oosteinde ('East End'), comprised several hundred farms, often lined up one behind the other on the same narrow plot; a similar situation prevailed in the villages of Staphorst and Rouveen.[2] Their positioning at an oblique angle to the main road is highly typical.

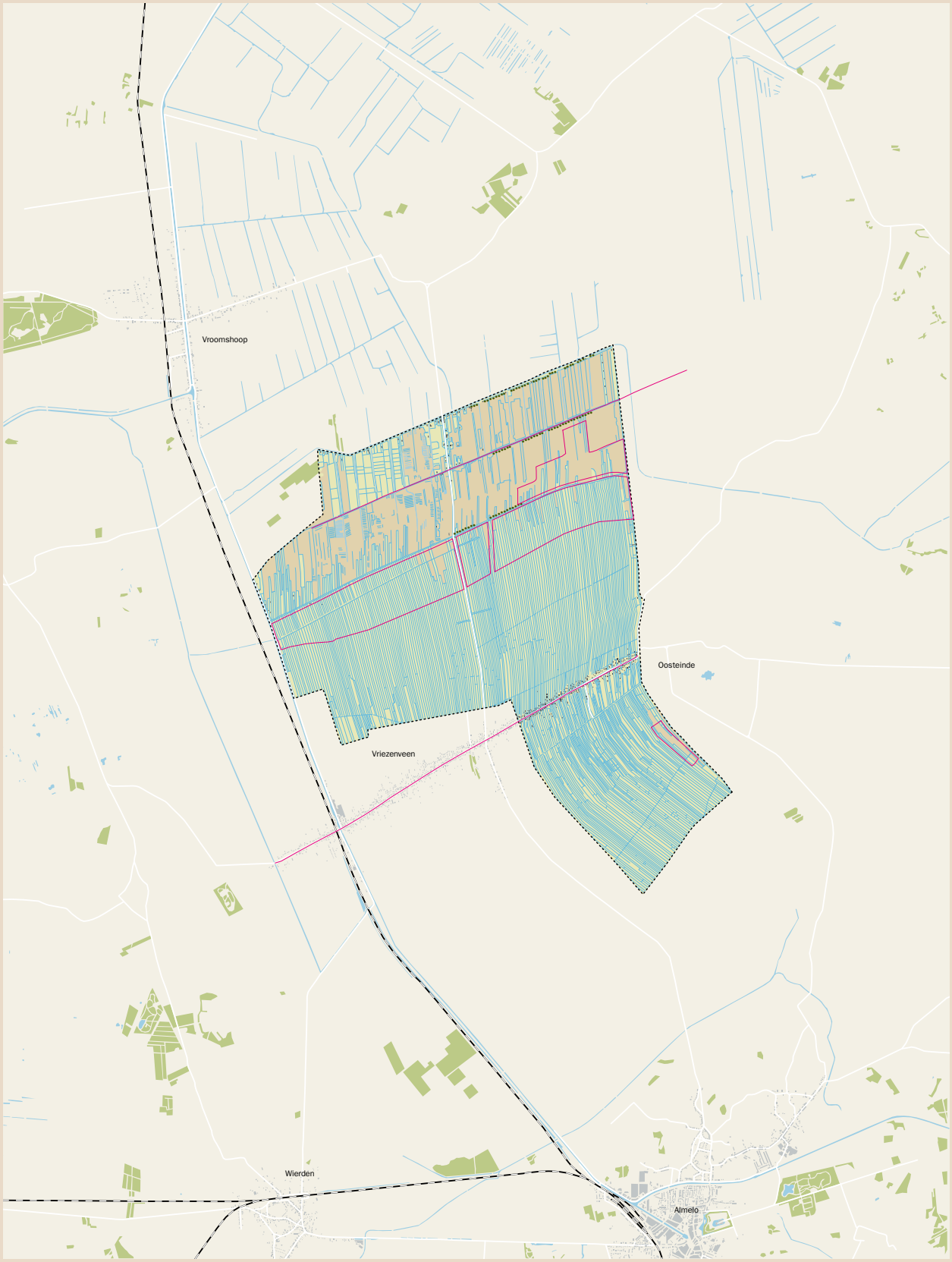
Realization

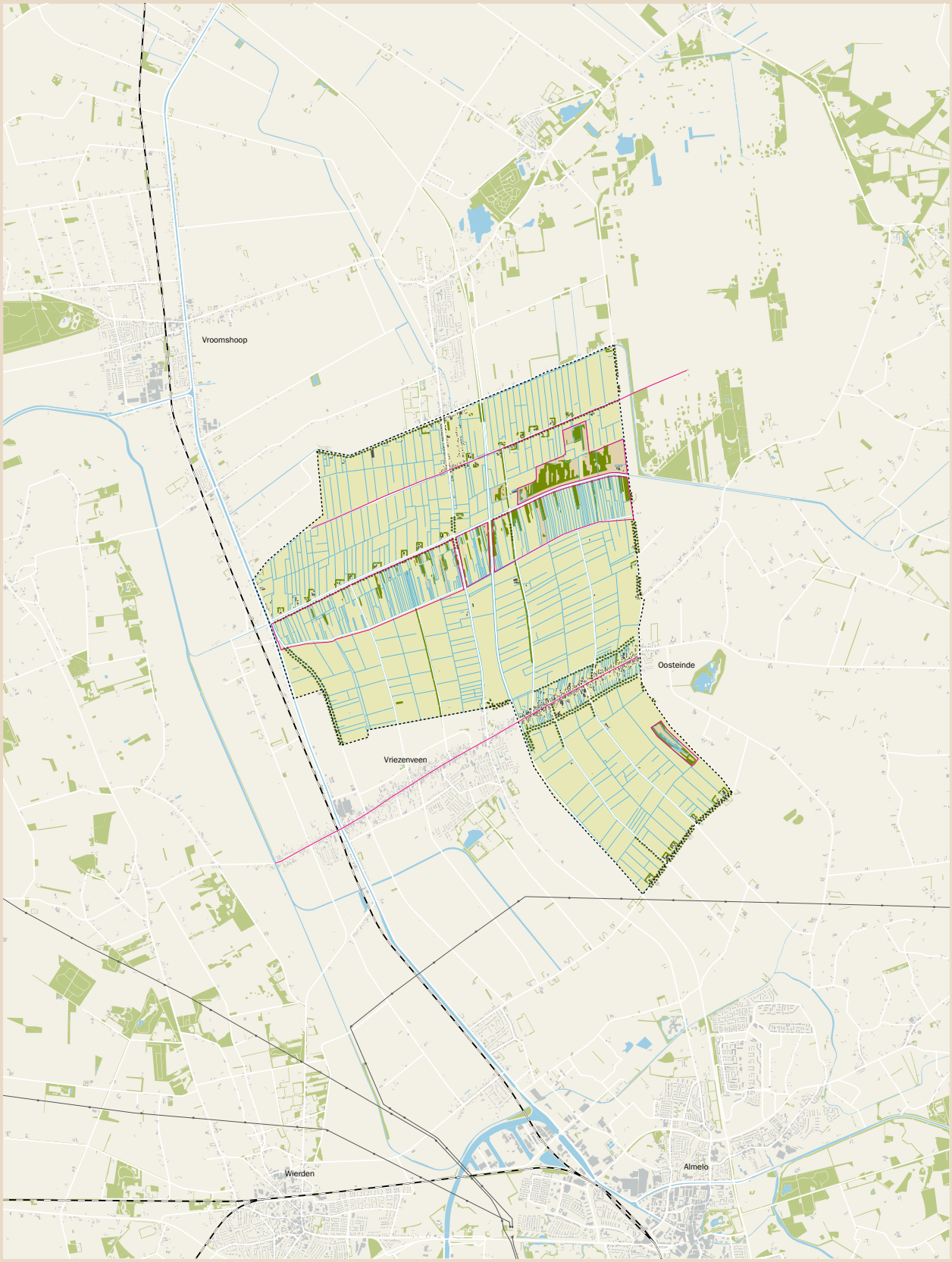
The earliest ideas on the land consolidation ('reconstruction') Vriezenveen date back to the early 1930s. Early in April, 1940, one month before the German invasion, they became more concrete. An actual plan was developed from 1942 onwards, initially on a much more modest scale than originally intended (ca. 640 ha, later increased to 1,740ha). After further elaboration the plan was finally implemented in the 1950s. By that time the area involved had expanded once again and finally encompassed over 4,300ha. During the land consolidation and redevelopment most of the historical field complex was rotated by 90° and the many miniature plots were combined into large continuous units. At the same time, ca. 70 farms were relocated to the newly formed plots (a form of 'colonization') and ca. 200ha of wasteland was reclaimed and converted into cultivable land. Ca. 80km of new country roads were constructed and many kilometres of new ditches dug, while ca. 50 new bridges and culverts were built. Existing field ditches – reportedly to a total length of 3,000km! – were mostly filled in, allowing the removal of most of the 1,000 culverts and smaller bridges. All these landscape interventions together represented a significant upscaling.
Although both the plot rotation and the farm upscaling have often been criticized the original landscape structure is still visible at a higher level, particularly from above, on aerial photos or maps.[3] Furthermore, substantial portions of the area encompassed by the land consolidation were left intact and still contain significant cultural and natural (landscape) qualities. This is especially true of the area south of the line Westerveenweg-Oosterveenweg (in Het Veenschap)[4] and also of the 'green' end of Vriezenveen, Oosteinde. In addition to their well preserved original, fragmented field pattern these zones are also characterized by medium-high to high vegetation which compartmentalizes the space and as such dominates the view. Despite its openness farther away from the village of Vriezenveen, the landscape and its vistas are therefore not 'limitless'. Contrary to what is sometimes assumed this open character predates the land consolidation, as maps and photos show. Just like Walcheren the pre-war Vriezenveen landscape was far less wooded than is sometimes stated. Traditionally, any sizeable stands of coppice wood were found almost exclusively near the settlements and in transparant lines of alder along ditches.[5] (fig. 90)
A number of new access roads were constructed, using pre-existing structures as a blueprint. These access roads subsequently served as the base line for newly established farms and resulted in a few new, sparsely built-up roadside farming settlements. These consist of buildings typical of the 1950s and 60s, mostly with (semi-)detached residential sections. In the north, in a continuation of tradition, these new farms were placed at an oblique angle to the road just like those in the old village. Farms tend to be surrounded by lines of trees, adding some 'decoration' to an otherwise rather open landscape. In the Oosteinde side of the historical main village, some of the original

90 Vriezenveen, October, 1959. Left: the original nearly treeless plain before the land consolidation.
Right: close by, the new also nearly treeless plain after the first stages of the land consolidation.



91 Vriezenveen before the land consolidation and a design for the new arrangement, focused on scattered possessions of two land owners. Further the plan shows re-located farms (red dots), new roads (red lines) and new main watercourses (black lines). (Probably ca. 1955)


Vroomshoop
Oosteinde
Vriezenveen
Wierden
Almelo



Vriezenveen
Right: Simplified map image ca. 1930. Scale: ca. 1:80.000
Left: Simplified map image ca. 1970. Scale: ca. 1:80.000
It is clearly visible the prevailing parcels direction turned ca. 90 degrees. Some parts of the Vriezenveen land consolidation can boast their authentic structure.

92 Another picture showing the long and narrow plots in Vriezenveen. Many culverts accross the field ditches were necessary to get rid of water overplus. On the horizon the present 'Het Veenschap', a former peat digging zone, now a nature preserve. (Photo ca. 1933)

93 Although deep ploughing davastated many traces of former human activities DEM / AHN may reveal reveal hidden memories. In land consolidation Vriezenveen here and there traces of the original parcellation shimmer through the present field surface.

agrarian settlement still remains; some farm buildings are still lined up perpendicular to the road, one behind the other, interrupted here and there by a sheep paddock or orchard. Some brick culverts and an historical graveyard are also still visible in the landscape.
An interesting aspect of the land consolidation Vriezenveen is its proximity to the peat marshes of Engbertsdijksvenen. This area, a large abandoned and overgrown former peat digging operation north-east of the land consolidation, presents a significant contrast to the overall 'functional' redevelopment of Vriezenveen; as such it is a significant added quality, as is Het Veenschap.[6]
The modern main village of Vriezenveen clusters in the south-west of this area. In recent years, building density within the area encompassed by the former land consolidation has increased, a number of farms were modernized and a few new roads/ thoroughfares constructed. Overall, however, the area's original land consolidation character has not been materially affected. (fig. 91, 92)

Key qualities
Vriezenveen is a largely intact, early land consolidation landscape, one of the first to take shape under the 1954 Act and in accordance with a landscape plan which either preserved or enhanced parts of the original natural and cultural landscape. Characteristic elements are the rotation of the field system whilst respecting the original main axes, with upscaling as a result. Equally typical are the newly constructed access routes, the drainage infrastructure and its accompanying features. Farms built in the characteristic reconstruction-era style constitute the most important new additions to the built-up area but again existing farms and houses were preserved as much as possible.

Among the numerous small structural elements are bridges, culverts and pumping stations. The preservation of sections of the former peat extraction landscape, as well as the fact that old and new landscapes are easily identifiable, has introduced some interesting and significant contrasts, both within the landscape and between it and its surroundings. The Vriezenveen land consolidation has often been the subject of debate, as it provided both proponents and opponents of its rigorous approach with ammunition for their respective points of view. Although it cannot be denied much of the 'original' landscape was lost even in this radical project at several places the former strips parcellation shimmers through the present surface. Even Vriezenveen vaguely shows a palimpsest of human rural activities. (fig. 93, 94)

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Notes

1 *Cope* reclamations were typical of medieval peat reclamations. They are characterized by unusually long and narrow plots and a highly regular structure. The name *cope* refers to the sales contract (in modern Dutch *koop*) between the farmers/reclaimers and the land owners. Vriezenveen is a 4km-long roadside village with plots along both sides of its main street extending kilometers into the peat. According to some the name Vriezenveen is a reference to West-Frisian (*Vriezen/Friezen*) colonists who settled in this peat (*veen*) region.

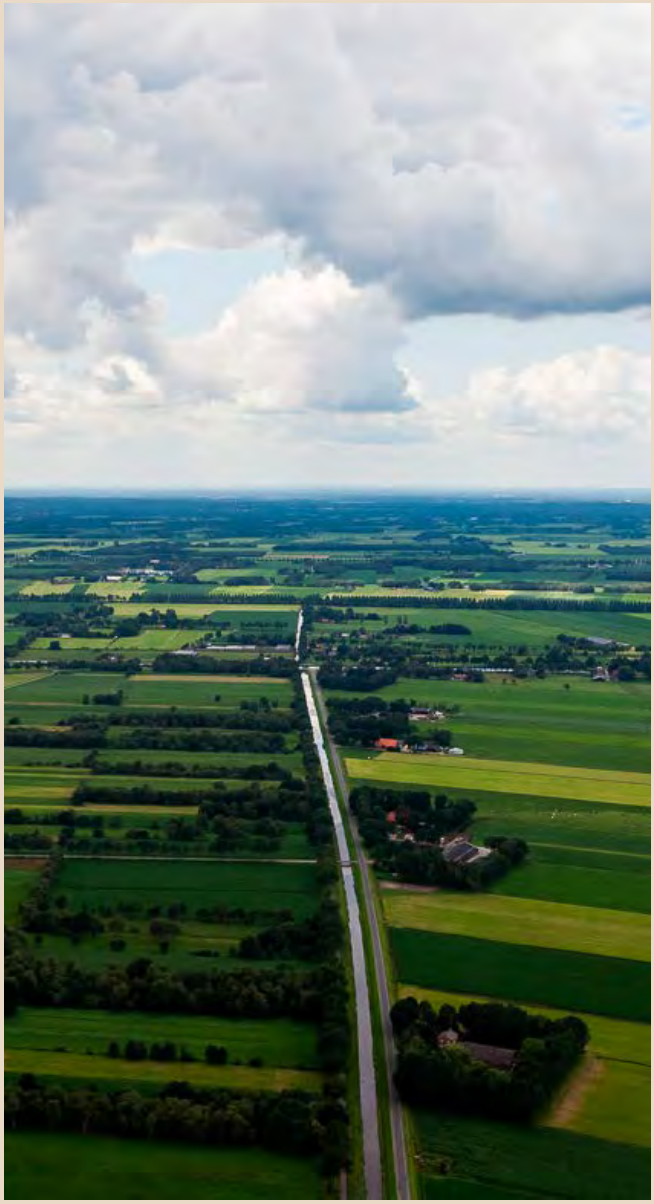
2 See http://www.topotijdreis.nl/ and zoom in on the period 1850-1970.

3 Numerous newspaper and magazine articles were dedicated to the land consolidation Vriezenveen.

4 The Veenschap is an only partly reclaimed raised bog which in the context of the land consolidation was subjected to a special water management and nature conservation regime.

5 Van den Wittenboer 2017, 68 ff.

6 See http://www.topotijdreis.nl/ and zoom in on the period after 1976.



94 Aerial impression of the nortern part of land consolidation area Vriezenveen. Left of road and canal the nature preserve 'Het Veenschap'. On the right side a series of farms built at an oblique angle to the road and all of them with right angled windbreaks or girdles. The north is right. (Photo June, 2011)

6 Solving the problematic food supply and tackling social deprivation

This chapter addresses two structural problems which plagued the Dutch countryside and its rural population for decades. The first relates to (among other issues) spatial and economic aspects of the changing national and international agrarian markets, and particularly the European market, from the first half of the 20th century onwards. The problem mainly arose during times of war and became manifest during the First World War, although the Netherlands remained neutral territory. WWII brought the so-called 'Winter of Famine'. The second structural problem concerns the severe social deprivation which affected a significant part of the agrarian population in many ways. Both issues could be solved, although not in ways that pleased everyone.

6.1 Food Supply: from shortages to competition. An incidental motive for modernization.

In the pre-war past, the Dutch agricultural sector had been one of the mainstays of the economy. That did not mean that large surpluses for export were being produced in all parts of the country, although in some respects that was certainly the case. The dairy industry, for example, created a milk surplus which was traded in the form of butter and cheese. In the poultry sector, the trade in chickens and eggs prospered.
Some niches in the horticultural sector were exceptionally successful, such as the cultivation of fruit, cabbages and flower-bulbs. One specialty within horticulture was the greenhouse or hothouse cultivation of crops such as grapes and tomatoes, which were exported in large quantities to Germany and Great Britain. The main greenhouse centre was between The Hague and Rotterdam, in the so-called Westland area. Flower-bulbs were another speciality and arboriculture a third; these two clustered on, respectively, some sandy soils in the west and the peat soils in the centre of the province of Zuid-Holland, but they were also scattered in many sandy areas throughout the country. These bulbs and other plants were also important commodities. The impact of the crisis years on agriculture was fairly small, and from the late 1930s onwards the situation further improved.[169] The Second World War, however, put a spoke in the wheel of good fortune. Not only was livestock being partly consumed and much agricultural land lost due to the vicissitudes of war, but damage to crops, looting and so on made the situation even worse. As the end of the war approached, the west of the country suffered greatly in the – what became kwown as – 'The Winter of Famine'. Another, more structural problem emerged after the war: the European agricultural market in particular made it increasingly difficult for Dutch farmers to be competitive, and land redevelopment – i.e. upscaling – was deemed inevitable. Thus, external factors – fear of food shortages, and international trade – provided another main impetus for land consolidation, agrarian reorganization and rural modernization, affecting especially the smaller farms but other sectors as well.

6.1.1 The Dutch 'Winter of Famine' (1944-1945)

Although food might occasionally be scarce, real famine was virtually unimaginable in the west of the Netherlands. Almost entirely agricultural, the western provinces were the very region where food had always been plentiful. In the Noord-Holland and Zuid-Holland countryside, dairy farming, agriculture and horticulture were all highly productive and food was even being exported.
During WWII things changed radically however. While in the south of the country the German occupation ended in September and October 1944, in the north and the highly urbanized west the German forces stayed put and dug themselves in. Especially in the west, a series of factors was responsible for the virtual cessation of the entire food supply. Stagnating transportation was a major factor and led to ever tighter rationing.[170] The winter of 1944-1945 would enter the history books as the 'Winter of Famine', in Dutch '*Hongerwinter*', despite the fact that the three previous winters had been colder. The exact number of fatalities during this bitter winter is unknown but is estimated at 20,000. Hunger and fuel shortages forced women and

[169] Du Prel & Janke, 1942, 257; Noordam 1987, 260 ff.
[170] Rüter, 1960: Stagnating transportation was due to a major strike of railwaymen, German endeavours to breake the strike, shortage of means for transportation by rail and over water, frozen and/or blocked waterways and railways, etcetera. Recently a new study was published: I. J. J. de Zwarte, 2018: *The Hunger Winter: Fighting famine in the occupied Netherlands, 1944-1945*, Amsterdam (Du: Ingrid de Zwarte, 2019: *De Hongerwinter*, Amsterdam).

95 Women and children walked from towns in the western provinces to the countryside hoping for food and fuel.

children in droves to undertake expeditions from the western cities to the countryside, where they hoped to find food and/or fuel. (fig. 95) Many men were housebound, for fear of being arrested and sent into forced labour in Germany, the so-called *Arbeitseinsatz*. Many others had already been deported there. This traumatic final phase of a war during which, for most Dutch people, the food supply had been more or less adequate until September, 1944, is the main reason why the five years of occupation are still firmly etched into the collective memory.[171] This incidental experience suddenly led to a relative positive or willing attitude to agrarian change. After the war, famine was a spectre dreaded by many, especially when the peace achieved in 1945 faced a new threat: the Cold War. The post-war idea that the Netherlands should be able to feed itself was not new, for the food shortages resulting from the First World War trade embargo had been one of the considerations behind the 1918 plans for the partial drainage of the Zuiderzee. A new international crisis (a third world war?), a perceived shortage of agricultural land, fear of unemployment, a slow recovery, and the ongoing rationing of food, to mention a few factors, all fed a general anxiety and fear of new shortages.[172]

6.1.2 International agricultural cooperation and competition

In order to alleviate these fears and to guarantee peace and security, politicians in the post-war years launched a number of initiatives to achieve international cooperation. More specifically, and primarily, European cooperation, in an attempt to establish a permanent reconciliation of at least the main parties – especially Germany and Italy on one side and France (and later Great Britain too) on the other – in the recently ended war. The national interests of the various nations, which in the past one hundred years had led to four major armed conflicts in Europe, now became secondary so as to avoid similar bloody altercations in the future. Shared interests were to supersede those that might conflict.[173] In July, 1953, the European Coal and Steel Community (ECSC; Du. *EGKS*) was established, the result of earlier initiatives. It was followed in March, 1957 by EURATOM and the European Economic Community (EEC; Du. *EEG*). The larger member states in all three organizations were France, Germany and Italy, alongside the smaller states Belgium, the Netherlands and Luxemburg (the so-called Benelux). An important part of the EEC's activities was an extensive involvement in agricultural issues. Its goals included a uniform European pricing system for agricultural products, with higher prices than those on the international market, in order to improve the situation of European farmers and create market stability. This was conditional upon higher productivity and the phasing out of farms that were no longer competitive. In practice that meant smaller farms, of which the Netherlands had relatively many.[174] Ten years later, in 1967, the three organizations ECSC, EURATOM and EEC merged into the present European Union (EU). The EEC was first and foremost an interest organization for its six member-states, which desired to form an economic power able to counteract the effects of fluctuating (agricultural) global market prices. Despite their best efforts this did not automatically imply internal coordination or collaboration with regard to farming practice and organization, nor did it involve any substantial exchange of expertise on the advantages of land consolidation and/or reorganization or farming practices.

6.1.2.1 The necessity of upscaling and rationalization

During the first post-war years, food was still scarce and many items continued to be rationed

171 See e.g. https://nl.wikipedia.org/wiki/Hongerwinter; https://en.wikipedia.org/wiki/Dutch_famine_of_1944%E2%80%9345; Of course, by that time tens of thousands of individuals had already been grievously affected by the horrors of Nazism in other ways, through deportation, retaliations, terror, bombardments, demolitions, clearances, evacuation, and so on. To them, the final eight or nine months of the war were the culmination of their trials, with the terrible exception of Jewish individuals who had been facing wholesale genocide since long before those final months of the war.

172 Van Faassen 2014, 5, 208. This fear led to an emigration stream – in part with government encouragement – to 'promised lands'. The post-1948 repatriation of Dutch citizens from the Dutch East Indies intensified the pressure on already scarce resources.

173 Crimean War (1853-1856), Franco-German War (1870-1871), First (1914-1918) and Second World War (1939-1945).

174 Hermans 2004, 108-111; https://nl.wikipedia.org/wiki/Gemeenschappelijk_landbouwbeleid.

96 Old-fashioned harvesting on recently reclaimed land: Noordoost Polder, August, 1949.

97 S.L. Mansholt c.s. promoted modern, large-scale agrarian production. (Zeddam, Gelderland Province, 1967)

until the 1950s. Poverty – and even malnutrition – also persisted, in part because unemployment levels remained high.
Despite these pressing issues the agricultural sector was slow to change, due to a combination of factors of which one in particular became important within the EEC after 1957. Years before the Second World War it was already obvious that the Dutch agricultural sector struggled with some fundamental problems, first and foremost the large number of smallholdings. Small farms were not economically viable and did not have the growth potential necessary to survive. Even at a national level they could barely hold their own against the much larger, modern and specialized farms, let alone survive the competition with European and world-market players. (fig. 96)
Dutch politician S.L. Mansholt (1908-1995) was the first to publicly state this conclusion. Mansholt was a farmer's son from Groningen, educated at the '*Rijksmiddelbare Koloniale School*' (later called '*Agrarische Hogeschool Deventer*' / 'National Advanced Agricultural College') but otherwise mostly a self-made man and between 1937 and 1945 a pioneering farmer in the Wieringermeer Polder (completed in 1930). During the war, Mansholt had been an active member of the resistance and had helped to organize illegal transports of food from 'his' polder to the hungry cities in the central west of the country.[175] As one of the polder's early residents he became its deputy mayor, in 1945. Mansholt's personal background encouraged him to think big. Not only did he himself manage a large farm in the polder ('large' by the standards of the time), but he was also intimately familiar with the substantial farms typical of his home region, the north of

98 Portrait of S.L. Mansholt in 1967

Groningen. In his eyes, large-scale operations and many hired hands were indispensable to agricultural prosperity. The office of mayor was his stepping stone to a post as Minister of *Landbouw, Visserij en Voedselvoorziening* (Agriculture, Fisheries and Food Supply) for the *Partij van de Arbeid* (Labour party) from 1945 until 1957. Until 1959, the procurement of food was within the purview of this ministry. One of Mansholt's main goals was upscaling the Dutch agricultural production and means of production by enlargement of the farms, mechanization and rationalization. (fig. 97)
His position as minister ultimately led Mansholt to Europe and the EEC. Between 1958 and 1973, Mansholt was European Commissioner for

[175] See https://nl.wikipedia.org/wiki/Sicco_Mansholt

99 Agrarian transformation and upscaling also provoked opposition. Dutch (small holding?) farmers demonstrated in EEC headquarters Brussels against Mansholt's intentions.

Agriculture and Rural Development. He was highly influential both as a minister and as a European commissioner; he placed national and international agricultural policies firmly on the map, and the results are still visible today. The eradication of hunger in Europe and the rest of the world as well as incessant campaigning for agricultural upscaling, rationalization and innovation were probably the most important issues during his ministry and his term as European commissioner.[176] (fig. 98)
Many (Dutch) smallholders and cottagers could muster little enthusiasm for Mansholt's European policies however, for they regarded them as a threat to their existence as independent producers and employers. A great many of them were fiercely opposed to land consolidation, re-allotment, upscaling, rationalization and other adjustments of the agrarian sector in favour of greater Dutch competitiveness on the European and global markets. (fig. 99) This was not just true for arable and mixed-farming but for stock-farmers as well. Even when trying to accommodate to the 'new standards' they might go down. (fig. 100) Yet, as we saw earlier in chapter 2, a decline in the number of smallholders began slowly (from 110,600 in 1930, to 103,500 in 1945

100 Cow-shed with room for dozens of cattle, but the shed's technical condition shows arrears and defects: it is not conform the 'new standards'.

and 101,737 in 1950), but tempo went up in the 1950s. In 1959 the number of small farmers – cultivating 1-5ha – was down to 87,700, in 1965 to 72,200 and in 1970 down to 42,497 or 23% of all users of agrarian land of at least 1 hectare. But besides the 1-5 ha smallholders there were thousands of owners and tenants of even smaller patches of agrarian grounds. To only give a simple impression of the quantitive aspects of this problem a view on Table 6.1 will suffice. In the first half of the 20th century there were some 140,000 holders of such less than 1ha farming grounds. So in that period their number equalled with 60% of the sum of all agrarians

[176] Later, he 'converted' to the environmentalist movement and openly doubted the wisdom of further upscaling.

Table 6.1 Number of agrarian smallholders, owning or renting less than 1ha of farming grounds, 1921-1970.

1921	1930	1950	1955	1965	1970
139.743	137.936	97.206	60.363	43.775	20.500

Source: Landbouwcijfers 1970, 42.

with over 1ha! Almost certain thanks to effective implementation of upscaling and rationalization programs this awkward situation quickly improved after ca. 1940.[177] We will not deeply focus on this group of crofters, but because there is a link with horticulture, we cannot but pay attention to this nvertheless economically important segment of Dutch farming.

6.1.3 Dutch horticulture: a striking agrarian exception

Although the necessity of upscaling in the Dutch agricultural sector had been evident at government level since the early 20th century and the first land consolidation bill had been drafted in 1905, for a long time little was done to remedy the situation, as was mentioned earlier. Hardly any upscaling took place until after the Second World War. On the contrary, due to specialization, application of fertilizer, and the need to feed more mouths (i.e. larger families) with the yield of the same area of land, some types of farms were even downsizing. Special case the cultivation of vegetables (as field crops or in greenhouses), (soft) fruit, bulbs and a range of other crops allowed an acceptable and sometimes even comfortable living standard, thanks to substantial harvests and high prices. Downsizing, rather than upscaling, was therefore the traditional trend in several horticultural regions – together they were an atypical, but economically important agrarian niche. In the first half of the 20th century, the total area dedicated to horticulture had expanded significantly, from ca. 60,000ha in 1890 via 75,000ha in 1910 and over 100,000ha in 1939 to 130,000ha in 1950.[178] Yet the average holding was and remained small. In the early 1950s, no less than 85% of market gardens worked a total area of less than 3ha, of which half worked only 0,01 to 1ha.[179] In addition to the above mentioned factors, the intensive care these crops required also fed the trend towards smaller holdings. The horticultural sector was therefore the exception to the norm (the so-called 'bulb region' (*Bollenstreek*) and the greenhouses of Westland are cases in point; see below), the norm in this case being an overall (mainly post-WWII) tendency in favour of larger agricultural holdings. A contrary development could be observed elsewhere in the Netherlands. In the north of the province of Noord-Holland, horticultural specialization also led to extreme fragmentation but there, drastic interventions in land tenure as well as large-scale re-allotment occurred in the late 1960s and the 1970s. A most notable – some even say most horrifying – example is *polder Geestmerambacht*. Other controversial examples of change can easily be traced, but preceding some explanation on polder Geestmerambacht two well known typically Dutch horticulture regions will be lifted out below: the world famous *Flower-bulb region* and the *Westland greenhouse region*.

6.1.3.1 The Bollenstreek: small-scale flower-bulb cultivation

The *Bollenstreek* is situated between Haarlem and Leiden in the sandy area behind the coastal dunes. Haarlem and surroundings was the first heart of flower-bulb raising in the Netherlands from the 16th and first half of the 17th century. It was the period of the world famous disaster of the 'Tulip mania' of 1636/37 that led to bankruptcy of many investors in flower-bulbs.[180] The flower-bulb area grew southward and from the second half of the 19th century onwards, more and more land was rendered suitable or reclaimed for the purpose of growing flower-bulbs. Until ca. 1960, the reclamations were concentrated in the inner dunes (or so-called: *geestgronden*), where the soils and water table proved to be highly suitable to this particular crop. (see Box Text on Oosterduinen). The resulting changes in the landscape (and on the map) were therefore primarily the result of a

177 Landbouwcijfers 1970, 42; *ibidem* 1980, 18.
178 The numbers presented by the various sources are slightly different.
179 Blink 1892, III, 455; Schuiling 1915, 548 ff.; *ibidem* 1934-1936, II, 622; Sleumer 1952, 169 ff. Around 1950 ca. 31,000 farms, 13,000 of them less than 1ha.
180 https://en.wikipedia.org/wiki/Tulip_mania

change in function (from grassland to bulb fields) and also to the removal of the top sand and the subsequent conversion into bulb fields. There were a few larger growers / land owners, but the vast majority of holdings were worked by tenants growing tulip, hyacinth and daffodil bulbs for export on tiny, occasionally scattered plots. Meanwhile, the extreme fragmentation of cultivable land had become endemic, but agrarian or economic crises were not the only causes. Problems were most severe in the area known as The *Bollenstreek*. Following Tables 6.2 and 6.3 A & B in 1900 about 1,378 hectares of cultivated land in the area was used for flower-bulb raising and in 1906 these ca. 1,400ha flower-bulb fields were cultivated by ca. 1,420 growers: about 1ha per grower. In 1910 the bulb cultivated area had increased to 2,484ha and in 1930 further to 3,723ha but the number of growers gained in proportion or even more. From then surplus production, economic crisis and losses of investments were the main reasons for stagnation.
Mainly due to governmental intervention in the 30s and WWII in 1950 the *Bollenstreek* area had decreased to 2,375ha again, these grounds being used by over 1,250 bulb growers. Ca. 40% of these growers used less than 1ha and another 40% between 1 and 3ha. In family businesses even 93% of the farms counted less than 3ha.[181] By 1965 2/3 of the growers in this area were losing money and from that time the sizes of concerns grew by taking over and upscaling. Besides this many of them were phased out as a consequence of growing population pressure. Yet it lasted well into the 1980s until the total number of growers in this area significantly sank. From the end of the 19th century the flower-bulb had gained public interest again, but this time trade was in extending in space rather than in exploding into ridiculous bulb prices. Ever more flower-bulb zones spread over Noord- and Zuid-Holland and soon after over other parts of the country as well. Many were keen to get a piece of the bulb pie, which by 1930 had resulted in ca. 19,000 growers on over 9,000ha! At that point the government was forced to intervene, with measures including radical reduction of the area used for raising flower-bulbs to a target amount of ca. 6,000ha (= restructuring; Du: *sanering*) and the removal of large stocks of bulbs from the market.[182] The number of growers dropped by

[181] Landbouw-Economisch Instituut 1958c, 20, 27, 29.
[182] See e.g. *De banier: staatkundig gereformeerd dagblad*, 4 July, 1933, 2; Schuiling II 1936, 48-51; Blink 1925, 355-358, map.

Table 6.2 Number of flower bulb growers and sizes of cultivated lots 1906 – 1999 in the Bollenstreek area.

Size of cultivated lots	Number of growers in 1906	1930	1939	1951		Number of growers in 1980	Number of growers in 1999
0-1/4 hectare	?						
1/4 -1/2 hectare	471				0-1/4 hectare	73	35
1/2-1 hectare	266				1/4 -1/2 hectare	114	43
1-2 hectare	241				1/2-1 hectare	209	61
2-3 hectare	164				1-2 hectare	256	84
3-4 hectare	74						
4-5 hectare	54				2-4 hectare	190	79
5-10 hectare	91						
10-20 hectare	30						
20-50 hectare	14						
50 > hectare	2						
					4 > hectare	172	164
Total nr. of growers	1420						
						1014	466
Total hectares used	ca. 2000	ca. 3725	ca. 2450	ca. 3050			
	(1909: 2200)					2504	2385

Sources: Winkler Prins geïllustreerde encyclopaedie, 1914-1922, III, 544; Schuiling 1915, 295; Landmeter 1954, 223; CBS Statline.

101 Small scale flower bulbs breeding. Painting by A.L. Koster (1859 (1880?) -1937).

half as a result (to 10,000 in 1940) but picked up again in the post-war recovery period: from ca. 8,000 (on 6,500ha; 1950), to 10,000 (on 10,000ha; 1960) and ultimately 14,000 (1965).[183] (fig. 101) The rise contributed to an increase in the already considerable annual stream of tourists: hundreds of thousands of day-trippers came to admire the colourful bulb fields – especially, but not uniquely in the *Bollenstreek*, where space became comparatively scarce and expensive. Different from other scattered land use areas no perceptible concentration and upscaling in the sector occurred until after 1965 when finally it was further accompanied by an expansion of the cultivated area, which today encompasses about 23,000ha being worked by 1,500 growers. Concentration came from within the bulb growing branch: the larger firms took over smaller ones and tenants holdings. This 23,000ha figure, however, is the limit, and bulb cultivation has consequently spread to many other parts of the country. Flower-bulbs for export are for instance being grown in the 17th-century polder of the Beemster and also in the 20th century Noordoost Polder.[184] In the last few decades more and more greenhouses are appearing in the Bollenstreek, which detracts from the region's traditionally open character.[185]

6.1.3.2 The Westland: microplots and microclimate

The Westland is a horticultural region stretching between The Hague, Delft and the western port district of Rotterdam. Today, the Westland is characterized by a string of so-called *warenhuizen* (series of internally linked greenhouses) where a wide range of vegetables and flowers are being grown. Until ca. 1950, cold frames and (separate) greenhouses were typical of the area, alongside field cultivation. Cold frames were used for vegetables while the greenhouses were predominantly used for grape cultivation, which emerged in the late 19th century. Particularly the silty-clayey sands (Du. *zavel*) in parts of the Westland were suitable for a wide range of crops, but other soil types could also be adapted by bringing in sand and peat from elsewhere by barge. Traditionally, the Westland was ideally

183 It is not quite clear if countings apply to the same kind of workers: are they all growers or labourers as well?

184 See e.g. Sleumer 1952, 178; Landmeter 1954, 220-224; Bultink, Goemans, et al. 2015, 24, *passim*.

185 Mil van, 2017, 35 ff.

Table 6.3 A & B Number of hectares in use for raising flower-bulbs 1886-2000 and number of growers.

Year	1886	1891	1900	1910	1930	1939	1950	1955	1965	1975	1980	2000
Bollenstreek East / West	**Hectares**											
East (hectares)	123	440	752	1401	1772	1369	1241	1490				
West (hectares)	140	230	626	1083	1951	1093	1134	1320				
Total Bollenstreek (hectares)		670	1378	2484	3723	2462	2375	2810			2360	2356
Rest of Noord-Holland Province		705	1647	3175	4638	3100	2877	3604				
Rest of Zuid-Holland Province		470	874	1393	4380	4405	3486	4569				
The Netherlands (total)		1178	2526	4605	9179	7800	6509	8741	10000	13000		22000
Number of growers ca.			2000		19000	10000	8000		14000	6500		2700

Sources: Landbouw-Economisch Instituut 1958c, 20, 27; Bultink, Goemans & Nijhof 2015, 24; Winkler Prins Encyclopedia 7th edition, IV, 117.

positioned to supply the cities of Rotterdam, Delft en The Hague. In the 19th century it also became a major player in the export of fresh produce to Great Britain (by ship) and Germany (by railway). Just as their colleagues in the Bollenstreek, Westland farmers were eager for a share in the boom. The already fine-meshed field system became even more fragmented as more and more tiny plots were being leased by market gardeners, ultimately resulting in a virtually uninterrupted cultivated zone. Within a few decades a veritable maze was formed of tracks, ditches and miniature plots. The application of hot-house technology (from 1904 onwards) made it possible to create a 'perfect climate'. As a result the area occupied by glass-covered nurseries expanded, initially mostly in the form of cold frames but after ca. 1900 in the form of greenhouses and, after the Second World War, *warenhuizen*. The positioning of this 'standing glass' is interesting: every cold frame, greenhouse or *warenhuis* entirely covered a separate plot, thus together forming a perfect jigsaw puzzle. Appropriately, by the 1920s the area was called 'the glass town' (*de glazen stad*) and, slightly later, also 'Europe's garden' ('*De tuin van Europa*'), in reference to the Netherlands as a whole.[186] The following data illustrate the expansion of Westland (greenhouse) horticulture.

The most significant spatial development was the substantial expansion of greenhouse cultivation during the pre-WWII period, followed by a recession during the war due to extensive damage and a lack of maintenance as well as German measures limiting the production of greenhouse vegetables. The Westland's limited accessibility was a structural problem which had already been noted in the pre-WWII period; the region's narrow roads – and a local tramway – as well as its many small watercourses caused not only fragmentation but also transportation problems for the produce. Although the situation was slow to improve, ultimately all market gardens became accessible by road while many of the ditches were filled in. In other respects, too, the recovery period was marked by a new course: cold frames were replaced wholesale by serried rows of *warenhuizen*, as were most of the isolated greenhouses. Viticulture disappeared while the cultivation of vegetables and flowers was booming. Around 1960, a turning point was reached when the then current regional plan for the first time restricted further expansion, leading to speculation as to whether market gardens should be relocated elsewhere.[187] This is indeed what happened, albeit after the 1960s. What did start in the 1960s was an ongoing process of rationalization, intensification and crop improvement, leading to an uninterrupted increase in yields, both in volume and financially. The Westland was a typical mid-20th century 'exploded' cultural landscape. (fig. 102) Interestingly, the size of the average market garden dropped to less than 2ha in the early 1960s, only to expand again in the 1970s as a result of agricultural upscaling, which

186 See e.g. *De standaard*, May 27, 1942, p. 1.
187 See e.g. *De Tijd De Maasbode*, June 2, 1960, 8; *Nieuwsblad van het Noorden*, January 25, 1957, 3; *Algemeen Handelsblad*, March 12, 1970, 10.

Table 6.4 Westland area: number of market gardeners and use of glass-covered horticulture in hectares, 1900 – 2019.

Year	Nr. of Market Gardeners	Cultivated Area	Of which Glass-covered
	(main settlement)	ha	ha
1900		2.400	340
1915	1.200	3.100	
1925	2.400		900
1929		3.500	
1940		3.400	2.000
1947			1.300
1953		4.500	1.650
1970	4.800		2.700
1975	4.000	4.600	3.200
2006	1.316		
2012	840		2.360
2019	587		2.300

Sources: Landbouw-Economisch Instituut 1958c, 20, 27; Bultink, Goemans & Nijhof 2015, 24; Winkler Prins Encyclopedia 7th edition, IV, 117. [188]

102 A series of Westland pre-war greenhouses (left) and so-called *warenhuizen*. (Photo March, 2011)

requires substantial investments.[189] Recent developments show a fast shrink of gardeners however and size upscaling as a consequence. Yet the average size of enterprises remains small. In 2012 for instance 631 out of 1410 counted between 0.5ha and 1.5ha and another 557 were between 1.5ha and 5ha. Only 8 were 10ha or more.[190]

6.1.3.3 Geestmerambacht: land consolidation in a horticultural micro-landscape

A contrary development occurred in the north of the province of Noord-Holland, where outdoor cultivation of vegetables was practiced in several polders. The local micro-climate on the clay-on-peat soils was favourable, thanks to the area's fragmentation into numerous islets: the abundant presence of water on all sides evened out temperature differences. Cabbage breeding was the main activity and several products auctions were 'floating'. A good example is the polder Geestmerambacht, another Noord-Holland '*vaarpolder*' where all transport was water-based. Polder Geestmerambacht where earlier attempts at re-allotment failed was called the 'Land of 1,000 Islands'. The area was ca. 5,500ha in size of which ca. 900ha was water. The degree of fragmentation was considerable, each holding comprising ca. six plots with an average size of 0.56ha. Following the earlier attempts to improve the situation a plan for land consolidation was finally approved in 1964. Over the next few years it was implemented and in 1974 it was completed. (fig. 103) Unlike *Westland* and the *Bollenstreek*, the polder Geestmerambacht was thoroughly overhauled in those ten years. It was dug over, levelled, drained, re-divided on a

188 The data derive from various, occasionally conflicting, sources such as (contemporary) manuals or newspapers; occasionally these represent averages over several years. The numbers presented here are therefore a mere indication.

189 Van Mil, 2017, 35 ff. A relatively recent publication is M. IJsselstein & Y. van Mil, *Atlas van het Westland: 10.000 jaar ruimtelijke ontwikkeling*. Bussum, 2016.

190 Van der Hoeven 2014, 41 ff. In 2006 there were still 1020 sized between 0.5ha and 1.5ha!

103 Transport of cabbages in 'punting polder' Geestmerambacht, Noord-Holland Province. (November, 1957)

larger scale, and redeveloped by means of a functional network of roads and waterways. It was a full-blown metamorphosis, including space set aside for recreational facilities and new income-generating activities. The number of market gardeners dropped from 1200 (1948) to 900 (1960) and finally to 300 (1974).[191] Although the final result leaves 'something to be desired' for the inhabitants, the benefits for the horticultural sector in polder Geesterambacht are undeniable and legal opportunities to realize recreational facilities have been fully utilized. However, the remaining landscape is virtually devoid of any cultural-landscape or contrast qualities: to be exact polder Geestmerambacht lost most of its cultural historically important microstructure – relic of medieval reclamation and typical later fragmentation.[192] (fig. 104) Spatial developments in the horticultural sector and arable farming often did not go hand-in-hand or even went separate ways, but sometimes upscaling finally led to comparable land forms. This conclusion may well be interpreted as mild criticism.

6.1.4 Competition on a global scale

Anticipating final conclusions it must be said Dutch agricultural change in the early post-war period was extremely successful. All the above mentioned shortcomings and structural problems were diagnosed and for most of them solutions were formulated and implemented. Yet there is one important remark te be made. While the progress of massive reclamation of waste lands and water surfaces, re-allotments or land consolidation slowly rose to its peak, the real agrarian wonder was in that 'striking

[191] Buiter & Korsten, 2006, 67 ff. Land consolidation was discussed as early as 1935 but the war put a stop to the plans; W. Middelbeek, 1967, 74 ff..; G. Andela, 2000. 165-173.

[192] Andela 2000, 165 ff.

104 Fragmentation of landownership and land use was endemic in some parts of Noord-Holland Province for ages. This early 19th century cadastral map of Zuid-Scharwoude shows a muddle of islands and watercourses.

agrarian exception: Dutch horticulture'. But in the end, there too processes of upscaling started – if later than might be expected through scattered land use in the horticultural domain.

6.1.4.1 Global export: a structural change

Therefore, a few remarks on the consequences of agricultural modernization and especially horticultural specialization. The success of the Dutch agricultural sector acquired almost mythical proportions. The Netherlands are the world's biggest exporter of agricultural products after the United States. In 2015, its total export amounted to more than 80 billion euros. Ca.14 billion of that was re-export, which means that over 65 billion had been produced on Dutch soil. Of this total sum, 7,25 billion represented flowers, flower-bulbs and other plants, 6,75 billion derived from meat and dairy, and 6,4 billion from vegetables and fruit.[193] Although the Netherlands had won the epithet 'Garden of Europe' already before the war, the success of its agricultural sector on a global scale first became manifest following the optimization of yields in a process of upscaling and intensification during the recovery period. In a sense, it could be argued that the need for rationalization of the Dutch agricultural sector was less pressing than had been expected in the 1950s. Not only did the nation catch up with its competitors but in several respects surpassed them. The Dutch countryside's initial structural shortcomings were amply compensated. The food shortages of the winter of 1944-1945, and doubts whether the nation would be able to feed itself, were turned upside down. The Netherlands produced such a substantial volume that despite its small size it became one of the world's leading exporters of agricultural products. (fig. 105, 106) But before being able to reach that point it had to implement not only spatial and efficiency-related but also social improvements. This structural problem is the subject of the next paragraph.

[193] See https://www.cbs.nl/nl-nl/nieuws/2016/23/nederland-tweede-landbouwexporteur-ter-wereld. In 2015, United States export represented a value of more than 180 billion dollars (agriculture-related trade included) while Dutch export amounted to over 112 billion dollars, with Germany being third at more than 100 billion dollars and France fifth with over 80 billion.

105 Arable farming was the first to profit from mechanization. The process already started early in the 20th century. During the reconstruction-period ever bigger sized machines were introduced, such as this Caterpillar harvester. (Noordoost Polder, date unknown)

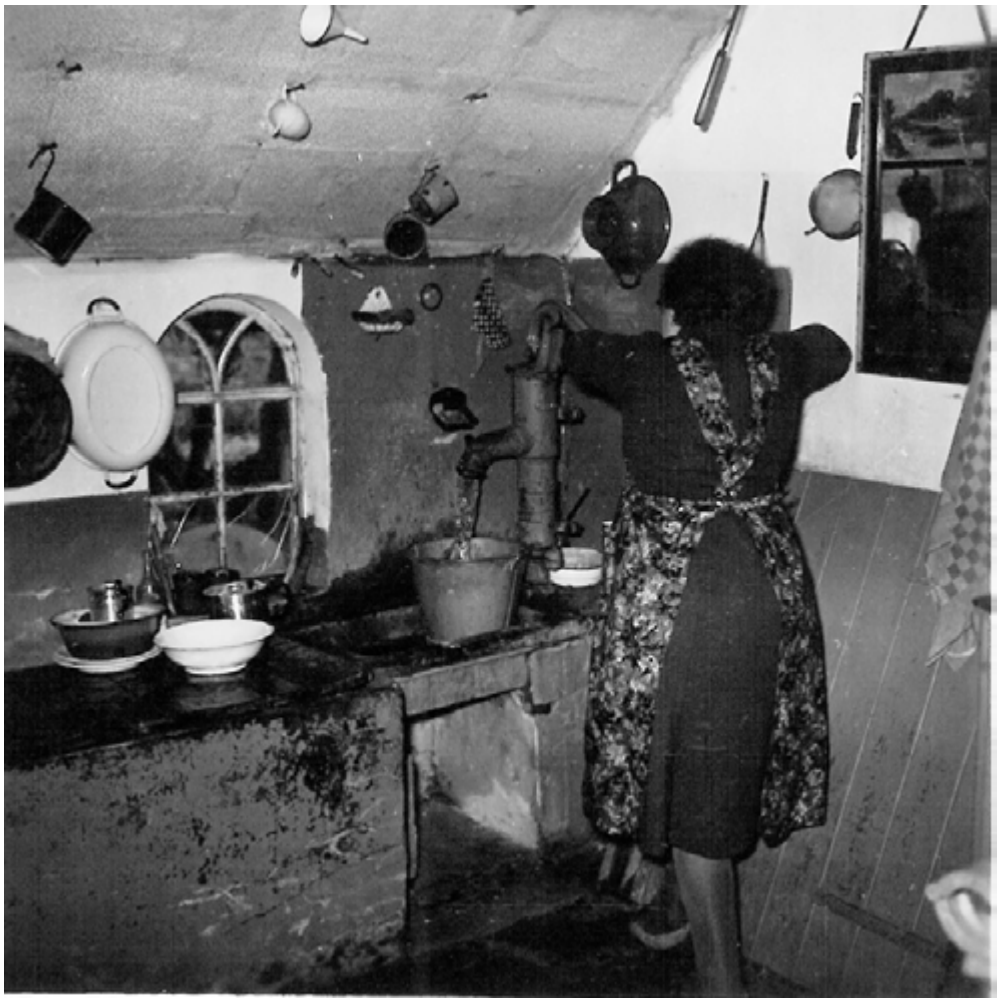
107 Although an extreme example this so-called plaggenhut (sod hut) was still inhabited in the 1950s, maybe as a consequence of war damage. (exact date and location unknown; Peel area, Limburg or Noord-Brabant Province)

106 During the reconstruction-period ever more diary-cattle holders could afford a milking- machine, the beginning of an upscaling process. Thanks to such machines the number of cattle could grow as did the total milk-produce. (Date and location unknown)

108 A contrasting photograph of a reconstruction period farm in the northern Peel area. (Oploo, Noord-Brabant Province, 1952)

6.2 Social deprivation as a structural argument for modernization

Social and educational deprivation have not always been accepted as main causes of the Netherlands' persistent agricultural problems. The vast majority of Dutch farmers were not in the forefront of modernization or education; as we saw earlier, most of them were smallholders. Although the Netherlands were an agricultural nation – like many others – productivity was low in several regions. Self-sufficiency, smallholding and crofting were common in sandy areas; production for the (European) market was only feasible for larger farms in areas with good access. The first half of the 20th century saw no great improvements and although the first re-allotments helped agricultural modernization on its way, after 1940 a huge task still lay ahead. Besides doubts – justified or not – as to whether the Netherlands would be able to cope as a member of the European Union, and in addition to the upscaling and rationalization which were a response to these doubts, there was yet another pressing issue. Social-economic deprivation was observed in several agricultural areas, ranging from a lack of (welfare) facilities to unacceptable housing conditions. Often these conditions existed already before the war but they had recently worsened as a result of factors such as damage (Second World War or 1953 Flood), evacuation, the relative inaccessibility of rural areas, deficient education, and so on. Some of these aspects will be discussed below. (fig. 107, 108)



109 A far outdated kitchen in a farm. Such kitchens were not uncommon in backwardish areas until far in the 60s. Rural modernization programs focused on such kinds of deprivation. (unknown date and location)

6.2.1 Deprivation in rural areas

Before the Second World War, the deprived situation of the rural poor compared to the wealthier rural classes and urbanites in general had shown few signs of improvement. In 1940, many rural houses and farms still had no access to amenities like tap water, electricity, gas or sanitary facilities, nor was road access everywhere at an acceptable level. Incidentally, the same conditions existed in the old city centres, but there, at least, regulation (e.g. the 1851 *Gemeentewet* – Municipalities Act – and the 1901 *Woningwet* – Housing Act) had elevated public housing to a much higher standard. Even so, highly unsatisfactory conditions still prevailed particularly in peripheral and thinly populated areas, and even in 'pivotal' provinces

110 A contrasting photograph of a reconstruction period kitchen. A Dutch firm – Bruynzeel - produced hundreds of thousands (standardized) kitchen elements etc. for use in modern farms and dwellings. (unknown date and location)

Noord-Holland, Zuid-Holland and Utrecht, several small towns and rural areas still lacked one or more public facilities or were barely accessible. Of course, islands were isolated by their very nature, but sandy areas and vast regions between the main rivers were also hard to reach and their residents consequently lived in relative isolation.[194] Housing in rural areas in such regions might be far below standard even in those days. Timber and straw slum dwellings, one room crofter houses and shared cattle and family lodgings were far from uncommon in sandy areas nor leaking brick micro houses in clay and peat zones. Well until after the war medical and all kinds of social and economic shortcomings paralleled with such problems. Once these deficits had been identified they had to be incorporated in a post-WWII catch-up effort. (fig. 109, 110)

6.2.2 The necessity of employment schemes and education

The pre-WWII unemployment schemes had tried to close this gap in its various manifestations. The schemes not only focused on infrastructural projects but might also encompass courses, trainings and smaller job creation projects at municipal levels, especially in non-urban areas in the north, east and south of the country.[195] For the gap took many forms. The physical aspect – spatial distance – was one; a disparity in expertise and knowledge was another. The level of schooling and general education in rural areas lagged far behind the overall urban situation and also varied hugely within rural populations.
Some glimpses of the situation can be gleaned from the results of a survey conducted ca. 1950 among rural labourers and their sons. Overall, ca. 20% of rural labourers had had some form of secondary education; in two-thirds of the cases (14%) this was agricultural training. In the northern peat areas (the' peat colonies', *Veenkolonieën*'), this was 14% and 9%, respectively. Among the younger generation (aged 20-34) these percentages were much higher; among the older generation (aged 50 or above) they were much lower. Although at first glance this might seem to suggest a trend towards higher education and training, the data on the next generation refute this conclusion. Of all children of rural labourers that were not employed in agriculture almost 60% had never received any form of education after primary school; in the peat areas, this was nearly 70%. The situation was even worse among those children who surely were agriculturally employed: of these individuals, over 80% had had no form of secondary education – with a staggering 93% in the peat areas. The 1950 survey suggests various explanations for the situation, including a lack of schools as well as funds. The first is suggestive of social deprivation, the second of economic poverty; both had to be dealt with.[196] (fig. 111)

111 Schooling and general education in rural areas were low. This ca. 1900 photo shows (young) boys working in a basketry.

6.2.3 Rural modernization: the need for technical and social reorientation

The projected rural modernization was hampered by the – according to some – rather backward character of the Dutch agricultural sector as reflected in its low levels of mechanization, its small farms, scattered land ownership and land use, its considerable diversity of crops, and its poorly educated rural population. Around 1900, the Netherlands began to import agricultural machinery, at first often still horse drawn. (fig. 112) From 1925 onwards, many hundreds each of most engine-driven

194 See e.g. Blijdenstein & Kooiman 1996, 104; Scheffer & Niemeijer 1996, 24-26.
195 Van Balen 1936, 171 ff.
196 Maris, Visser & Rijneveld 1954, 62 ff., Appendix 38, 39.

112 Horse-drawn modern mechanized harvester in the early thirties in the Purmer Polder, North-Holland Province.

types entered the country. The tractor is a good example: between 1925 and 1929, 336 were imported; between 1930 and 1934 (i.e. during the economic crisis) this dropped to 213, but once the worst of the crisis had passed it rose again to 466 annually. In 1940, the total number of tractors in the Netherlands was ca. 4,450. After the Second World War, only a few hundred were left.[197] Replenishing the national stock of agricultural machinery was therefore one of the gaps that had to be quickly filled. (fig. 113)

113 After the war owners of big historical farms that had survived were among the first to provide themselves with new or replacing machinery, like tractors and trailers. This photo was taken in the village of Leens, Groningen Province)

Another problem specific to the Netherlands – compared to its neighbours – was low industrialization in combination with a comparatively high proportion of the population being employed in agriculture, in the near absence of mechanization. The immediate consequence was low labour productivity, one of the arguments which effectively convinced those who still had doubts to finally approve land consolidation plans.[198]

Although Minister of Agriculture Mansholt first continued the pre-war policy to stimulate smallholdings, during the first post-war years it soon became obvious that far too many people depended on farming, especially 'on the sands'. Research by the *Landbouw-Economisch Instituut* (LEI) strengthened the conviction that over 65% of farms in those areas should be phased out (affecting 80,000 farmers, often working alone), together with 20% of the other agricultural jobs.[199] Although there is no doubt that phasing out was an indispensable element of modernization it was probably the most difficult one to achieve.

197 Van de Poel 1983, 243 ff.
198 Compare Siepman 1960, 75; Janssen 2006, 149-152.
199 Andela 2000, 37-40; compare Moerman & Wentholt, 1959, 266; Janssen 2006, 107-155.

114 Deep ploughing in Noordoost Polder with two 'Caterpillar machines' in line drawing the ploughshares. (Exact place and date unknown).

6.3 Economic and spatial reorientation: the only way out?

The preceding chapters lead to the conclusion that various issues relating to land tenure, drainage and accessibility, together with damage sustained during WWII and the 1953 North Sea flood as well as a range of social problems – but equally, fresh intentions – were the main factors behind the post-WWII interventions in the agricultural and economic structure of the Netherlands. Reshaping the economic future of thousands of farmers and their offspring may well have been the most difficult task.

The obvious conclusion was that other forms of employment had to be found for these people; this in turn sparked off a vast reorientation of the Dutch economy, chiming in with the adage '*Nederland industrialiseert*' ('The Netherlands are industrializing'). A number of peripheral areas were designated '*stimuleringsgebieden*', the equivalent of the US 'empowerment zones'. For example, the largely agrarian populations of the three northern provinces as well as Zeeland, eastern Noord-Brabant, northern Limburg and northern Noord-Holland were to be made 'ripe for industry' through education and training.[200] Ultimately these broad targets would far exceed the boundaries of agricultural rationalization and land consolidation. In fact, post-war rural reorganization was to proceed hand in hand with other structural improvements, beyond farm rebuilding and road or watercourse improvements. Repartitioning, better drainage and accessibility, modern farm houses and farming practices, the opening up op regions – these were all means to remedy broader rural issues; so was 'elevating' the rural population through schooling. We will return to these issues later.[201] (fig. 114)

The new agricultural 'production companies' on the young marine clays of the former Zuiderzee – Noordoost Polder (1942) and Wieringermeer Polder (1930) – set the standard for the post-war strategy. As already said above upscaling, mechanization and above all land consolidation were the proposed means by which to revive the agricultural sector after the war. (fig. 115)

200 See e.g. Schuyt & Taverne 2000, 79-105, 150 ff.

201 See e.g. Otto [1963]; Berendsen 1997, 220-221.

115 After the war ever more heavy-duty machines came in service in modernized areas. (Unknown date and location)

An additional modernization campaign targeted social deprivation; the price was payed, to an extent, by individual farmers who by means of subsidies were coaxed into giving up their, usually marginal, farm and to look for other sources of income. Ultimately, the introduction of 'modern' lifestyles became a powerful weapon in the fight against deprivation.

6.3.1 Reorientation: towards massive implementation

While upscaling and rationalization of farming practices – including land consolidation – were being implemented as solutions to the structural problem of farms that were too small to be viable, the horticultural sector in many cases remained small-scale. A simultaneous process was set in motion towards improvement of the working and living conditions of tens of thousands of rural residents by means of education, employment projects and various forms of modernization.

The previous second part of this book (Chapters 2-6) zoomed in on rural problems and, by extension, on the causes of the interventions. We have distinguished incidental and structural problems which together provided ample inducement for drastic government interventions in rural areas during the recovery period. How the various goals were achieved, and by which means, in the different landscape types which characterized the recovery era is the subject of the third part: implementation.

[202] Earlier (from ca. 1930) but smaller scale re-reclamation, colonization and relocation happened near Giethoorn (Province of Overijssel).

Maas en Waal-West, 1949-1962

Land consolidation (reclamation) and rural improvement, West Maas en Waal Municipality.

Identification

- Maas en Waal-West is an agricultural area with alluvial clay soils and levees in the central valley of the rivers Meuse and Waal in the province of Gelderland. In the final months of the Second World War the area was in the frontlines and was affected by inundations.
- The land consolidation and rural improvement plans Maas en Waal-West (8,500ha) were drafted by J.E. Stuvers of the *Cultuurtechnische Dienst* (CTD) and put to the vote in 1949. The implementation started in 1950 and was completed in 1962. Involved in the implementation, besides *Nederlandsche Heidemaatschappij* and *Staatsbosbeheer* (architect of the landscape plan was N.M. de Jonge) were *Ontginningsmaatschappij Gelderland* and *Stichting Ontwikkeling Komgronden* (StOK).

Problems

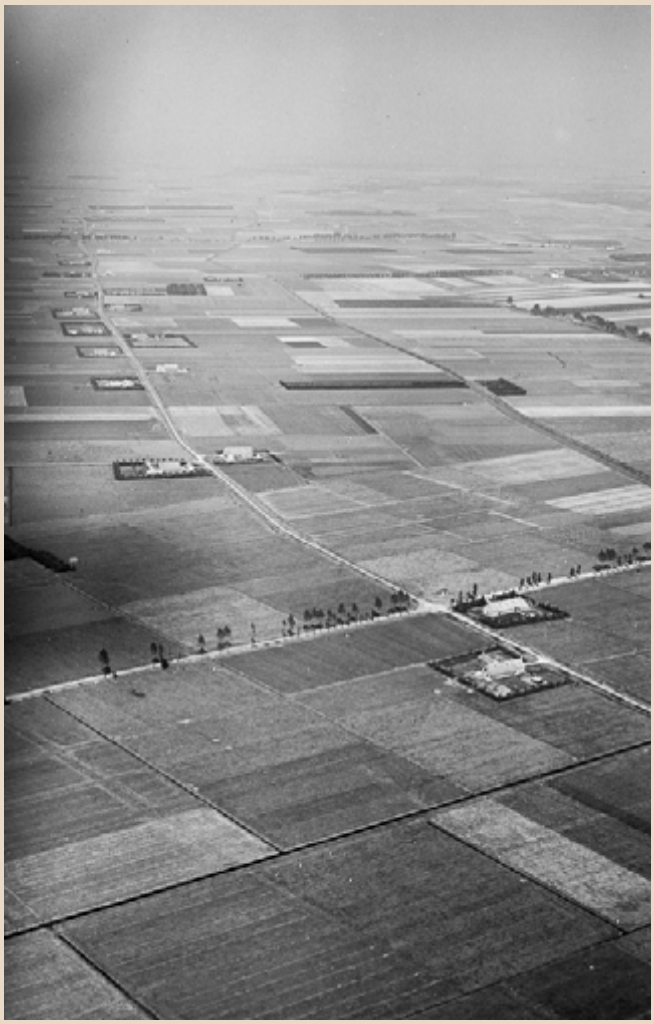
Like many areas near and particularly in-between the major Dutch rivers Rhine – in cluding its main branche Waal – and Meuse (*Du*: Maas) the region of Land van Maas en Waal was frequently affected by extremely high water tables, regular flooding and highly variable soil quality. The latter issue related to the area's geological composition: alluvial deposits with varied textures had created horizontally alternating strips of fine clayey material and coarser, slightly higher, mixed soils. As a result of soil consolidation the finer clays steadily subsided and were difficult to drain (the Dutch word for these alluvial clays is a reference to this problem: '*komklei*', means 'bowl clay'). They were used as hay meadows, osier beds and to harvest waterfowl by means of duck decoys.
The alluvial clay soils which constituted the central section of Land van Maas en Waal were characterized by a mostly open and sparsely settled landscape. Its population lived almost exclusively in ribbon villages along the river dykes and on the levees.
The area was poorly accessible. Not only the rivers but also the scarcity of (metalled) roads between the dykes contributed to its isolation. Land ownership was fragmented and land use was further dominated by short-term leases and – consequently – frequent changes in tenancy. As a result, tenants barely invested in the soil or the land in general, including its drainage, and both soil quality and the structure of the area progressively deteriorated. During the Second World War the area moreover suffered from artillery fire and severe and long lasting inundations. The combination of all these factors had given rise to material and social deprivation.

Realization

During the Second World War it became evident that the fluvial region required some radical interventions. In order to end the alluvial clay areas' isolation and deprivation, a land consolidation plan for Maas en Waal-West was put to the vote as early as 1949. This land consolidation was to become particularly significant in its future role as both a test case and an example for 'land consolidations in the new style' and, by extension, for the 1954 Land Consolidation Act. Interestingly, the area's qualities and character are in essence the product of the previous Acts of 1938 and 1941.
The *Cultuurtechnische Dienst (CTD)* wished to go beyond what until then had been the customary improvements to field patterns, accessibility and water management. It came up with a plan for the 'colonization' of the virtually unsettled alluvial clays. This would necessitate some radical interventions in order to convert the existing soils into valuable agricultural land, which in turn would involve profound structural changes in the area. The plan comprised dozens of new farmsteads as well as farm relocations and many kilometres of new roads and water courses. Around 1950 the field pattern was modified through mergers and in part also by a complete realignment of the field system. Access to the new plots was in most cases accomplished by means of newly constructed, metalled roads. Scattered arable fields and orchards in the area, which until then had been only extensively exploited, testify to the improved drainage situation of Maas en Waal-West.
The colonization envisioned by *CTD* ultimately resulted in almost a hundred farm relocations. One of the goals was to transfer the often small and social-economically 'backwards' farms along the river dykes to the (by now greatly improved, drained and levelled) alluvial clays while at the same time increasing their size. In addition, some other farms needed to be phased out in order to make room for new holdings of at least 10 to 12ha. The new, roughly east-west aligned road Papesteeg and surroundings became the longest and best known roadside farming village in the Netherlands, with dozens of modern farms lining its two sides (on the 1970 map the horizontal road axis in the central area between the two red diverging lines). Because Maas en Waal-West was designated not only as a land consolidation but also as a reclamation project the government made funds available for farm construction and farmyard vegetation, thus conforming to the landscape plan as defined by the 1954 Act.
All these factors introduced important changes in the landscape. Some of its open character remained, but in addition to a few scattered patches of woodland, transparent, double or single rows of trees now lined most roads, especially in the area's central and southern sections, compartmentalizing the mostly flat terrain.
An important aspect of the land consolidation Maas en Waal-West is that it incorporated a number of elements that were valuable from a nature or cultural-historical perspective, including duck decoys. Some of them are still functional or else left visible traces in the landscape in the form of their characteristic vegetation and ponds terminating in each corner in a narrowing funnel (a few are marked on the 1930 and 1970 maps). A number of geomorphological features (levees, low river dunes) were also preserved during the redevelopment, although here and there levelling or even complete inversion of the relief occurred, as in some locations where sand was extracted for road construction or as building material, leaving behind small lakes (i.e. lower points).

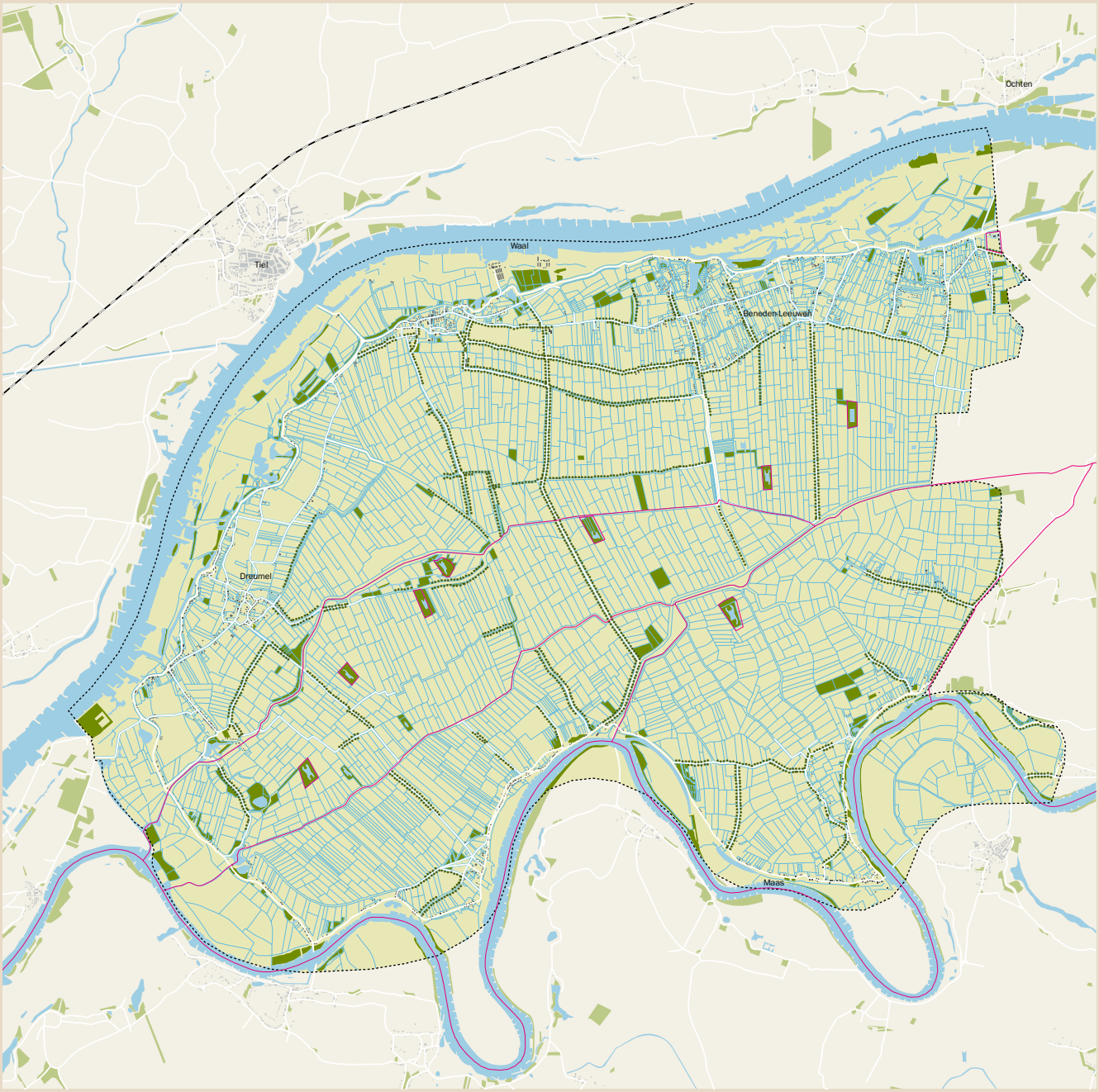
Elsewhere, sand or gravel was mined on an even larger scale, mostly along the northern banks of the rivers Waal and Meuse. In most cases it was decided to convert these locations into recreation areas, as happened with nature preserve and recreation park Gouden Ham. This might be accompanied by a diversion of sections of the streambed, which facilitated both (national) water management and water-based traffic (see 1970 map, south-eastern section).
The intended upgrading of Maas en Waal-West meant that rural improvement programmes were called for. Until then, farming practices had tended to be traditional, small-scale and with a narrow economic basis. Courses were offered on for example modern housekeeping – aimed at women – and on professional farming skills based on mechanical appliances. Of course, utilities were also updated, both in the newly built houses and in the old linear villages along the river dykes: natural gas, tap water and electricity arrived. Any dwellings unfit for human habitation, however, were demolished. One of the newly established holdings in the area's centre was equipped as a model farm. Both Maas en Waal-West in general and the model farm in particular drew thousands of interested rural and urban visitors. Together, the land consolidation and the farm had a strong positive impact on the distribution of modern agricultural and social ideas.
(fig. 116, 117, 118, 119)

Key qualities
The land consolidation Maas en Waal-West was an important test case for the 1954 Land Consolidation Act. Particularly significant in this regard are its mostly well-preserved roadside farming villages – the product of colonization – since they belong to the first 'farm relocations' on a large scale.[1] Most of these farms feature a yard vegetation of high timber which significantly adds to the quality of the landscape. Its semi-open structure and the virtual absence of long straight road sections or geometric field patterns also greatly add to its significance. The drainage improvements implemented in the 1950s and the associated water-management related elements are among the area's main assets, where agriculture is the dominant activity today. (fig. 120) Duck decoys were an important feature in this area and some of them remained as (working) relics. AHN pictures (DEM, *digital elevation model*) show there were more and another revealing aspect of DEM are the clearly visible traces of former parcellation. This example of human 'palimpsest use' of terrain during the Dutch post-war reconstruction period might be labelled typical for rewriting the earth surface without totally erasing the past. (fig. 121)
A new land consolidation is currently in progress in Maas en Waal-West, as in many other locations in the central Dutch river valley. Unlike the 1950s, however, this project will have little effect on the landscape structure although some upscaling will occur, for 10 to 12ha-farms are no longer viable today. The new land consolidation will be mainly administrative. A (temporary) rural effect will mainly be on the roadside vegetation: the Papesteeg and surroundings could be widened slightly by removing timber along one side of the road.



116 Parcellation in Maas en Waal-West after the realisation of the land consolidation. The Papesteeg runs from bottom right to top left. Note the right angled windbreaks or girdles around the farmsteads. (Unknown date)

117 Central committee for allotment exchange (Du: Centrale Commissie voor Ruilverkaveling) visiting land consolidation Maas en Waal-West in progress. (Date unknown)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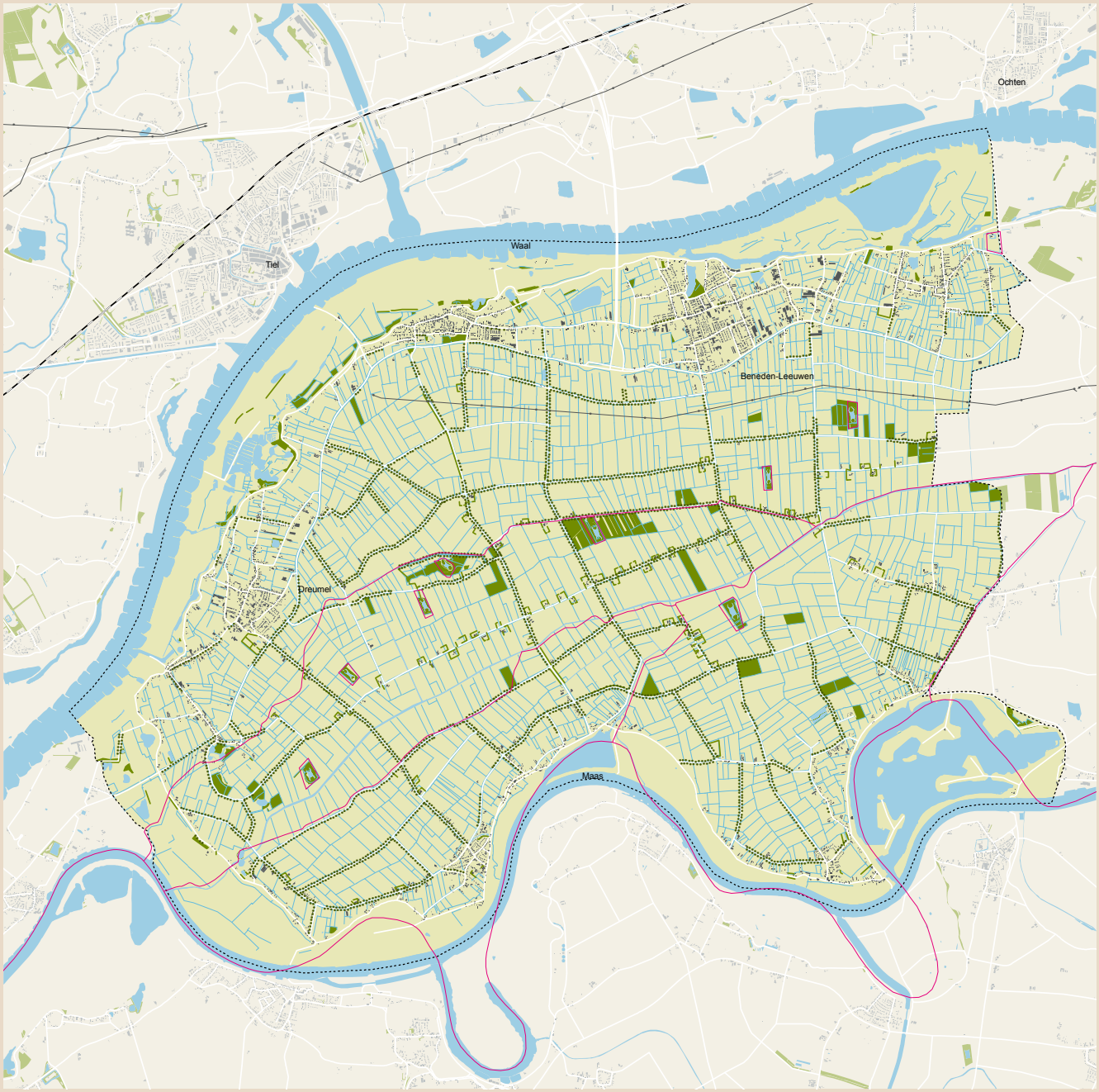
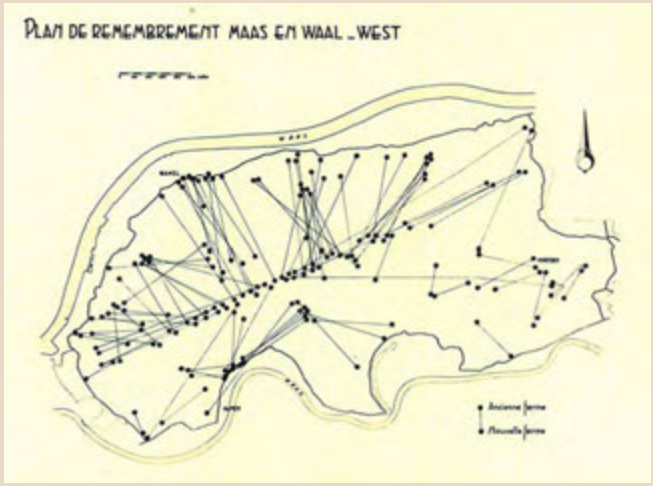


Maas en Waal-West
Left: Simplified map image ca. 1930. Scale: ca. 1:75.000
Right: Simplified map image ca. 1970. Scale: ca. 1:75.000
Not only there was scaling up of lot sizes and change of parcellation, but clearly recognizable is the 'fishbone structure' in new agrarian settlements in the central colonized zone. Also note several maintained duck decoys.

118 Cutting up deep indurated soil layers in land consolidation Maas en Waal-West. (August, 1953)

120 Aerial impression of land consolidation Maas en Waal-West. Central feature is a duck decoy. The north is top right. (Photo May, 2013)



119 Re-located farms from the periphery of Maas en Waal-West to the newly consolidated and agriculturally improved central zone - a proces known as 'colonizing'.

121 Duck decoys were an important feature in the Maas en Waal-West area and some of them remained as relics. Palimpsest use of DEM / AHN pictures show there were several more however. DEM also reveals traces of former parcellation that are invisible at surface level.

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Note

1 Earlier (from ca. 1930) but smaller scale re-reclamation, colonization and relocation happened near Giethoorn (Province of Overijssel).

Section 3

Implementation

7 State-controlled reconstruction

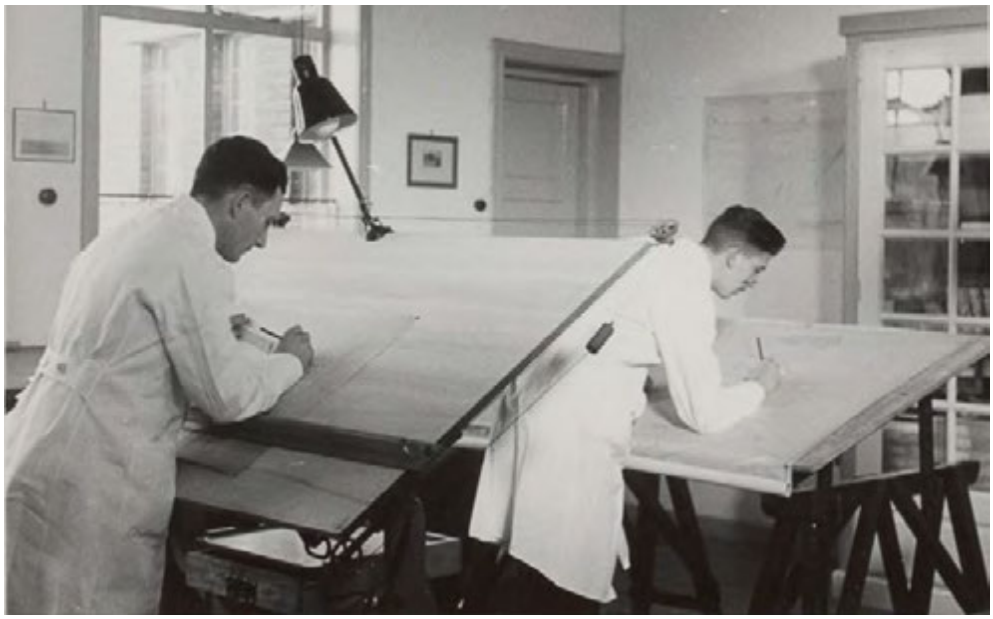
In the previous chapters we saw which reasons coincided and reinforced each other to finally make agrarian and rural modernization inevitable. The Second World War and the 1953 North Sea flood were mere incidental reasons in a row of structural shortcomings. The recovery and redevelopment of the Netherlands during the so-called 'reconstruction period' (1940-1965) involved numerous parties, many of which dominated the scene in the post-WWII nation. Others were only briefly active or played a marginal role. This chapter explains the recovery and redevelopment of rural areas during and shortly after the Second World War and the organizations which controlled the process.

7.1 Reconstruction: the Second World War

The first few years of the recovery period coincided with the German occupation. They were characterized by attempts to continue developments already set in motion before the war, including the execution of (re-)reclamation and land consolidation projects in various locations, and the construction of new farms. A case in point was the continuation of enterprises near Staphorst in the north of Overijssel Province. The south-eastern shores of Lake IJssel (the former Zuiderzee) form another illustration; after the completion of the Afsluitdijk their residents no longer had to live in constant fear of flooding. Along these shores in the spring of 1941, on a long and narrow strip of land, the first steps were taken towards reclamation and land consolidation and the establishment of new farms.[203] Circumstances, however, had clearly changed, of which the glaring absence of many – formerly self-evident – democratic principles is probably the most obvious. Shortly after the start of the German occupation, parliament had been dissolved and legal and consultative frameworks in many other fields had also been radically altered. The influence of the central government on Dutch spatial development was never more profound than in the period 1940-1945. (fig. 122)

7.1.1 A centralized approach

Within days after the German invasion the Dutch ruling monarch at the time, Queen Wilhelmina, and her ministers went into exile in London, having delegated all governing power to General



122 From May, 1940 a centralized approach in reconstruction led to endeavours to concentrate land consolidation, reclamation and reconstruction within Dutch implementation. This picture shows designers for Noordoost Polder. (unknown date and location; probably 'Laboratorium Noordoost Polder', ca. 1943)

[203] See e.g. *Provinciale Overijsselsche en Zwolsche courant: staats-, handels-, nieuws- en advertentieblad*, October 22, 1940, 2; *Leeuwarder nieuwsblad: goedkoop advertentieblad*, May 7, 1941, ed. II, 3.

123 Minister J.A. Ringers.

124 Bust representing General H.G. Winkelman.

H.G. Winkelman, then still commander-in-chief of the Dutch military forces.[204] On May 21, 1940 Winkelman issued the *Eerste Wederopbouwbesluit* (First Reconstruction Decree), followed on May 24 by a *Tweede Wederopbouwbesluit (*Second Reconstruction Decree). At the same time, he appointed civil engineer J.A. Ringers as *Regeringscommissaris voor de Wederopbouw*, or Government Commissioner for Reconstruction'.[205] (fig. 123, 124) All this took place after the Dutch capitulation on May 14, 1940 but before the German occupying forces officially assumed power on May 25. Although the Netherlands were placed under military rule the German government did not regard it as a hostile nation. Keen to restore normal life as soon as possible after the take-over, the German authorities endorsed the Reconstruction Decrees and allowed Ringers, who was greatly respected, to stay at his post. For the reconstruction efforts, the Reconstruction Decrees were very useful also in a practical sense.[206] The Second Reconstruction Decree granted Ringers, as government commissioner, the authority to decide on all reconstruction proposals and if necessary to expropriate movable and immovable property for the purpose of repairing war damage. Ringers' authority extended to the reconstruction of (rural) areas damaged immediately prior to, during and following the German invasion. His mandate further included 'reparations to traffic infrastructure, the drainage of inundated areas, the reconstruction of towns, villages and buildings, and everything pertaining to it'.[207] This in effect constituted a radical centralization of the decision making process and a simplification of procedures, something which was deemed to be quicker and more efficient. Although Ringers delegated certain aspects of his mandate to (provincial) commissioners and building firms, final responsibility remained centralized.[208] Nonetheless, lower administrative levels were certainly involved in the implementation. Regional architectural committees were established to supervise the appointment of the architects who were to draft the reconstruction plans and urban designs, whereby those working in typical regional styles were preferred.[209] Ringers' mandate did not extend to the construction of German and/or military structures.[210] Nonetheless, some of the military

204 http://www.parlement.com/9291000/biof/09213: Winkelman's authority lasted only a few weeks. From July 2, 1940 until the end of the war he was interned in Germany as a prisoner of war.

205 Bosch & Van der Ham 1998, 155: Ringers had been government advisor on military hydraulic engineering since September, 1939. As such he had worked hard to prepare the nation's water-based defences; Siraa 1989, 9 ff. Other government commissioners besides Ringers were appointed in other fields.

206 In late 1940, Ringers was given the additional position of *algemeen gemachtigde voor de Wederopbouw en de Bouwnijverheid* ('general deputy for the Reconstruction and the Building Sector').

207 E.g. *Nederlandsche Staatscourant*, May 22, 1940, 1; *Provinciale Geldersche en Nijmeegsche courant*, May 21, 1940, 1; *Dagblad De Grondwet: Rosendaalsche en Nieuwe Zevenbergsche courant, voor godsdienst, koning en vaderland*, May 24, 1940, 1-2.

208 Bosma & Wagenaar 1995, 91 ff., particularly 94: 'The general idea was an authoritarian and business-like structure with short lines to the floor and simple procedures without the possibility of appeal, so that bureaucracy would be cut short and nothing would be wasted, least of all time. However, the financial, material and urbanist aspects of the reconstruction turned out to be so complex that Ringers' office expanded into a notorious bureaucracy with ultimately ca. one thousand employees.' See also Pollmann 2006, 200; Siraa 1989, 9 ff., 30-31. The approach was strategically convenient from a Dutch perspective but it also pleased the occupying powers.

209 Bosma & Wagenaar 1995, 97-99.

210 Siraa 1989, 11-14.

projects from the period 1940-1945 can be regarded as special reconstruction-related cases. Among much else, the German Nazi ideology entailed the establishment throughout Europe of a so-called 'New Order', which demanded a new (military and economic) infrastructure.[211]

7.1.2 Centralized rebuilding of farms and continuation of land consolidation

The actual organization of the Dutch reconstruction efforts rapidly took shape, and numerous repairs were started in towns and villages. We will focus on those aspects of the reconstruction which were relevant to rural areas. For instance, responsibility for farm rebuilding was placed with the *Bureau Wederopbouw Boerderijen* (BWB; 'bureau farm rebuilding'), in Amersfoort (Utrecht Province). Besides its main office the BWB also had several regional branches in towns and areas which had sustained damage early on during the war. The blueprint for the BWB's internal organization was the *Bouwkundige Afdeling* (civil engineering department) of the Wieringermeer *Directie,* resorting directly under *Rijkswaterstaat* as did BWB itself.[212]

Unlike the planned rebuilding of damaged and destroyed farms or the establishment of entirely new farm holdings, centralization was hardly an issue in land consolidation. Land consolidation had been marked by continuity since the introduction of the 1938 Act, which made it easier for owners to decide on a consolidation. The main changes under German rule involved a 1941 revision of the Act which among other things was intended to speed up the various projects.

7.1.2.1 Farms during the early reconstruction period

The reconstruction started quite vigorously. From the summer of 1940, a number of newly created institutions successfully tackled damage to farms, in part thanks to funds that were earmarked for the task.
While in the (larger) towns clearing away the devastations of war took many months, repairs and reconstruction quickly began in rural areas. Wherever government commissioner Ringers had given the all clear, building and repairs commenced as early as 1940 albeit with considerable differences in quality due to the war situation.
Both after May, 1940 and shortly after the Dutch liberation in May, 1945 up to 1947, wall thickness in most of the newly built farms was only half a brick or a single brick; cavity walls were seldom used. Many of the buildings then produced were little more than emergency housing. Especially the smaller emergency farm houses in some of the poorer regions were often single-brick, built out of recycled stones and topped by a low gable or mono-pitched roof. Such simple farm houses continued to be built for several years after the war, after which they were either demolished or converted into chicken coops or barns. Dwelling reconstruction was probably 'not always' in exact accordance with the 1901 *Woningwet* (Housing Act) or its later adaptations. Alongside these emergency houses brick-built temporary barns and stables appeared, often propped up by buttresses. Examples of such emergency buildings still survive in several parts of the country, such as the Grebbelinie area, Peel-Raamstelling area and the province of Zeeland. (see Box Text De Groep and Surroundings).[213] (fig. 125) More elaborate and monumental agricultural buildings arose as well, occasionally also near the Grebbelinie. Adequate or even high-quality buildings often appeared in areas where farmers had more money to spend. At the start of the reconstruction period the quality of any reconstruction or rebuilding was expected in principle to match that which it replaced. Any additional costs of improvements above and beyond that had to be paid for by the owners themselves.[214] Nonetheless, innovations in

125 Simple emergency farm, probably reconstructed on an existing foundation. Hummelo, Gelderland Province, 1945.

[211] See e.g. https://en.wikipedia.org/wiki/New_Order_(Nazism)
[212] *Rijkswaterstaat* is one of the main Dutch government institutions, responsible for the central management and supervision of everything pertaining to water, safety and traffic in the (low-lying) Netherlands. See e.g. https://en.wikipedia.org/wiki/Rijkswaterstaat
[213] Elpers 2019, 221 ff. Pre-existing poultry-houses etc. are reported to have been used as temporary dwellings.
[214] Lamberts 2007a; 2007.

126 A reconstruction-era farm near Wageningen, Gelderland, Province. The main functions are under one saddle-roof; other functions are separately roofed. The farm house is relatively richly decorated in a pseudo Dutch renaissance style. (Photo 2017)

127 Today many owners are proud of their heraldic lion and underline its existence by having it painted. Also note the other memory stone behind the fence.

construction were used on occasion, like prefabricated wooden rafters (e.g. Nemaho) or structural ceilings in reinforced concrete. (fig. 126)

Examples of reconstruction-period farms from the 1940s can still be found in several places, usually precisely dated by a ceramic gable stone uniformly and specifically designed for such farms. From 1940 until 1942 the gable stone shows a heraldic lion emerging from the flames. (fig. 127) Occasionally, plaques embedded in the brickwork briefly record the destruction of the house's predecessor, the laying of the first stone for its successor, the institution responsible for the rebuilding, or other information.[215]

Clearly, no standard reconstruction-era farm house type exists, but farms from that period do have a few things in common: they strongly cluster within relatively small areas (of course mainly the May 1940 battle zones, see fig. 30), they tend to be plain and simple, their architecture and choice of materials are traditional and usually typical for the region in question, and they often feature the above mentioned gable stone. Quite a few of them did not conform to what in the first decades of the 20th century had become the architectural and typological norm, both farm-technically and in size. An individual lack of funds was not the only cause. True enough, money was in short supply in a national economy which had just gone through the economic crisis of the 1930s followed by war preparations. After May, 1940, however, the 'German' money presses kept the economic engine going (until the effects of the war effort and inflation started to kick in). Manpower was available in abundance, for the great army of the unemployed still existed. Once the economic crisis ended (ca. 1938) there was initially no shortage of building materials either. That slowly changed, however, especially after 1942 when the chances of a German victory rapidly turned. It was one of the reasons for a German-instigated general moratorium on civil construction activities. Henceforth all efforts and materials were reserved almost exclusively for German military projects. Farm-related construction and repairs were also sobered down and eventually ceased altogether. The single exception was the construction of a number of storage barns in the Noordoost Polder for the benefit of the expected expansion of agricultural land. The oldest of these barns, named 'De Eerste' ('The First'), was completed on December 1, 1942. Upgraded to a farmhouse after the war, the barn is situated near the village of Marknesse in the east of the polder. Three other Noordoost Polder farms, built in 1943, are now listed as national monuments.[216] (fig. 128)

128 Some of the oldest barns in the Noordoost Polder are listed as national monuments. They date from 1943, they look more traditional and differ therefore substantially from the later prefab barns.

[215] Besides in Type area De Groep and Surroundings many examples can be found in the townlands around Amersfoort near Hoogland. Comparable examples built shortly after the war can be found east of the river IJssel in the province of Gelderland. It seems all 'heraldic lion gable stones' dating from the 1940-1943 period are dated '1940'.

[216] http://www.flevolanderfgoed.nl/home/erfgoed/noordoostpolder-2/boerderijen/cultuurboerderij.html

7.1.2.2 Farms during the second reconstruction period

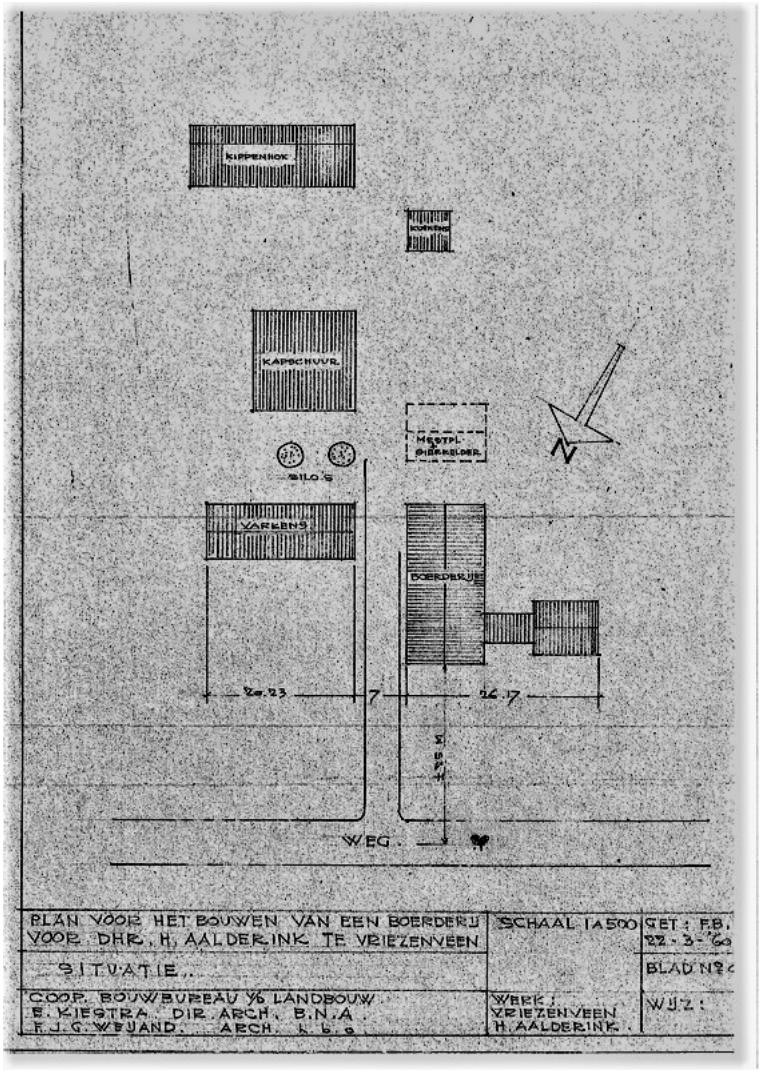
During the final six months of the war, both repairs and new construction projects were slowly resumed in the already liberated south of the Netherlands. Central planning continued, under the aegis of the Dutch government in exile in London where legal expert H.A. Helb in 1944 had been appointed deputy government commissioner for reconstruction affairs in the liberated areas. Immediately after the war the earlier mentioned *Bureau Wederopbouw Boerderijen* (BWB) resumed its activities. Many farms from this period can still be recognized by their 1947 or 1948 gable stones showing the heraldic lion emerging from the flames, just like those signed 1940.[217] However, at this time and for a few years to come the quality of the new buildings did not yet return to its pre-war standards. Especially in the most severely struck areas of Limburg, Noord-Brabant and Gelderland quality of (provisionally) reconstructed farm buildings was often below standard. This was not only due to shortages of money, building materials and labourers but had to do with the amount of destroyed and damaged buildings. About 2/3 of all destructed farms in the Netherlands were concentrated in these three provinces. Moreover the greater part of these provinces were covered with sands and could be characterized as relatively poor, with an relatively (and in fact an absolute) high amount of smallholders with scattered land. The same can be said of the in between zone of the central rivers plains, where the battle-front got stuck for over half a year. This was a fluvial clay area notorious for inaccessibility, drainage problems and scattered tenants grounds. In other words the inhabitants of both areas were not only 'war victims' but they were also 'perfect targets' for modernization of agricultural production, rural life and land consolidation etc. It cannot be easily proven, but one might suppose it was not a coincidence that farm reconstruction in Limburg and Noord-Brabant was at least 'more than average provisional in quality' and that land consolidation in the major river plains only started from the mid-50s. Elpers shows there were many complaints by farmers in these areas that their provisional dwellings and barns were unacceptable. From *BWB*, *Nederlandsche Heidemaatschappij* and many municipalities it can be understood they used this low quality of rebuilt accomodations as an incentive for later further and more radical improvement of standards of living and production, including

129 A sober emergency farm in Groesbeek, Gelderland Province. (Photo 1946)

[217] Lamberts 2007a, 32 ff.; Elpers 2019, 142-149.

removing, colonization and land consolidation.[218] (fig. 129)

Of course by far not all reconstructed farms were inferior from even 1945-1950 standard. On the contrary. From early 1947 no further emergency farms were erected and a 'normal' construction process was resumed. Several thousands of the new farms were (rather) modern or based on modernized traditional concepts. Differing or opposing premises of *BWB*, *Nederlandsche Heidemaatschappij*, *Standsorganisaties* (agrarian interest groups and their associated magazines), and local, regional or national cultural heritage protectionists (e.g. *Bond Heemschut*) as well as individuals and even building companies tried to promote their future plans. A great variety of new-built farms was the result, with centres of gravity on traditional characters in sandy areas with relatively small sized land use and with more modern farms in newly (re)developed and re-allotted or land consolidated areas. A main difference between modern and traditionnally inspired farms is their lay out. In traditional forms usually most functions are concentrated under a single large roof or a chain of roofs. In modern farms differing activities and storage functions may be housed in separate buildings grouped in a convenient plan.[219] Examples of the first centre of gravity – traditionally inspired new farms – were the Achterhoek in eastern



130 Design for a new farm with semi-detached dwelling (bottom right) and several separate housings, for e.g. pigs (central left) and poultry (top left). This farm was designed for land consolidation area Vriezenveen, March 22, 1960.

[218] Elpers 2019, 227-231.

[219] Elpers 2019, *passim*. Many farms of the modern type are so-called *gelede boerderijen* (articulated farms).

131 Newly realized farm in a colonization zone within the land consolidation Vriezenveen. Semi-detached dwelling along one of the new roads in the shortly before reclamated north of the area. (Photo September, 1961)

132 Concrete prefab barn as built from the late 1940's in several sizes in Noordoost Polder. (Photo March, 2011)

Gelderland and the Over-Betuwe in the eastern part of the major rivers plains. Examples of reconstructed areas where modern farms dominate the landscape are the Lingewaard in the central part of the major rivers plains (newly colonized from the mid-50s), Vriezenveen (see the relevant Box Text) and parts of Zeeuws-Vlaanderen, hit in and/or reclaimed (e.g. Braakman) after WWII. (fig. 130, 131)
Provisionally reconstructed farms have become relatively scarce as a result of their temporaral status of course. Some of the barns and stables survived however.
The Noordoost Polder and Wieringermeer were exceptions in that after the war new building projects quickly took off and good old-fashioned quality was the norm from the start. The Dutch State was commissioning body and owner of these buildings, mostly large and often innovative agricultural holdings where cutting corners was not an option. They were characterized by experimentation with functional variations on standard dimensions and prefab components. (fig. 132)
Of course all farm reconstructions and repairs were realized in the service of regeneration and modernization of the Dutch agricultural production and rural developments. This is what we will focus on hereafter.

7.1.2.3 Land consolidation during WWII

During the first few years of the war the number of applications for land consolidations scarcely decreased. In 1941, no fewer than forty-seven applications were filed and sixteen were approved for implementation. The years 1942 and 1943 saw seventeen applications each and respectively five and six plans that were approved. In 1944, the number of applications dropped to ten with only one project being approved. In 1945, no applications were filed.[220]
The wartime land consolidations conformed to the 1938 Act and its 1941 revision. The latter further simplified and speeded up the procedures, in particular by allowing implementation of a land consolidation plan to proceed even before it had been approved by all stakeholders. Another new element was the option for compensation (i.e. for land that was yielded) in money rather than through a land exchange.[221] The revision proceeded from the German authorities' need to look after their own interests; to them, it was also a 'legal' method to quickly acquire more land for military use.[222]
In june 1940 the land consolidation Molengoot in Hardenberg (Overijssel Province) was voted and approved and successively implemented during the German occupation. The Dutch *Kadaster* and the *Cultuurtechnische Dienst* (CTD; see below) prepared the program, that arose from a regional drainage improvement plan. When it came to actual execution of the field works the Germans obliged young local men to participate.[223] Another land consolidation project approved under the German regime occurred in the area De Scheeken, between Boxtel, Best and Sint-Oedenrode (Noord-Brabant Province). Its landscape plan – one of *Staatsbosbeheer*'s first – was drafted in the summer of 1944, in other words shortly before the arrival of the Allied troops. Once started, work continued even soon after Operation Market Garden.[224] (see Box Text De Scheeken) Three other noteworthy areas where land development coincided with the war

220 Van den Bergh 2004, 47-48, 208-209.
221 *Ibidem*. Among other things, the latter option meant that those concerned were required, if necessary, to give up land for military purposes for which they were 'compensated' in virtually worthless guilders (due to inflation and post war currency reform).
222 E.g. airfields, defensive structures, roads. In German occupying forces's view, these structures could be classified as being 'of general interest'.
223 Van den Bergh 2004, 208; https://www.historischeprojecten.nl/geheugenvanhardenberg/shpedia/excerpten-uit-de-vechtstreek/vechtstreek-anno-1940/ ; https://www.hollandsecirkel.nl/component/djmediatools/album/39-ruilverkaveling-zwolle-oorlogsjaren-1940-1945#media/39-ruilverkaveling-zwolle-oorlogsjaren-1940-1945/584-meetassistenten-kadaster : The call up was a few days preceding February 23, 1945.
224 For the various details of Operation Market Garden, see e.g. Bollen 1988; https://en.wikipedia.org/wiki/Operation_Market_Garden

years were the consolidation projects Beoosten de Eem (in the Eem plain in the province of Utrecht) and Veenendaal (in the provinces of Utrecht and Gelderland, along the Vallei Canal, both part of the former Grebbelinie), and third Kruiningen, situated in the inundation zone of the defence line of Zanddijk on the island of Zuid-Beveland (Zeeland Province). These projects were put to the vote in 1941; all of them were accepted.[225] None of the land consolidations approved between 1940 and 1945 were 'typical' (= distinguishing) of the war period as such; the 1941 revisions to the 1938 Act were comparatively minor and, in general, the consolidations concerned merely continued on a course set out two decades earlier. At that time cultural-historical or natural assets were given no priority in land consolidation; as such, the planning process during the period 1940-1945 was hardly exceptional. Nonetheless rural cultural-historical and natural-historical values began to generate some interest, as for example on Walcheren and in the above mentioned De Scheeken. These two reconstruction areas were to become test cases for the implementation of the so-called landscape plan. (also see Box Text Walcheren)

7.2 Institutional continuity: the post-WWII reconstruction period

This section will discuss, albeit in condensed form, some of the institutions involved in rural reconstruction and other developments in the post-WWII period. It will also reveal the complexity of the programmes targeting agricultural issues and other forms of land use. When, from the very start of the German occupation period, the reconstruction of war-damaged areas and the construction of physical manifestations of the 'New Order' took off it also became necessary to create a supporting organizational structure.[226] Most of its elements originated in pre-war institutions but some (also) had a German background. In the period 1940-1945 a few ad-hoc organizations, modelled after existing institutions, sufficed. Most of these organizations continued to be active after 1945, sometimes under another name and occasionally also with different responsibilities.

7.2.1 Exclusively Dutch governmental institutions

This paragraph can't leave out the names and/or abbreviations of some institutions that were active in the reconstruction of the Netherlands after 1945. Most of them re-appear in the main text or in box texts. Traditionally, a number of ministries were already involved in the infrastructural development of the Netherlands, specifically those of *Waterstaat* (Transport, Public Works & Water Management), *Landbouw* (Agriculture), and *Binnenlandse Zaken* (Interior). In 1945 a new ministry was added to this group, *Openbare Werken en Wederopbouw* (Public Works and Reconstruction), in 1947 changed to *Wederopbouw en Volkshuisvesting* (Reconstruction and Public Housing). Within the purview of the *Ministerie van Wederopbouw en Volkshuisvesting* were matters like the reparation of houses and other buildings, slum clearance, the supervision of the *Rijksdienst voor de Uitvoering van Werken* (DUW; 'state service for the execution of works'), and spatial planning, the latter through the *Rijksdienst voor het Nationale Plan* (RNP; 'state service for the national plan').[227] Another important party was the *Cultuurtechnische Dienst* (CTD or CD – both abbrevations occur; 'agro-engineering service'). CTD played a pivotal role in spatial development. (for both RNP and CTD see below). (fig. 133)

The DUW, established in May 1945, was the successor to the pre-war *Rijksdienst tot Bestrijding der Werkloosheid* ('state service for combatting unemployment'). The DUW was responsible for handling the war damage by means of deploying the unemployed as a source of (relatively cheap) labour. The DUW was also increasingly involved in land consolidations and land development and in the reparation of dykes in inundated areas in the south-west of the country, both after the war and in the aftermath of the 1953 North Sea flood. The DUW existed until mid-1954.[228]

[225] Van den Bergh 2004, 208, 209.
[226] The so-called New Order was one of the National Socialist political, economic and military objectives. See e.g. https://en.wikipedia.org/wiki/New_Order_(Nazism)
[227] https://www.parlement.com/id/vjqpgk4h8uyw/ministerie_van_wederopbouw_en; https://nl.wikipedia.org/wiki/Dienst_Uitvoering_Werken.
[228] Compare e.g. http://www.gahetna.nl/collectie/archief/pdf/NL-HaNA_2.15.18.ead.pdf, 7 ff.; Camp & Kamphuis 1992, 26-27.

133 The first post-war ministerial cabinet is best known under the duo-name W. Schermerhorn and W. Drees. Other members were e.g. J.A. Ringers and S.L. Mansholt.

One of the main organizations established specifically to oversee the reparation of war damage and the reconstruction efforts was the earlier mentioned *Bureau Wederopbouw Boerderijen* (BWB; 1940). After 1949, it was renamed *Afdeling Boerderijenbouw* ('farm building department') and resorted under the ministry of *Wederopbouw en Volkshuisvesting* (Reconstruction and Public Housing). After the 1953 North Sea flood the BWB for several years continued to supervise farm (re)construction.[229] Other organizations operating alongside the BWB included the *Stichting Landelijke Bezettingsschade* (SLB; 'foundation national occupation-related damage'; 1941) and the *Rijksdienst voor Landbouwherstel* (RDL; 'state service for agricultural recovery'; 1944). After 1945 the SLB was responsible for processing cases of damage, while the RDL was involved in soil reclamation until 1956. In 1946, the RDL supervised the installation of the *Commissie van Overleg voor het Landschapsherstel* (COL; 'consultative committee for landscape *reconstruction*') which rendered (financial) assistance in establishing suitable vegetation on farm yards, verges and in entire landscapes.[230] Some COL members also participated in yet another organization, *Contact-Commissie voor Natuur- en Landschapsbescherming* (CC; 1932; Liaison Committee for Nature and Landscape Conservation) and its affiliated *Werkgroep voor de Cultuurlandschappen* (WCL; 1943; Cultural-landscape Taskforce). The members of these two consultative bodies wanted to promote the intrinsic values (assets, qualities) of natural and cultural landscapes in the context of land consolidation, (secondary) reclamation, drainage and, by extension, the (re-) development of the afflicted nation as a whole. After the war, these individual members reaped the reward for their hard work in the form of the introduction of a new Land Consolidation Act

229 https://cultureelerfgoed.nl/sites/default/files/downloads/dossiers/sophie_elpers.pdf

230 Andela 2000, 31, 33.

134 Geometer preparating the land consolidation Middelste Horst, Baarlo municipality, Limburg Province. (October, 1958)

(1954), which made the drafting of a landscape plan mandatory.[231] (see the relevant chapter)
A last institution again to be mentioned here is the *Kadaster*, the official body responsible for the definition of the exact boundaries of real estate and the assessment of its (current exploitation or bargaining) value. During the reconstruction period, the *Kadaster* fulfilled these two functions in cases of a change in parcellation and/or land ownership, both before and after the event.[232] (fig. 134)

7.2.1.1 The Cultuurtechnische Dienst (CTD or CD)

One of the main if not most important organisations engaged in agrarian and land development and reconstruction of damaged areas since the 1930s was the above mentioned *Cultuurtechnische Dienst* (CD or CTD; 'agro-engineering service'). Since its establishment in 1935 it acted in an advisory capacity with regard to the improvement of the agricultural-cultural landscape and it drafted plans for drainage, (re-) partitioning and access-enhancement projects. With regard to land development the CTD's role – despite its logo – was mainly preparatory, financial and supervisory rather than executive.[233] The CTD initially resorted under the ministry of Economic Affairs and later under Agriculture.[234] Although the CTD from the start had realized the importance of the social and economic changes, these issues became even more the focus of attention after 1945, due to the ongoing mechanization and internationalization of the agricultural market. In the plans, restructuring, farm relocation, and land consolidation became crucial elements although in most cases private organizations such as Heidemij, Grontmij and several provincial or regional enterprises remained responsible for their actual implementation (see below).[235] Together with government

231 Dekker 2002, 40, 44-56; Andela 2000, 68-76, 184 ff.; De Visser 1997, 8-9, 34 ff.; Luiten & De Visser 1985, 27 ff.

232 https://nl.wikipedia.org/wiki/Kadaster. Although the *Kadaster* had been carrying out surveys in the Netherlands since 1811 it was officially established in 1832.

233 Bouwman 1958, 14 ff.; until then, Heidemij (and several other companies) had played a pivotal role through their own land consolidation projects; they now had to accommodate a supervisory government institution. Schuiling 1934-1936, II, XXIV. The CTD combined three separate tasks which until 1935 had been carried out by the *Rijksbureau voor Ontwatering*, the *Centrale Commissie voor Ruilverkaveling*, and the *Commissie van Advies inzake Ontginning van Woeste Gronden*. (There were three predecessors: state services respectively engaged in draining, re-allotment and reclamation of waste lands.) As such, the CTD mainly acted in an advisory capacity.

234 http://www.gahetna.nl/collectie/archief/ead/index/zoekterm/cultuurtechnische%20dienst/eadid/2.11.42/wollig/uit/volledige-tekst/aan/gebruikersinbreng/aan/anchor/descgrp-appendices-bibliography

235 Buiter & Korsten 2006, 9 ff.; Compare Van Hellemondt 2002, 67 ff., 149 ff.

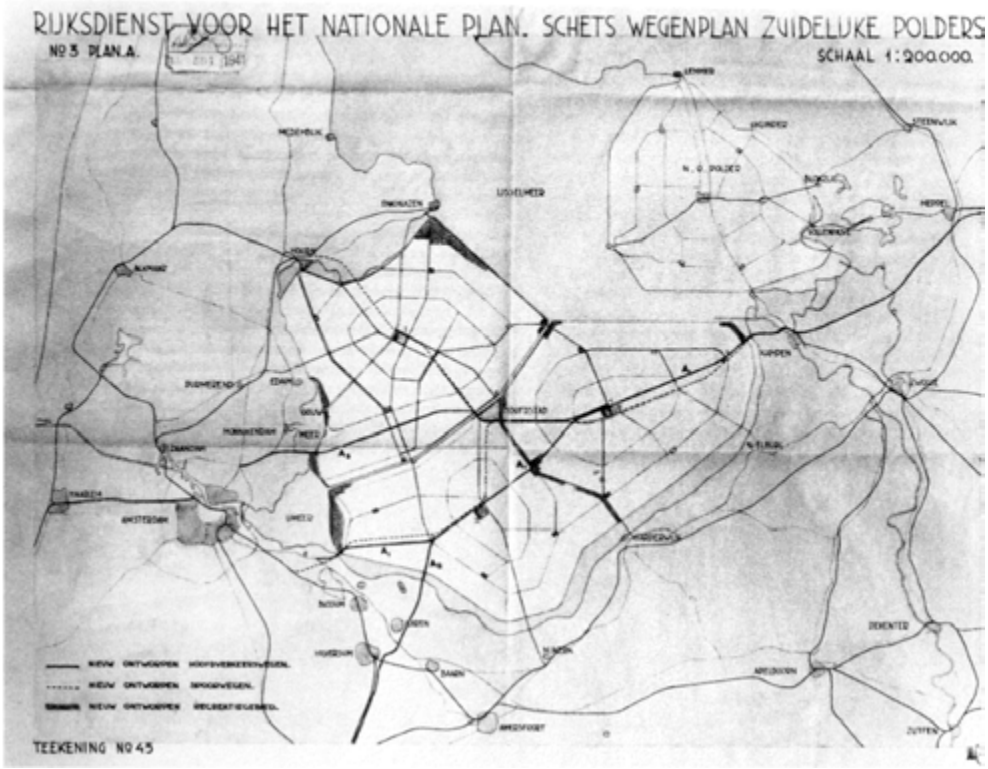
organization *Staatsbosbeheer* (SBB), the *Cultuurtechnische Dienst* was the main institution responsible for the preparation of land consolidations and land development projects. A later successor to the CTD, the *Landinrichtingsdienst* ('land development agency'), was also involved in projects relating to recreation and nature, while its successor after that, the *Dienst Landelijk Gebied* (DLG), was finally dissolved in 2015 when many spatial-development tasks were decentralized and delegated to the twelve Dutch provinces.[236]

7.2.2.2 The Rijksdienst voor het Nationale Plan (RNP)[237]

The above mentioned *Rijksdienst voor het Nationale Plan* (RNP) can be held a hybrid organisation. Some years before the war, ideas were already floating about for a national plan for the development of the Netherlands, and shortly before the German invasion preparations were ongoing for the establishment of such a *Rijksdienst voor het Nationale Plan*.[238] Because its set-up tied in with Nazi ideology, the occupying authorities wholeheartedly endorsed the plan.

On May 15, 1941, exactly one year after the Dutch capitulation, the RNP became a fact. It was largely modelled on German examples, specifically the *Reichsstelle für Raumordnung* (1936) and its successors *Raumforschung* (spatial research), *Raumplanung* (spatial planning) and *Raumordnung* (spatial development).[239] The RNP operated with relative autonomy, except in matters of military interest (*kriegswichtige Sachen*) or the reparation of war damage (*Kriegsschäden*). In the stimulation of food production, on the other hand, it was given free reign: farm repairs, reclamation, land consolidation or partitioning, and the ploughing up of grassland to convert it into arable land.[240] As such, the RNP was firmly entrenched in the German strategy of striving for self-sufficiency in the production of food, raw materials and fuel by expanding the *Deutsche Lebensraum* ('German living space') and through colonization, all as part of the ideology of a European-wide 'New Order'.[241]

The RNP, however, was opposed to absorption of the Netherlands into this grand pan-Germanic scheme from the start, and the haste with which the organization was established in 1941 was



135 RNP-sketch design for road-system in IJsselmeer Polders, dated 1941. A concentric system for the (Eastern and Southern) Flevoland Polders has never been realized.

236 For its history, see Buiter &Korsten 2006; https://www.rijksoverheid.nl/actueel/nieuws/2015/03/11/transitie-dienst-landelijk-gebied-afgerond.

237 From the beginning the Rijksdienst voor het Nationale Plan was equally often called Rijksdienst voor het Nationaal Plan.

238 see Kloos, 1939, 121-222, especially 215-222; Also see complete issue of *Tijdschrift voor Volkshuisvesting en Stedebouw*, 19, nr. 4, April 1938.

239 E.g. Scheffer 1938, 88 ff.; Van Dam & Vuijsje 2012, 13, 17 ff.

240 Faludi 2009, 241 ff.; Van Dam & Vuijsje 2012, 7, 17, 23-29. Compare e.g. *Scheurbeschikking Bodemproductie*, November 14, 1941; *Het Vaderland*, March 6, 1941 (in anticipation of interventions in the Dutch agricultural sector); *Eindhovensche en Meierijsche Courant*, October 15, 1941: '*100.000 H.A. grasland moet worden gescheurd*' and '*Ontginning is slechts na jaren effectief.*'

241 Bosma 1993, 313 ff.; Siraa 1989, 164 ff.; Pollmann 2006, 221 ff. Opinion is divided as to the motives for the establishment and position of the RNP with regard to the occupying authorities.

partly fed by an earnest desire to prevent too much German influence. It got to work at once and carried on what had already been initiated.[242] In concrete terms, the RNP's activities extended to participation in the planning of the *Zuiderzeewerken* and other land acquisition projects. Further it participated in preparations for more land consolidations, the protection of natural areas and water-collection zones, including proposals to acquire land for those purposes. The planning of major road construction projects was also part of the RNP's portfolio,[243] but its involvement in the actual implementation was minimal. (fig. 135)
After the war, the RNP's position was precarious for a while due to its ties with the German occupying authorities. It was one of the reasons why it lost its relatively autonomous status and was placed under the ministry of *Openbare Werken en Wederopbouw* and its successors. Yet in 1965 the RNP was explicitly assigned a central role in the planning of future spatial developments. Also in that same year, the new *Wet op de Ruimtelijke Ordening* ('Spatial Planning Act') came into force, inaugurating a new course for the trajectory 'from planning to policy'.[244] On that occasion the old name *Rijksdienst voor het Nationale Plan* (RNP) was changed into *Rijksplanologische Dienst* (RPD; 'state service for spatial planning').[245]

7.3 Further administrative, executive and preparative organizations

The physical implementation of the often radical designs and plans produced by all these institutions and organizations required specialist expertise, well-founded advice and concrete assistance. The private and (semi-)public organizations discussed in this section were responsible for important aspects of all forms of land development without actually doing the physical work. They were involved in maintenance, surveying, research and mapping as well as administration, assessment, information and representation. The *Landbouw Economisch Instituut* (LEI; 1940; 'institute for agricultural economics'), *Landbouw Economische Voorlichtingsdienst* (1937; 'agricultural-economics information service') and the *Rijkslandbouwvoorlichtingsdienst* (RLVD; 1890; 'national agricultural information service') were responsible for, among other things, (providing the basis for) development programmes for the improvement of technical and economic aspects of farming, and as such they contributed to land development from a different angle.[246]
Two of the main organizations engaged in the physical preparations for land consolidation during the reconstruction period were *Stichting Bodemkartering* (*Stiboka*; 'foundation for soil assessment') and the already mentioned *Kadaster* (land registry). The *Stiboka*, established in 1945, managed and assisted in the preparation of land consolidation and other forms of land development, carrying out morphological soil analyses as well as hydrological surveys.[247] It is therefore hardly a coincidence that the earliest *Stiboka* soil analysis projects clustered in areas that had been inundated in the period 1940-1945: the river plains in the middle of the country and the islands of Zeeland and Zuid-Holland.[248]
Its range of duties automatically made *Stiboka* – and the *Kadaster* – a participant in the appraisal of the involved real estate. In addition, both organizations took part, implicitly or explicitly, in the recording of a wide range or cultural-historical assets, from archaeological sites to historical field patterns. Some of their employees were prominent experts and published extensively on cultural and historical topics.
The functions of the *waterschappen* (district waterboards, polder-boards) were very different. *Waterschappen* and similar organizations are among the oldest Dutch public institutions, with a history which in some cases reaches back to the 13th century. Traditionally their significance lies in the fact that they regulate water management-related matters at local and regional levels. Today they are also involved in water treatment and in assets of cultural and natural history. Until recently, the Netherlands boasted many (in 1950 circa 2,700) larger and smaller waterboards.[249] (fig. 136)
Waterschappen have always been major players in land development projects. Most land consolidation or rural development projects required extensive hydraulic interventions. Often, water courses, drainage installations, roads, bridges, sluices and so on needed to be modified and given a new form or function or to be built from scratch. Moreover, after the

242 Siraa 1989, 153 ff.; Bosma & Wagenaar 1995, 48-49.
243 Siraa 1989, 154 ff., 164-166; Bosma & Wagenaar 1995, 149-151, 164-166. The German '*Abteilung Planung*', under its director H. Roloff, liaised with Germany; see e.g. *Deutsche Zeitung in den Niederlanden*, May 28, 1941.
244 Siraa 1989, 177 ff., 213-217.
245 In 2002, the RPD was split up into a policy and a research branch. Its successor was the *Ruimtelijk Planbureau* (RPB; 'spatial planning bureau'). In 2008, the RPB and the *Milieu- en Natuurplanbureau* ('planning bureau for the environment and nature') merged, forming the *Planbureau voor de Leefomgeving* (PBL; 'planning bureau for the living environment'). For RNP also see: http://www.gahetna.nl/collectie/archief/pdf/NL-HaNA_2.17.04.ead.pdf
246 See e.g. http://www.gahetna.nl/collectie/archief/pdf/NL-HaNA_2.11.65.ead.pdf, 7 ff.; https://www.archivesportaleurope.net/ead-display/-/ead/pl/aicode/NL-ZlHCO/type/fa/id/0497
247 See e.g. http://www.bodems.nl/canon/venster-14.php; https://nl.wikipedia.org/wiki/Stichting_voor_Bodemkartering.
248 *Boor en Spade. Verspreide bijdragen tot de kennis van de bodem in Nederland* I (1948), 25 (map). Its first director was C.H. Edelman.
249 The larger water boards are also called *heemraadschappen* or *hoogheemraadschappen*. From the 19th century onwards yet another type existed, the so-called *veenschappen* (peat colony boards) with similar jurisdiction and responsibilities. Larger water boards might, and usually did embody smaller ones.

136 A multitude of small and medium sized waterboards as well as much bigger umbrella organizations (e.g. *hoogheemraadschappen*) couloured many historical maps of Holland and other provinces. This one is by Melchior Bolstra and dates from 1745.

137 Dutch waterschappen (waterboards) still function within the regional democratic system.

introduction of the 1938 Land Consolidation Act *waterschappen* became the driving force behind many land consolidations. In the period 1954-1957, one third of all applications were filed by a *waterschap*.[250] Today most of our *waterschappen* have been unified and centralised, their actions being even more democratized than ever before. (fig. 137)

7.4 Agronomic engineering: contractive organizations

Equally important, besides organizations that were institutionally and administratively involved in land development, land consolidation and land acquisition, were those who actually carried out the work in the field by taking care of the necessary earthwork or, in more general terms, everything pertaining to agronomic and/or civil engineering. The Dutch state was always in control during the planning stage, whether directly or indirectly, but not necessarily also during implementation. That task was usually delegated to private parties, first and foremost the *Nederlandsche Heidemaatschappij* and *Grontmij*, and further to the governmental *Staatsbosbeheer* (SBB).[251]

[250] Van den Bergh 2004, 137. Interest groups were behind 27% of all applications, municipalities behind 24%.

[251] Nederlandsche Heidemaatschappij was founded in 1888 as a union of members unjustly it has often been referred to as a semi-governance or semi-private company; Grontmij was founded as Ltd. two years later, in 1915.

7.4.1 Nederlandsche Heidemaatschappij and Grontmij

Especially *Nederlandsche Heidemaatschappij*, established in 1888 to carry out large-scale reclamation and other agronomic projects, from an early stage was active in several fields.[252] In 1916, for instance, private Heidemij was involved in the first Dutch land consolidation conducted on a voluntary basis, Ballumer Mieden on the island of Ameland.[253] Around 1938 the company calculated that over 500,000ha of arable and grassland qualified for consolidation, or one sixth of the entire country.[254] Heidemij (today known as the multinational Arcadis) became the most important and largest player in land consolidation in the Netherlands. Besides reclamation and consolidation projects Heidemij's activities also included earthworks for the large land acquisition projects in the former Zuiderzee, today's IJsselmeer or Lake IJssel.

A second major private company, *Grontmij* (today part of multinational Sweco), originated in 1913 as an enterprise for 'earthworks in the widest sense of the word'.[255] Although Grontmij's land development activities were surpassed in scale by those of Heidemij, Grontmij was nonetheless one of the largest Dutch players in the field of spatial development, in land consolidation, (re-)partitioning as well as reclamation.[256] Like Heidemij, Grontmij was involved from the start in the formation and preparation of major undertakings in Lake IJssel like Wieringermeer Polder and Noordoost Polder. Both companies carried out earthworks, at the time mainly by hand. A number of government schemes intended to secure an honest living for the many pre-war and post-war unemployed formed the main pool of labour for Heidemij and Grontmij, who hired their personnel from *DUW*.[257]

7.4.2 Staatsbosbeheer (SBB)

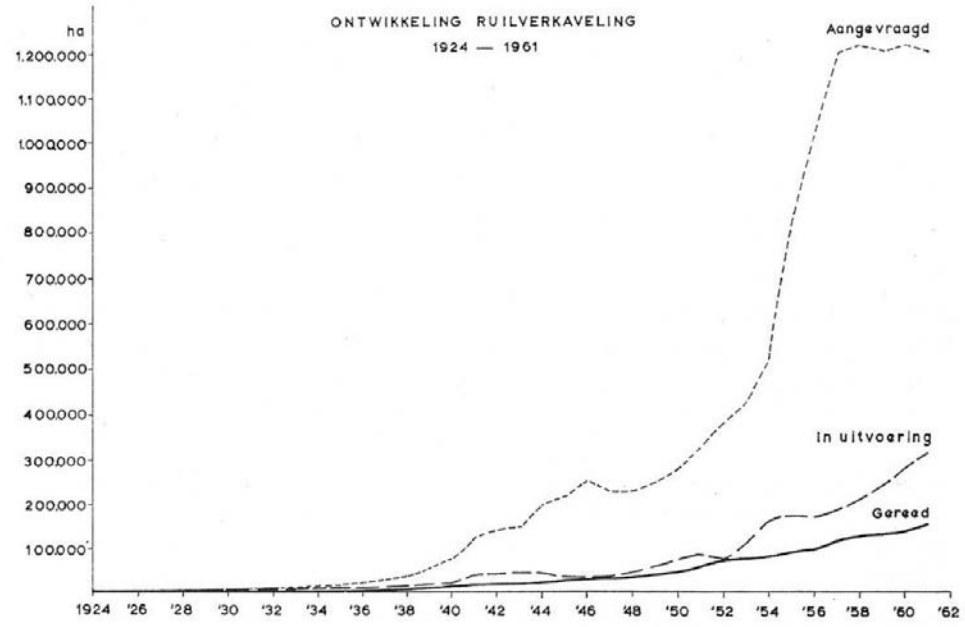
Staatsbosbeheer (SBB) (State Forest Management) was established in 1899 and until 1998 resorted under the Dutch national government. The organization's original function was the plantation and exploitation of woodland, but from 1915 onwards it expanded its activities to include roadside and shore vegetation, and later also to land consolidation and development as well as recreational forms of land use – forests, but mainly other types of landscapes. Its land-consolidation activities focused both on 'new land', in the polders in the IJsselmeer / Lake IJssel, and on 'old land'. An example of the latter is the project De Scheeken (landscape plan, 1944); others took place in the wake of the inundation of Walcheren in 1944-1945 and the 1953 North Sea flood.[258] (see Box Texts De Scheeken and Walcheren)

Alongside and in collaboration with these three major, nationally operating private or state companies a number of smaller, (semi-)private, provincial, regional or municipal companies were active in land consolidation (e.g. *Ontginningsmaatschappij 'De Drie Provinciën'*, *Ontginningsmaatschappij 'Het Lantschap Drenthe'*, *Ontginningsmaatschappij 'De Vereenigde Groninger Gemeenten'*, all three est. 1924, and their joint successor, named after the first mentioned *De Drie Provinciën*, 1951-1968). Some of them are mentioned in the Box Texts.[259]

7.5 Land owners, farmers and local committees

The final group involved in land development to be mentioned here are the farmers and land owners themselves. In principle, their prior consent with regard to the development or redevelopment of their land was always required – if they were so-called voluntary or agreed by majority or state imposed. Often there were dozens or even hundreds of stakeholders, each with their own interests. The next chapter will discuss how these were dealt with from a legal perspective. This legal aspect was the main entry for the interest groups to make their opinions clear.
A combination of a democratic strategy and persuasive tactics was resorted to so as to not only deploy legal instruments but also create actual local support for a land consolidation. So-called *plaatselijke commissies*, 'local committees', were appointed to represent the local farmers. On the one hand, these were the

252 Van den Bergh 2003, 114.
253 Hendrikx 1998, 140. In 1910, the *Koninklijk Nederlandsch Landbouwcomité* ('royal Dutch agricultural committee') entered a proposal for an official scheme; the total area involved amounted to 170ha. The first known documented private re-allotment took place in 1905 between two land owners in Eibergen and Neede (Gelderland Province) and involved 71ha. See Otto [1963], 73, 81. The first (general) Land Consolidation Act dates from 1924.
254 Hemel 1994, 65; *Algemeen Handelsblad*, January 3, 1938, 13.
255 The name 'Grontmij' came into use in 1915. It is a contraction of '*grondverbetering* (soil improvement) and *ontginningsmaatschappij*' (reclamation company)'. It is also a pun on '*grond-mij*', '*grond*' being the Dutch word for 'soil'.
256 https://nl.wikipedia.org/wiki/Sweco_Nederland.
257 Van der Wal 2007, 26 ff.; See also *Rijksdienst voor de Uitvoering van Werken* (DUW). See also https://nl.wikipedia.org/wiki/Dienst_Uitvoering_Werken
258 Buis & Verkaik 1999, 167 ff.
259 Brood 1978, 1-21.



138 Cumulative represenation of three phases in land consolidation 1924-1961, respectively: Aangevraagd (= Applied for); In uitvoering (= In progress); Gereed (= Finished). There was a boom in applications after the coming into operation of the 1954 Act.

local eyes and ears and, on the other, they performed preparatory and executive tasks with regard to the voting procedures in relation to a land consolidation. In addition, they supplied information on planned or desired projects. The local committees were a direct link between the (rural) population of land owners and land users, and government institutions and executive bodies. The committees were assisted by experts, e.g. employees of the *Cultuurtechnische Dienst* (CTD), the *Kadaster* and of the administrative, executive and/or preparative organizations.[260] Unlike the institutions mentioned earlier, local committees usually did not have a corporate status, although in fact they were permitted to function as such. However, some committees were established for the explicit purpose of filing an application for land consolidation; in these instances they were formally recognized as corporate parties.

7.6 Upscaling thanks to planning and mechanization

Together the above mentioned parties and participants changed the rural areas of the Netherlands profoundly. Before and during the Second World War man-power was prevailing but mechanical help got the mastery soon afterwards, although for nearly ten years an army of unemployed was used as well. Large sections of the countryside were mechanically 'overhauled' in the post-war years. After 1948 the number of applications for land consolidation in particular exploded, resulting in a considerable implementation backlog (fig. 138) Indeed, (planned) changes to an area's spatial layout had been common in the past; cases in point are the 16th to early 20th-century polders established on the bottom of former lakes, and the reclamations of the vast peat marshes. But these earlier undertakings were never on such a large scale nor were they as widespread as was the case in the second half of the 20th century. Decades and sometimes centuries of labour with manpower and horsepower were no match for the much more advanced (and more rapidly advancing) machines. Today, the enormous impact of mechanization on land development seems obvious, but at the start of the reconstruction period most farmers were largely unfamiliar with engine-based technology. The most radical landscape changes were therefore initially the result of interventions carried out by

260 See e.g. the inventory to Archive 3.11.13 in the National Archives, The Hague (http://www.gahetna.nl/collectie/archief/ead/index/eadid/3.11.13/anchor/descgrp-context-bioghist).

companies, who 'attacked' the countryside with their ever larger and more advanced machines. The tractors and other agricultural machinery that became available to a growing number of farmers were a different aspect of agricultural mechanization and upscaling. In the first years of radical change a lot of them were probably hardly aware of the approaching revolution of the European and world markets would bring to their positions. But from 1958 when Mansholt's E.E.C. policy gained power many felt victims to upscaling and inevitable productivity raising. And this was all part of governmental centralizing agricultural planning.

7.6.1 Some tangible results of upscaling agricultural production

Of course a steady growth of Dutch agricultural production in the 1940-1965 years must be visualised here. There is an innumarable amount of figures on all kinds of products but the tables unfortunately not always quite conform. Yet their overall trend usually is clear enough to present some 'amazing' results of modernized and upscaled agricultural production.[261]
Table 7.1 clearly shows a steady increase in most of the products and an explosive growth in some specific products e.g. poultry and to a lesser degree milk (= cheese an butter). Both of them were – just like tomatoes and cucumbers – important export products. Because the Dutch intended to recover their pre-war economic position as soon as possible they tried to re-establish a strong agricultural export value. As the Netherlands was a strongly agriculturally directed society from the old days they succeeded in attaining this goal in relativey short time. Despite the 1953 North Sea flood, but thanks to reclamations, making new land and land consolidations and of course thanks to too modernization. Many agricultural export product's values rose and during the 1950s and '60s reconstruction period its share in the National income remained at dozens of percents. Yet a relative decline in a fastly industrializing country was inevitable. From it's peak in 1925 (ca. 50% of the export value) it fell to approximately 30% in the 40s and 50s and to 23,7% in 1967. A level of 20% remained the avarage until ca. 1990.[263] As just noted several (niche) products' values rose explosively and contributed much to the National income. A fine example is the export of flower-bulbs. In 1935 and 1939 the export value was around 20 to 23 million guilders. In 1950, 1960 and 1970 this amount rose to 112, 250 respectively 385 million guilders.[264] Another example is the export of Dutch tomatoes. In 1950 the total volume amounted ca. 41,300 tons, in 1955: ca. 89,000 tons, in 1960: 162,000 tons and in 1963: 188,400 tons – over four times as much![265] On the one side it must be clear from this short selection of harvests and export figures that the Dutch agricultural production flourished after the reconstruction period, parallel with other sectors of the economy and it's value grew even faster than most of them. The Dutch economy and the Dutch people took much advantage of this production and export growth. On the other hand Table 7.1 is also a clear indicator of the continueing process of upscaling and growing efficiency: lesser and bigger farms are producing more products and higher value while using lesser space and needing fewer personnel. The reconstruction period proved only to be the launching platform for further dynamic developments.
Although planning by companies and mechanization were main factors in upscaling, the Dutch state was an important participant and initiator in most of the changes. In the next chapter we will mainly address the legal aspects of upscaling, particularly to the extent these affected land consolidation. We will also pay attention to social problems connected with agricultural time-lags and the handling with them. [262]

261 More comprehensive information can be found in *Atlas van Nederland*, 1984-1990, Vol. 10, 1989.
262 The sources used differ in origin and exactitude. Most important are CBS Statline and *Verslag 1949*.
263 See: https://www.cbs.nl/en-gb/news/2017/05/agricultural-production-in-the-period-1950-2015 ; https://www.cbs.nl/en-gb/news/2018/14/exports-nearly-400-times-higher-than-in-1917#id=undefined ; Many more detailed figures are available in *Verslag over de Landbouw in Nederland over [19>>]*.
264 Bultink, Goemans & Nijhof 2015, 24: in 2000 the export value was 711 million guilders and in 2014 even €680,000! Note these figures (probably) have not been corrected for inflation
265 Maan 1965, 83.

Table 7.1 An overview of developments in a limited variety of aspects of Dutch agriculture,1900 – 2015.

Year	ca. 1900	ca. 1940	ca. 1950	1960	1965	1970	1980	2000	2015
Number of farms and amount of products									
Farms (total nr. farms, incl. mixed farming) x 1000		237	410	301	264	185	145	97	64
Labour force (total nr.) x 1000	650	655	650	590	490	390	305	281	186
Arable farming (nr. farms) x 1000		235		193		96	69	36	19
Arable farming (ha) * x 1000	930	941	1.049				704	806	
Wheats (winter) (ha) x 1000	60	80	82	88		105	128		108
Wheats (winter) (tons) x 1000			273	434		509	815		1.195
Potatoes (for consumption) (tons) x 1000	1.478	2.231	2.846	2.705	2.727	3.234	3.950		4.842
Diary farming (nr. farms) x 1000			242	215		141	107	68	49
Meadows (ha) x 1000	1.185	1.329	1.317	1.327		1.334	1.198	1.010	956
Cattle / milk cows (pcs) x 1000	950	1.520	1.441	1.495		1.650	1.908		1.324
Milk (delivered at factories) (tons) x 1000	851	4.500	4.766	6.068		7.748	11.510		13.331
Production value horned cattle (billion guilders)			1.6	2.3	3.5	4.7	10.1		
Pork breeding (nr. farms) x 1000			271	146		76	42	15	5
Pigs / Pork (tons) x 1000			236	413		700	1.125	1.371	1.456
Pigs (pcs) x 1000	800	1.288	1.298						
Production value pigs (billion guilders)			0.5	0.8	1.3	2.4	4.6		
Horticulture (number of farms, glass covered) (x 1000)						20	16	11	4
Tomatoes (warehouse) (tons/ha)			68	77		118	180	473	495
Cucumbers (warehouse) (tons/ha)			107	167		284	244	586	810
Production value horticulture (billion guilders)			0.5	1.1	1.7	2.4	6.2		

* Verslag Landbouw 1949 gives for 1940 996.000ha; Years 1900 – 1950 including horticulture

Source: mainly CBS Statline.

De Scheeken, 1944-1959

Land consolidation (and landscape plan), Boxtel, Best and Sint-Oedenrode Municipalities

Identification

- De Scheeken is a thinly populated area between Liempde and Best, near the hamlet of Vleut. To the west, it borders on former *Rijksweg* (National Road) 2, today motorway A2 (Den Bosch-Eindhoven). Only a small section of the land consolidation is part of the present municipality of Sint-Oedenrode. On the Best side, a few reconstruction-period buildings stand just outside the boundary of the National Interest area.
- The design of the land consolidation and landscape plan De Scheeken (ca. 1,030ha, 1944) is by R.J. Benthem of *Staatsbosbeheer*. It was realized under vigour of the 1938 Act and its 1941 Adaptation. Responsible for the realization was the *Rijksdienst voor de Uitvoering van Werken* (DUW). The implementation was completed in 1959 while the road network was already in place by 1954.

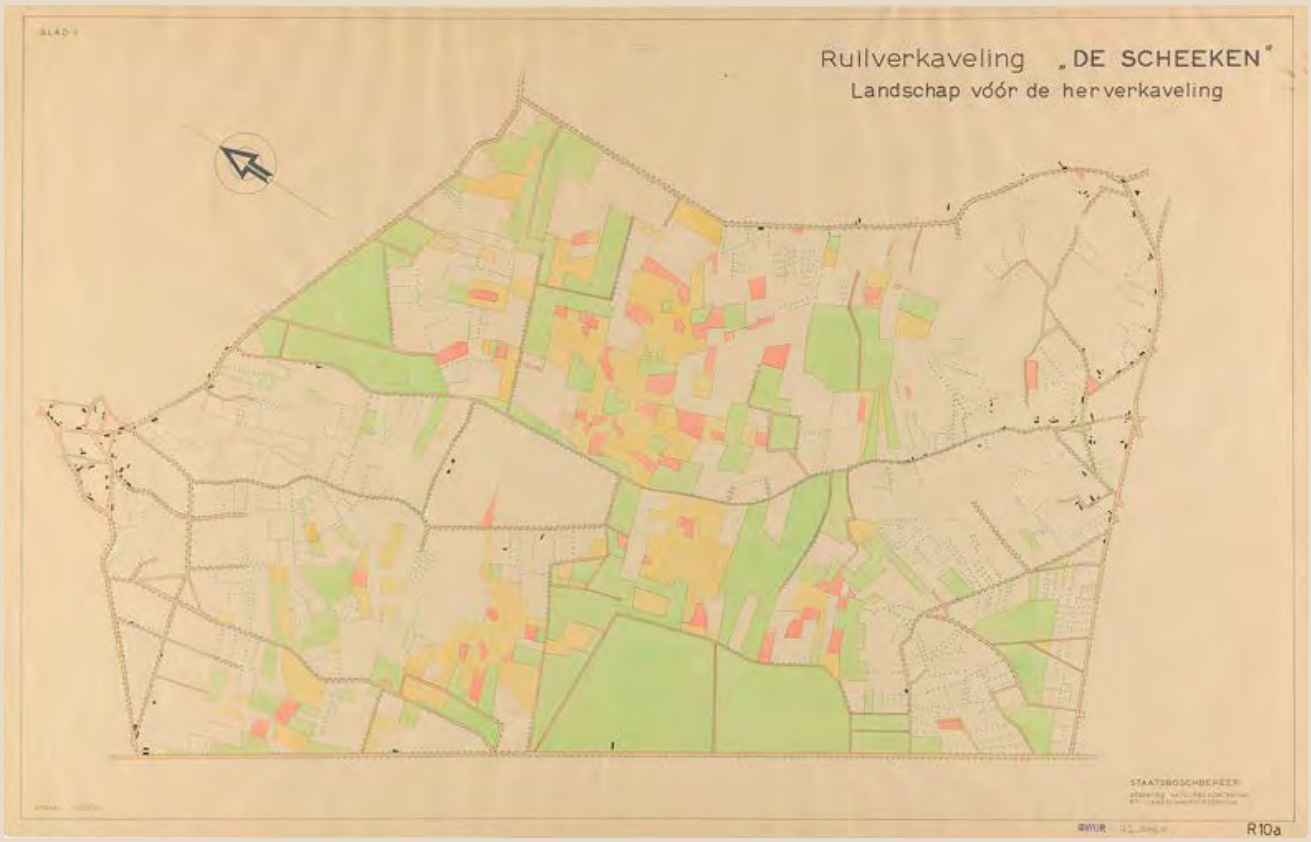
Problems

Traditionally, the small-scale and highly compartmentalized landscape of De Scheeken was characterized by stands of timber (mainly Canada poplar) lining roads and water courses, by various willow species, wooded banks and shrubbery and small open fields and paddocks. A peculiar aspect of this landscape was (and to a certain degree still is) its controlled water-meadow or sewage field system (Du: *vloeiweiden*), in 1895 introduced in De Scheeken's northern section by *Nederlandsche Heidemaatschappij*. Soon the system collapsed and at least from 1928 it has been pictured as wood. Older historical maps and some ditches clearly show this former experiment however. And recent *digital elevation model* pictures (DEM) (Du: *Actueel Hoogtebestand Nederland* (AHN)) reveal the structure of the system is still recognizable.[1] The 'translucency' of former land occupation after 'rewriting' of the terrain surface in this part of The Scheeken can be considered a fine example of a palimpsest. (fig. 139) To some extent as a result of human activity, in the first half of the 20th century the area also featured a rich diversity of stream valley and woodland vegetation, which is why De Scheeken was included in a list of valuable (cultural) landscapes compiled by members of *Contact-Commissie voor Natuur- en Landschapsbescherming* (CC; Liaison Committee for Nature and Landscape Conservation) and *Werkgroep voor de Cultuurlandschappen* (WCL; Cultural-landscape Taskforce). When this list was drafted preparations for a land consolidation were already ongoing, but the Second World War created opportunities for new ideas. The pre-war field pattern was dominated by fairly regular blocks intermixed with a few more irregular patches and substantial sections of wasteland. Roads were winding with here and there angular segments. The area gave the impression of having been developed more or less haphazardly (organically), an impression reinforced by features such as a number of disconnected or dead-end country lanes and paths. Watercourses and ditches formed a network of highly variable density, partly the result of the uneven, undulating surface of the fields and forest meadows. In and around De Scheeken were a few farms, mostly smallholdings.

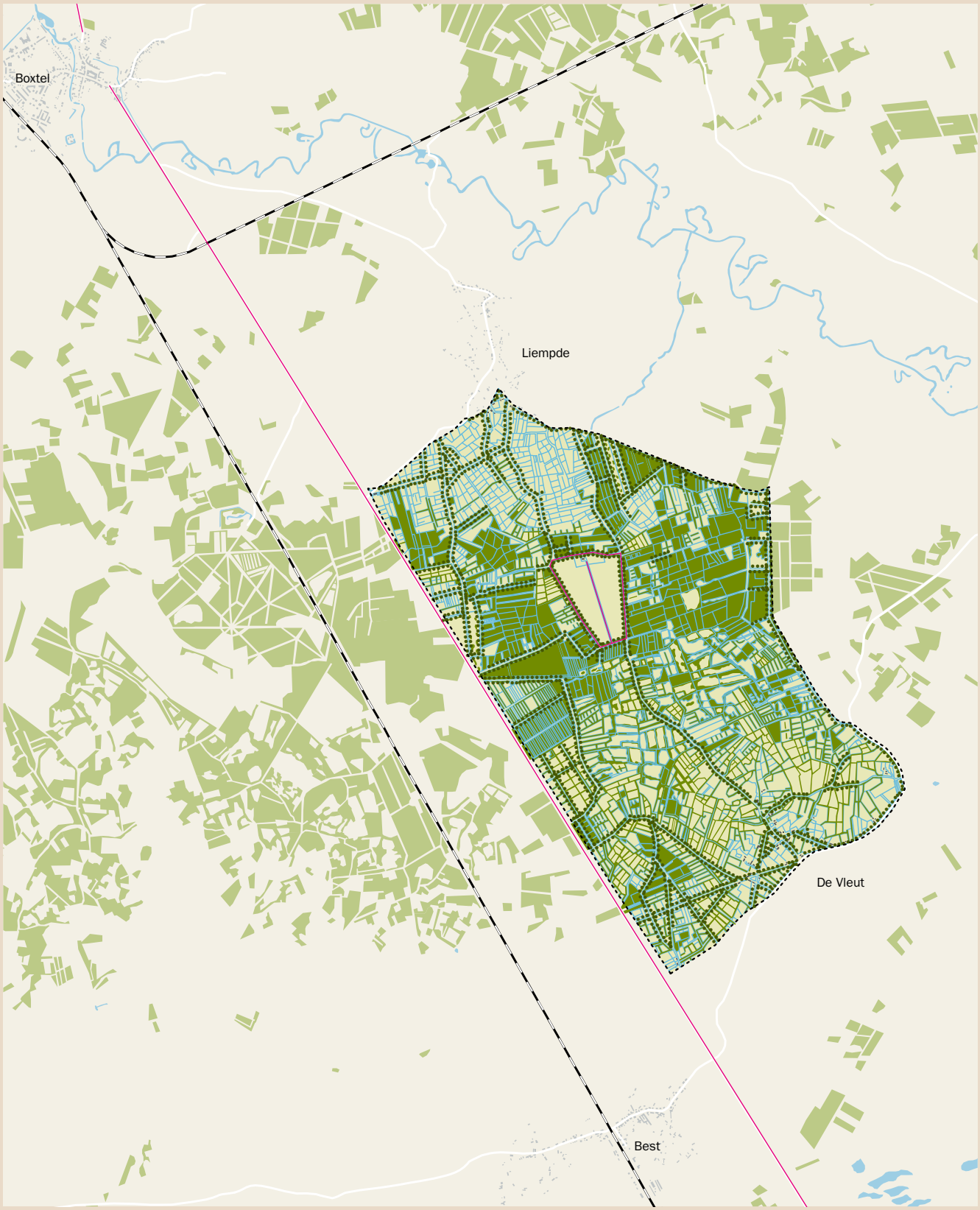
139 Palimpsest landscape in the northern section of De Scheeken. An 1895 controlled water-meadow or sewage field system (Du: '*vloeiweiden*') is still recognizable in DEM / AHN. Note the central system of ditches.

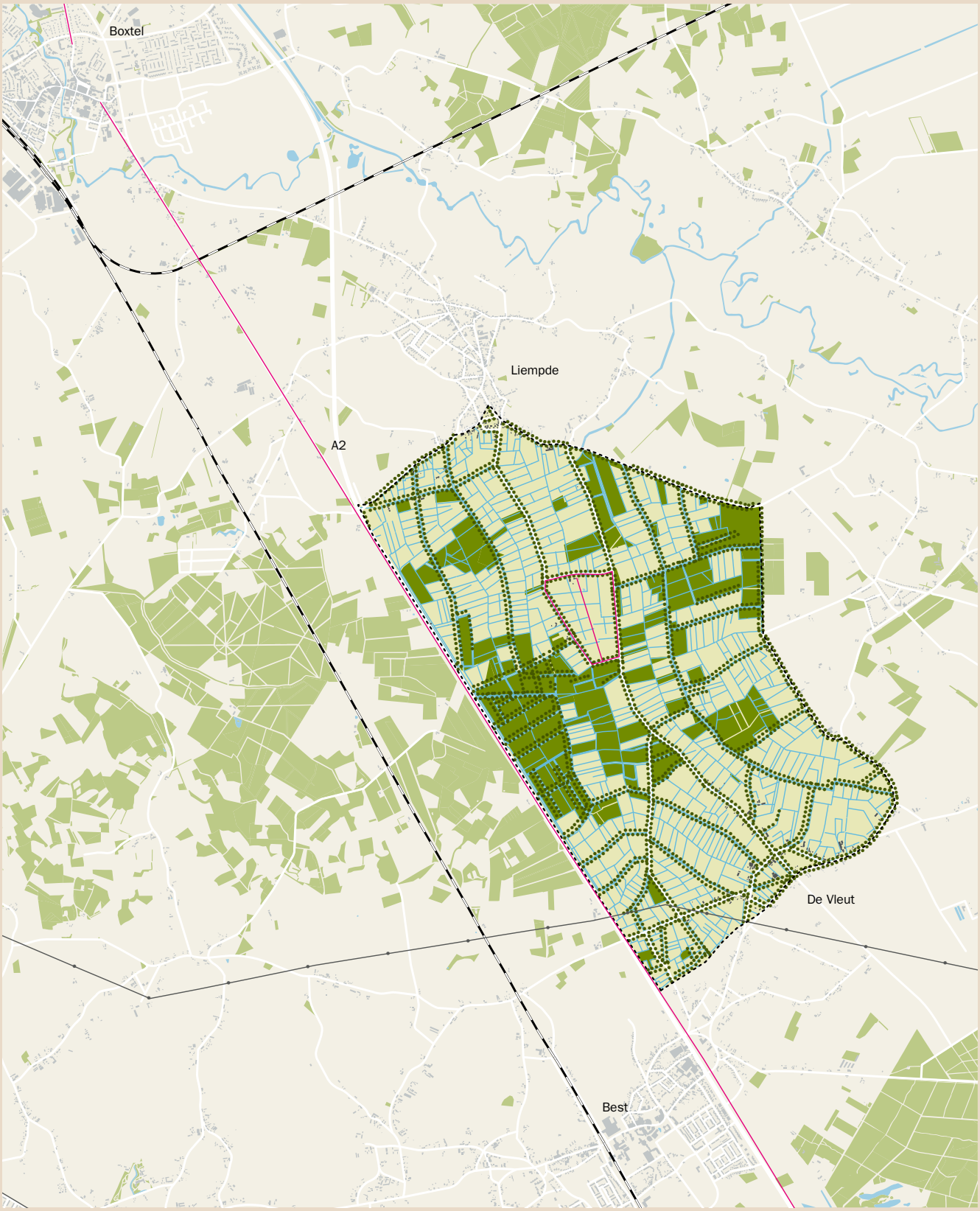
A contrast had always existed between the northern and southern part of De Scheeken. In the north, plots were smaller and the landscape more open, while in the south the fields and pastures were surrounded by hedgerows. The two sections were more or less separated by a wooded area which, ironically, encompassed a fairly large, open section, Goossen Bunder. A low embankment cuts across it, and although it was consistently referred to as cultivable land it is clearly set apart from its surroundings: Goossen Bunder was part of the local commons. Shortly after 1914, *Heidemij* was responsible for its final reclamation and a farm, Annahoeve, was built on it in 1920. De Scheeken's field pattern was inefficient and its potential for exploitation limited; when, in March 1938, a forest fire destroyed over 100ha of the area the council by the end of that same year filed a request for land consolidation. This would not only obliterate much of the remaining woodland vegetation and poplar trees but it would also implement a more efficient organization. However, when, in February, 1941 the plans were put to the vote a narrow majority voted against. The national government then imposed a land consolidation (on March 26, 1941) but the Second World War caused further delays – thus providing an opportunity to create a landscape plan *avant la lettre*.[2]

In mid-September, 1944, the already problematic situation caused by an impractical field pattern, poor access and inadequate drainage was made worse when during Operation Market Garden (the Allied attempt to capture the bridges of Nijmegen and Arnhem) the area became a battle zone. In the course of the fighting a number of houses, farms and stands of trees were damaged or completely destroyed. Later, the damage to this



140 Top: scattered landscape units and land use in De Scheeken area before the land consolidation took place. (note: also mentioned 'herverkaveling' = re-consolidation). Bottom: R.J. Benthem's design for a landscape plan as it was intended to be integrated in the land consolidation. The plan dates from 1944 and is one of the first of its kind.


Boxtel
Liempde
De Vleut
Best



De Scheeken
Right Simplified map image ca. 1930. Scale: ca. 1:25.000
Left: Simplified map image ca. 1970. Scale: ca. 1:25.000
An improved and more systematic network of drainings and roads together with a conveniently arranged foresting made De Scheeken an important green zone.

141 Before its land consolidation program De Scheeken counted many sandy cul-de-sacs and dry ditches. (Unknown date and exact location).

sparsely built-up area was repaired and a substantial number of new farms were established along its edges.

Realization

The first steps towards land consolidation in De Scheeken were taken in 1938/40, but the Second World War intervened. Actual implementation started towards the end of the war, when the south of the Netherlands had already been liberated. The landscape qualities of De Scheeken were recognized early on by R.J. Benthem it was due to Benthem's efforts that the land consolidation was 'dressed up' with a landscape plan. This 1944 early plan drafted by Staatbosbeheer was implemented to a significant extent but far from entirely. (fig. 140)

In addition to land exchanges and mergers, the land consolidation also comprised a radical alteration of the existing spatial structure by linking the numerous dead-end roads and improving the drainage infrastructure. At the same time the landscape plan allowed for region-specific forms of vegetation in the form of lines of tall trees and hedgerows along most roads. Poplar was the most commonly used species but oak (especially along some of the main roads), ash and willow were also part of the planting scheme. In this way, the area's original visual compartmentalization was preserved despite significant changes to and upscaling of its spatial structure. (fig. 141, 142) Aerial photos from 1960 show much recently planted vegetation; it seems to have taken a decade to complete the programme. Overall, the road layout continued to follow the original, winding courses. Straight roads are rare and the map still shows a 'quasi-organic' network and matching field pattern.

The hamlet of Vleut to the south-east of the land consolidation comprises a number of farms and houses from the reconstruction period and a matching 1950 chapel dedicated to the Holy Virgin, the *Maria Assumptakapel*. The oldest reconstruction-era buildings have a distinct, regional appearance and are visibly the successors of earlier buildings destroyed in September, 1944. Some of them, such as a number of *langgevel* farm houses (longhouse farm, stretched along a road; a distinctly regional type) even appear decidedly old-fashioned. (fig. 144)

Key qualities

Among De Scheeken's main qualities is the fact that it served as a Type area for landscape plans as *Staatsbosbeheer* saw them. Because plans for the area had already been drafted before the Second World War, and also due to the necessity to repair the damage caused by that war, it was possible to experiment both

142 De Scheeken can still be characterized as a compartmentalized landscape with meadows, arable and forested parts tied together and fringed by ribbons of timber. (Photo October, 2008)

143 One of the reconstruction period farms along an unmetalled road in Vleut hamlet in the southern part of De Scheeken. (Photo October, 2008)

144 Hamlet Vleut, De Scheeken. 1950 chapel dedicated to the Holy Virgin. In the background reconstruction era 'langgevel farm houses'. (Photo 2018)

145 Aerial impression of land consolidation area De Scheeken with its compartmentalized lay out. The north is right. (Photo May, 2013)

with land consolidation and with redevelopment by means of a landscape plan.
The plan's spatial structure can still easily be recognized although in recent years some additions to both the road network and the built-up area have materialized, especially in the south-east near the hamlet of Vleut. The specific character of the post-WWII design is immediately obvious; the landscape's qualities were identified in time and have essentially been preserved, despite the new parcellation. (fig. 143) Although the A2/E25 motorway touches upon the area in the west it has barely affected its structure, no doubt in part because its course and its first metalling date back already to the late 18th and early 19th century. Nearby areas west of the road and the parallel railroad tracks traditionally had a similar structure. There, a (later) land consolidation has led to some upscaling, but without creating a contrast. The qualities the entire area – today part of what is called National Landscape called Groene Woud – possessed the 19th century were preserved more or less by accident and today still remain of great cultural-landscape and ecological significance. Yet, despite De Scheeken's substantial cultural-landscape assets there are also some threats. Topographical maps reveal a significant change through time in the proportion of woodland, meadow and cultivated fields (or land designated as such). At first, the total area of woodland increased rapidly but later, cultivated fields and tree nurseries expanded (particularly to the east) at the expense of the meadows. In recent years a number of large industrial farms for meat 'production' were established in the area. (fig. 142, 145)

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Notes

1 Bleumink 2019, 6-12.
2 Oetelaar, van den 2016, 78-87.

8 Legislation, Regulation and Rural Improvement as Instruments of Reconstruction

This chapter focuses on developments in legislation and regulation between 1940 and 1965 to the extent they had a bearing on reconstruction in rural areas, including the reclamation of new land. Pre-war legislation in the domain of spatial planning will be briefly discussed. Finally, we will zoom in on specific aspects of rural improvement programs, the so-called *streekverbetering*.

General Winkelman's two Reconstruction Decrees of May, 1940 (mentioned in the previous chapter) were frequently applied to urban environments, for example in the aftermath of air raids. They gave the government the tools to bring the affected area under one jurisdiction in order to speed up repairs or redevelopment. In most cases, that jurisdiction would be the municipality.[266] Other expropriations occurred for the benefit of infrastructural projects. To facilitate this, further regulation had been introduced in the form of the so-called Decree 168/1940. On the basis of this decree it was possible to proceed to expropriation in the context of the reconstruction efforts without a prior court order.[267] In the absence of ad hoc regulation in the form of a so-called '*Bevel*' or '*Bekendmaking*' ('order' or 'notification') other, pre-war military legislation in addition facilitated expropriation for (military) purposes.[268] Although this decree and the orders might be understood as 'emergency war time measures' they turned out to become handles for future legislation.

8.1 Material and social dimensions of reconstruction

The main post-war successor of the two 1940 reconstruction decrees was the Dutch Reconstruction Act of July 1, 1950. Under this Act, the Minister of *Wederopbouw en Volkshuisvesting* ('reconstruction and public housing') was obliged to submit a detailed annual building programme to parliament. Due to the scarcity of materials and resources, a shortage of currency and massive unemployment, strict planning within the various sectors of the construction industry was deemed essential. Although the building programme was gradually adapted as materials became available again, the Act remained (partly) in force until the introduction of the 1965 *Wet op de Ruimtelijke Ordening* (WRO; Spatial Planning Act).[269] This means that the reconstruction period effectively lasted from the first weeks of the Second World War until the mid-1960s.

While the reconstruction period is generally defined in terms of *material* (viz. physical) urban and rural improvements through the reparation of (war and 1953 North Sea flood) damage and the redevelopment of (post-war) space, it also had a *social* (and economic) dimension which was equally significant. As stated above, the war and the flood were 'mere incidents' in a diversity of urban and (usually interconnected) rural problems. Reconstruction and (re)development in urban areas were often inspired by a 1946 issue '*De stad der toekomst, de toekomst der stad*' ('The upcoming town, the future of towns').[270] The most important outcomes are the so-called 'neighbourhood unit concept' (Du. *wijkgedachte*) and its concomitant manifestations of social and material neighbourhood planning.[271] In rural areas, beside physical reconstruction government programmes were initiated to tackle social deprivation. Such programmes were called *streekverbeteringen*, rural improvement projects. Initiator of rural improvement was the Ministry of Agriculture, which was also responsible for land consolidations; this explains why these two programmes often ran parallel. Legislation was a major tool for intervening in rural structures and arrears. Rural improvement projects started in the mid-1950s and continued until ca. 1970. One of the goals was to increase the efficacy of land consolidation and land development by dealing with associated social issues at the same time.[272] We will return to these social aspects of reconstruction towards the end of this chapter.

8.2 The 'Housing Act' and other relevant pre-WWII spatial-planning regulation and legislation

By the mid-20th century spatial development legislation in the Netherlands had a history going back at least fifty years. The most familiar of its early manifestations is the earlier

266 See e.g. Van der Werf 2016, 109-121.
267 *Ibidem* 114. Compensation measures were part of the expropriation procedures.
268 In particular the *Onteigeningswet* 1851, Article 62 ff., 73 ff.
269 Van der Werf 2016, 127-128. The Reconstruction Act was only fully and completely rescinded in 1992.
270 Bos, A. 1946, esp. 313-367. Literally: '*The city / town of the future, the future of the city / town*'
271 See e.g. Blom 2016, 52-54.
272 Schot, Lintsen, et al. (eds) 2000, 52.

146 A so-called plaggenhut (sod hut) in the village of Surhuisterveen (Friesland Province). It was declared uninhabitable, but was not (yet) abandoned by this family. (Unknown date)

mentioned 1901 'Housing Act' (*Woningwet*). This important Act, which addressed issues such as uninhabitable statements, urban construction and building regulations for new housing developments, came into force in the summer of 1902 and has been regularly adapted since as standards changed. It not only affected cities and built-up zones but villages and rural areas as well. (fig. 146) The so-called *uitbreidingsplan* ('municipal extension plan' or 'planned city extension') became one of the Housing Act's main instruments for defining spatial planning including land use and urban and environmental zoning.[273]

8.2.1 Regulation and legislation: the government enters the private domain

Another act which had an equally profound effect, if not more so, on people's personal lives had been introduced half a century earlier: the 1851 Expropriation Act (*Onteigeningswet*). It regulated 'expropriation for the common good [...] in the public interest of the State, one or several provinces, one or several municipalities, and one or several water boards [...].'[274] This Act too was radically revised multiple times.[275] Later, the Expropriation Act was to play a role in land consolidations, for these in effect amounted to expropriation of private land 'for the common good'.

Several other important acts introduced after ca. 1900 had a bearing on water management and water works. An example is an 1895 Act regulating the management of former peat extraction pits turned into lakes, and other dug-up peat soils. It stipulated that (private or corporate) land owners were responsible for the construction and maintenance of water-management features, and it also regulated the financing of 'costs of any embankment and drainage of land following peat extraction.'[276] In many instances, national laws supplemented the sometimes ancient local, regional or provincial rules and regulations surrounding water management. As we saw earlier peat extraction continued after WWII in several areas, whereas other (deep) excavations of clays, sand and gravel paralleled and followed.

273 *Woningwet (Wet, houdende wettelijke bepalingen betreffende de volkshuisvesting)* 1901, Articles 11-28.
274 *Onteigeningswet* 1851, Article 1.
275 Meijer Wiersma [1906].
276 *Wet houdende bepalingen omtrent verveningen*, July 13, 1895. The Act replaced earlier legislation which in part dated from the period of the French occupation.

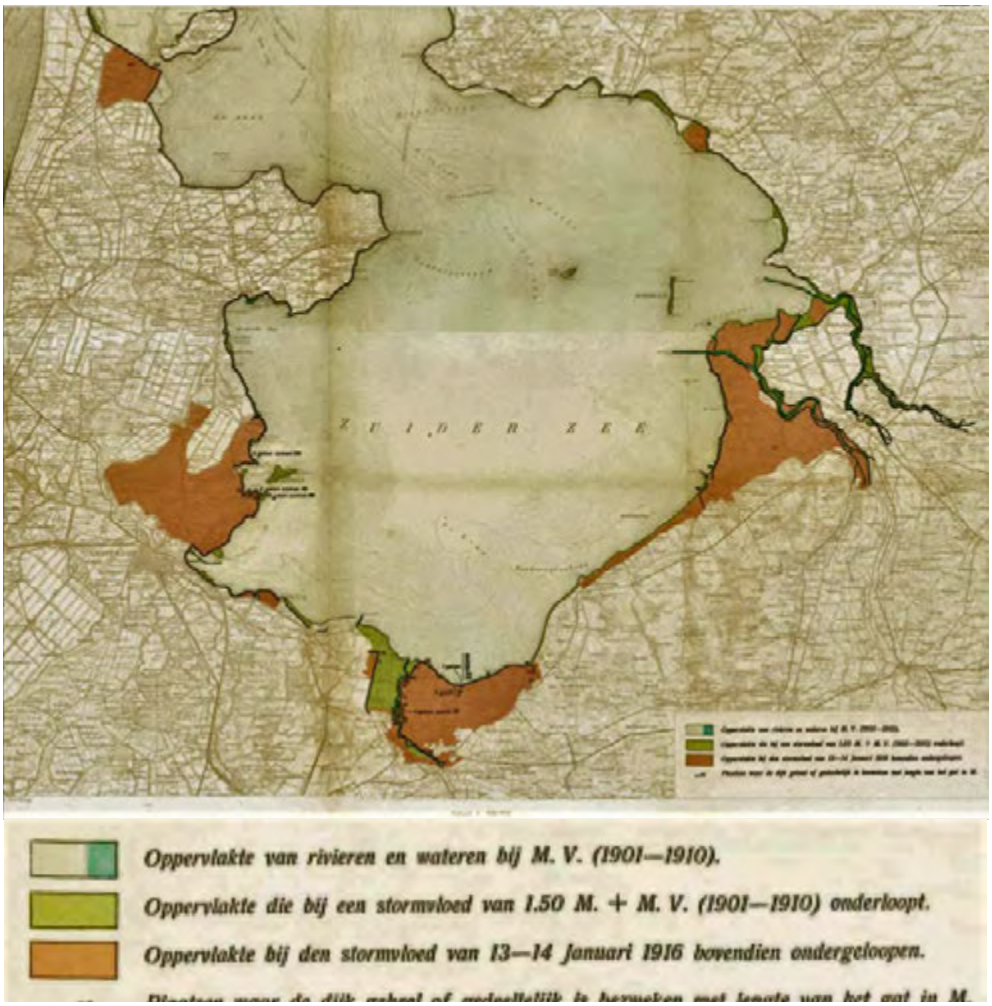
Legislation such as this represented an important step in a process in which administrations – and the national government in particular – could encroach upon the (physical) private domain of its subjects and land owners and compel them to cooperate in matters deemed to be in the public interest. In the case of land consolidations or the enclosure and partitioning of formerly common land (following a request by one or more stakeholders), legislation in effect elaborated on the 1840 the Exemption Act , the 1851 Expropriation Act and the 1886 Marken Act, all three discussed earlier in the context of reclamations. (see 2.3.1)
In comparison to other spatial legislation, the first Dutch Land Consolidation Act (‘*Ruilverkavelingswet*’) of 1924 was late in coming. While the State had the public interest at heart and was expected to act for the common good, the farmers’ initially rather tepid response hints at a more nuanced view. A favourable experience with cooperative diary factories etc. did not mean common approach of re-allocation was to be easily accepted. Farmers often failed to see how they might benefit from land consolidation and many therefore instinctively rejected the expropriation (and transfer) procedures. As a result, this first Land Consolidation Act was only moderately effective.

8.2.2 Early 20th-century legislation regarding water management

Governmental interference was also apparent on an even larger scale, especially as regards water management. In addition to the above mentioned 1895 Act regulating former peat extraction pits as well as the governmental intervention in water course maintenance, the government also felt increasingly responsible for the physical condition of the Dutch population. To modern readers, such an attitude may be self-evident but for a long time it was not, either in the Netherlands or in other countries.
As for the Netherlands, they were affected by several severe floods and famines between 1800 and 1916, reducing the living conditions of many of its subjects. The January 1916 storm surge and flood striking the heart of the country became a turning point however. (fig. 147)

From the mid 19th century onwards, plans were made to change things for the better. But in the early 20th century – while the World War I was fought outside Dutch territory – the existing body of legislation and regulation pertaining to water management was supplemented by new legislation which was to have a lasting impact on the nation’s appearance. This earliest national legislation (1918) regarding the great civil engineering and hydraulic projects of the 20th century mainly pertained to the embankment and partial drainage of the Zuiderzee. The *Zuiderzee Act* (Zuiderzeewet) might be regarded as an extension of the 1863 Act which led to the construction of the North Sea canal from Amsterdam to the west coast. This canal plan included drainage and reclamation of a branch of the Zuiderzee, the former Y. Various proposals to dam up and reclaim the much larger Zuiderzee itself had been made since the mid-19th century. Although the project touched upon the interests of many private individuals and lower administrations, two national interests prevailed: safety, and ensuring the food supply. The actual execution and design were the subject of separate planning procedures and regulation. As was mentioned earlier, existing ad hoc legislation and regulation was a traditional component of especially the smaller land acquisitions. Throughout the ages and up until the 20th century many hundreds of decrees were issued as to how to manage polders, land acquisition and land development. Some of them are still in force today – even if these decrees were issued before the Dutch unitary state was founded.[277] What is important is that Dutch water management comprises many tasks which the State has delegated to lower-level institutions, viz. the water boards (= polder-boards or *waterschappen*).[278] Yet, never a reclamation of any water surface in the Netherlands could be realized without governmental consent – be it on ad hoc basis or by legislative measure. The territories of many water boards coincided with the boundaries of specific land acquisitions or polders[279], and as such these water boards were statutory bodies which by definition were entitled to request a land consolidation. As a result, land acquisitions and polders sometimes set the course for land development during the reconstruction period.

[277] This unitary state was only founded in the last years of the 18th century and was revived in 1813 after Napoleon’s troops were defeated.
[278] https://en.wikipedia.org/wiki/Water_board_(Netherlands); See e.g. Giebels 2002, especially 276-279.
[279] Nearly all land acquisitions (reclaimed former bodies of water; Du. ‘*droogmakerijen*) are polders, but not all polders are *droogmakerijen*.



147 Map showing the flooded coast zones of the Zuiderzee in January 1916. There were about 20 deadly victims and damage was great. Such springtides happened rather frequently (see green), but this one led to a swing: de Zuiderzeewet. In 1916 both orange and green were flooded.

8.2.3 Land-consolidation: legislation prior to 1938/1941

In addition to entering the private domain and intervening in matters pertaining to water management, the government also intended to improve private living and working conditions. In the last decades of the 19th century it was observed that many Dutch farmers were eking out a living on small and scattered plots of land and that the situation was deteriorating. Land repartitioning or redevelopment has existed for centuries; in fact, these phenomena can be traced from the remote past right up to the present. Although historical maps can be important sources of information with regard to spatial development, it is not at all certain that old Dutch map series such as the *Topografische en Militaire Kaart* (TMK; Topographic Military Map; scale 1:50,000; issued since ca. 1850) or the *Chromo-Topografische Kaart van het Koninkrijk der Nederlanden* (CTK; Chromo-topographic Map of the Kingdom of the Netherlands; scale 1.25,000; since 1865) actually reflect 'original' situations. At the very least, they do not always or everywhere reflect the pre-19th-century state of affairs. After all, the radical partitioning and fragmentation of field and plots did not set in until that century,[280] largely in response to the reclamations and enclosures encouraged since the late 18th century and during the French period.[281] A probably far more reliable source on

280 With the exception of a few areas where farming estates were traditionally split up and divided among the heirs, as in Vriezenveen (Overijssel Province).

281 Van den Bergh 2004, 37 ff.

148 Partitioning of common grounds began in the early 19th century in the so-called French period. This Vorden case (Achterhoek region, Gelderland Province) is an early example reported on the first cadastral maps and in registrations.

pre-18th-century land division can be found in early cadastral maps and registrations and their predecessors. In rural areas they were the first 'exactly' and standardized recorded field surveys. Today they still can reveal us if and how far fragmentation of land ownership (and/or enclosures) had progressed in the 1830s. Especially a sequence of cadastral maps of rural zones in the sandy areas may show hardly expected developments. From the early 19th century there was a first legal footing for partitioning common grounds. (fig. 148)

Enclosure and partitioning of the *marken* received a further legal basis in the 1886 Marken Act referred to in an earlier chapter. The Act admittedly contributed little to agricultural modernization, at least with regard to maximization of the efficiency of land development, but nonetheless it was in a sense the predecessor of the 1924 Land Consolidation Act, the first universally valid piece of legislation on this issue in the Netherlands.[282] An important legislative milestone fact was the 1922 Boswet (Woods Act) that facilitated subsidy on several assets in woods, vegetations and in (natural or cultural) landscapes. The act unlocked the unassailable position of landownership in a positive way.[283] The 1924 Act was further preceded by specific regulations pertaining to

[282] See e.g. Schuiling 1934-1936, II, 639; Bijhouwer 1977, 67-68.
[283] See http://edepot.wur.nl/270958

land consolidation on a voluntary basis, as for instance on the island of Ameland (Ballumer Mieden, 1916) and in the Dalfser Hooislagen (1918; Overijssel Province); for both, the Heidemij (see previous chapter) had carried out the groundworks.[284] Heidemij, as a stakeholder in its own right who, with backing from the government, promoted land consolidation, was ultimately successful not only with farmers and land owners but also, and in particular, with the government in its legislative capacity.[285]

8.2.3.1 The 1924 Land Consolidation Act[286]

The overall purpose of the 1924 Land Consolidation Act was to counteract land fragmentation, which the government considered inefficient, and to create larger and contiguous fields by means of land swaps. It was further motivated by a desire to undo, mitigate and/or improve situations of 'deficient access or drainage'. Diepenhorst further explained the shortcomings of smallholdings and the advantages of land consolidation.[287] In addressing such shortcomings legislators faced a choice between two more or less opposite courses, a complication which had to be resolved before the Act could take shape. The first option entailed the full cooperation by all involved parties. In this option, land consolidation would be achieved by means of a so-called 'voluntary consolidation', which required that all land owners were willing to bring in their entire property to the extent it would be affected. The details of the ensuing process could be worked out by the land owners, provided no illegal procedures or illicit acts took place. In the second option, the legislator could opt for a fully 'statutory consolidation' in which repartitioning would proceed exclusively in accordance with legal rules set by the government. These rules had to be decided democratically, i.e. through parliament, as the representative of the people. However, in the final decades before the Land Consolidation Act most stakeholders were not democratically represented in parliament; until 1917, small farmers with low incomes usually were ineligible to vote and had no say in the political process.[288] When, after lengthy discussions, the Land Consolidation Act finally arrived in 1924 it did not immediately spark a rural revolution. On the contrary, the large number of stakeholders caused numerous problems and ordering or enforcing a land consolidation was impossible, since the 1924 Act did not contain provisions for that.[289] The State facilitated, without being a party in its own right. The 1924 Act was effectively a compromise between a 'voluntary' and a 'statutory' land consolidation process.[290] Its central tenet was that the legal procedure for every land consolidation would entail a *de facto* but not an administrative form of expropriation, after which the land would be re-allotted 'for the benefit of agriculture'.[291] The democratic nature of the 1924 Act was evident not so much in its genesis as in the practical conditions it posed. Before being able to proceed to land consolidation, at least one quarter of the involved land owners had to file a request to this effect with the provincial government (*Gedeputeerde Staten*), after which at least half the owners had to accept the plan in detail.[292] Those same owners together also had to represent at least half of the concerned acreage (this was called a 'double majority'). Abstainers were assumed to have voted in favour.[293] Voting was the final stage in the preparing activities of any land consolidation. Pre-interventional cadastral valuation, future spatial planning, etc. were ready and the new situation was thus taken a vote. In order to be assured the land consolidation was to be implemented enough stakeholders – in the 1924 Act represented by a 'double majority' of the landowners – had to approve the so called *Plan van Toedeling* ('allocation scheme'). In theory, the entire process from parliament to vote was thus a democratic one, with the possible exception of the stipulation regarding abstention. In practice, however, many were opposed to it, people were occasionally bullied,[294] and many plans came to nothing. The latter was partly caused by the fact that the government advanced the costs for a consolidation but under the 1924 Act did not subsidize it and even charged interest over the advance. As regard annuity on loans, conditions in 1924 were unfavourable at a staggering 13.6% over a period of ten years. Far too high for most of the farmers in scattered field areas. In 1933 Diepenhorst took a retrospective view of the first results, which were – as we can conclude now – not overwhelming. In 1930 he counted three completed land consolidations under the 1924 Act, comprising 1718ha. Further there were

284 Van den Bergh 2004, 61 ff., 74 ff.

285 Bouwman 1958, 40. Although this booklet is seldom referred to it nonetheless contains an eminently lucid description of the process of land consolidation.

286 For a contemporary discussion and explanation on this subject see the rarely consulted inconspicuous issue: Koenen (& Bordewijk) 1924, 108-145.

287 Diepenhorst 1933, 395 ff. He mentions as imperfections: 1. scattered fields, 2. tiny lots, 3. insufficient drainage, 4. adverse lot shapes, 5. shortages of roads, 6. loss of cultivable grounds caused by inefficient roads, 7. border clashes, 8. wrong crops, and 9. inappropriate land use practices.

288 http://www.parlement.com/id/vh8lnhrreozr/van_censuskiesrecht_naar_algemeen; https://www.politiekcompendium.nl/id/vh4vajttjxpa/geschiedenis_van_het_kiesrecht; https://nl.wikipedia.org/wiki/Censuskiesrecht. Until the introduction of universal suffrage for men in 1917 and for women in 1919, only those who met specific social criteria could vote. Prior to 1887, franchise only extended to men whose income tax exceeded a certain minimum amount.

289 See also: Van den Bergh 2004, 205.

290 Koenen (& Bordewijk) 1924, 137 ff.; Van den Bergh 2001, 63 ff. The land consolidation project Dalfser Hooislagen, executed by Heidemij, may have been a contributing factor in the introduction of the Act. Yet, consolidation was not universally successful; drainage problems, for example, persisted, in some cases making cultivation impossible (*ibidem* 2004, 73 ff.); Van Leusen, Vroom, et al. 1944, 32 ff. This *Nederlandsche Heidemaatschappij* (!) issue still distinguishes the two types when describing land consolidations Zwindersche Veld and Nieuwleusen (ca. 1925).

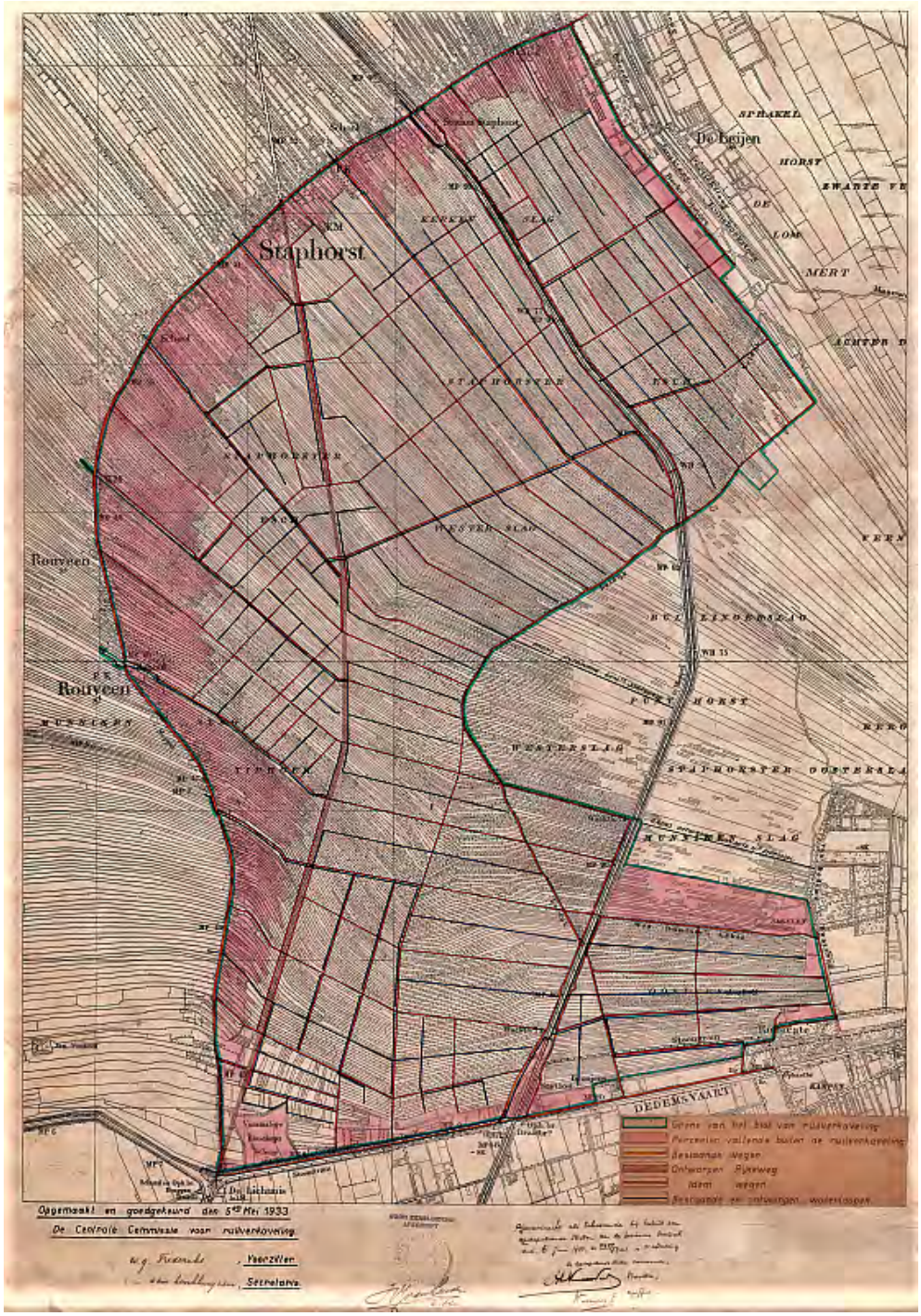
291 Voluntary, i.e. non-statutory land consolidation remained possible. It obviously required the permission of all stakeholders but had to proceed without financial advances by the government.

292 *Gedeputeerde Staten* are the executive council of the provincial government or *Provinciale Staten*.

293 Van den Bergh 2004, 40-44, 205. Universal suffrage for parliament existed since 1917 (for males) and voting was usually compulsory. Those who were qualified to vote could only vote in favour of one party or person. In land consolidation voting procedures, however, participants could also explicitly vote against a proposal. Abstaining therefore effectively damaged a participant's own interests.

294 An interesting phenomenon, since intimidation or bullying was precisely one of the illicit goings-on the procedure wished to prevent.

149 Land consolidation Hollumer Mieden, island of Ameland. This land consolidation was the first under the 1924 Act. Top: condition of scattered land, focused on three owners before the land consolidation; Bottom: properties of these three owners after land consolidation. About 20 years earlier these former common lands were devided on account of the 1886 'Markenwet' and as a result became extremely 'fragmented'.



150 Plan for land consolidation Staphorst (Province of Overijssel). The plan was approved by the Central committee for allotment exchange (Du: Centrale Commissie voor Ruilverkaveling) May 5, 1933. The right bowed line is an existing railway; the left bowed line is a partly newly planned national road. Red lines are new local roads; blue lines are water courses.

ten land consolidations under implementation (3880ha) and nine others were applied for (2685ha). Together these count to nearly 8300ha in 1930. The author nevertheless seems satisfied, although he remarks cooperation between the organizations on rural economist and agronomic engineering should be improved.[295] (fig. 149) This only changed from or in 1937 when in the impulse to the 1938 revision the Act the annuities dropped to 5% over a period of 26 years. Both the government and the House of Representatives (Du.*Tweede Kamer*) themselves were disappointed with the results until then.[296] The 1924 Act remained valid until shortly before World War II; its successor, the 1938 Consolidation Act, was adapted in 1941. (fig. 150)

8.2.4 Re-allotment and land consolidation: legislation 1938/1941 to 1945

Between 1938 and 1954, legislation and regulation pertaining to re-allocation and land consolidation changed considerably. Wartime conditions occasionally necessitated ad-hoc measures but at the same time new ideas were emerging while a number of special emergency acts came into force in the aftermath of the 1953 North Sea flood. The next paragraphs will focus on some aspects of the (sometimes abrupt) changes which characterized this period.

8.2.4.1 The 1938 Land Consolidation Act[297]

In 1938, the 1924 Act underwent some important revisions, leaving its original purpose more or less unaltered but adding provisions for a 100% subsidy on labour costs. This was made conditional upon the so-called *Dienst voor de Werkverschaffing* (Public Service for Unemployment Relief Works), the future *Rijksdienst voor de Uitvoering van Werken (DUW)*, carrying out the project. Moreover, the 1924 Act's 'double majority' clause was changed to the effect that, in the future, at least half of the involved land owners or a minority together representing over 50% of the land had to give their consent. In effect, this meant that a 'single majority' henceforth sufficed. In addition – and this turned out to be highly significant – the 1938 Land Consolidation Act gave the government the option to impose a land consolidation if this would be in the public interest. In other words, in the future the government could enforce land consolidation, as it did in the case of for example infrastructural projects that were judged to be essential. The 1938 revision turned the instrument of 'administrative expropriation' into an element of the Land Consolidation Act after all: it allowed some of the land to fall into the hands of public agents or other institutions working for the common good. This accomodation of the Act was the beginning of later changes.

As Table 8.1 shows, the new approach was effective, contributing factors being the fact that the economic situation started to improve around 1938 and that the prospects for the future were favourable. However, the start of the Second World War soon dampened the new optimism. Growing uncertainty among farmers meant that very few new land consolidation plans were newly initiated between 1943 and 1945. However, the total number and summed acreage of applications permanently increased and in 1945 even peaked for a while. Table 8.1 does not show the exact areas concerned, but a little more information on this can be extracted from the following numbers. As shown by August 1, 1938, 29 applications for land consolidation projects had been approved (which did not necessarily mean they had also been implemented), followed by another 19 projects up to the Second World War. The total number of applications between 1924 and 1940 was more than three times higher, probably adding up to ca. 158 and covering over 94,000ha in total (25,000ha each in Overijssel and Noord-Brabant). The year 1939 was a peak year, with almost sixty applications. The years 1938 (ca. 19) and 1940 (ca. 30) lagged behind; nonetheless, ca. 90 out of a total of ca. 158 applications were filed within this three-year period. The average size of the requested land consolidation projects kept pace: from less than 400ha before 1938 to over 1,000ha in 1940.[298] On the eve of the Second World War, interest in land consolidation was clearly soaring. Two factors are widely held responsible: namely confidence in a lasting economic recovery after the crisis of the 1930s was increasing, and the new 1938 Land Consolidation Act that was taking effect not only strengthened the position of those who were

[295] Diepenhorst 1933, 400, 401.
[296] Van den Bergh 2004, 205; see also: Kamerstuk Tweede Kamer 1936-1937 kamerstuknummer 210 ondernummer 5, 33 ff., 42.
[297] Schepel 1938, 24 ff. Just like Bouwman 1924 this compact issue is seldomly consulted. Yet it practically describes the full process of land consolidations under the new 1938 Act. It also contains the full text of the act.
[298] Van den Bergh 2004, 115-122.

Table 8.1 Number of applications and accepted and rejected land consolidations in the Netherlands, 1923-1970.

Year	Requested	Accepted by vote	Rejected by vote	Total completed 1960
		1923-1928	**1923-1928**	
1923	0			
1924	1			
1925	4			
1926	2			
1927	5			
1928	7			
1923-1928	19	8	2	
		1929-1936	**1929-1936**	
1929	4			
1930	2			
1931	3			
1932	2			
1933	5			
1934	1			
1935	0			
1936	5			
1929-1936	22	13	11	
		1937-1940	**1937-1940**	
1937	10			
1938	19			
1939	58			
1940	30			
1937-May 1940	117	27	4	
Total	158	48	17	
May 1940-May 1945	109	36	4	
May 1945-Dec. 1950	183	47	4	
1951-1955	50		7	
1956-1960	38		3	
Total	538	179	52	
	Requested	**In implementation**		**Total completed 1960**
Total in 1960*	587	84	ca. 52	146
1961-1965	46		0	
1966-1970	42		2	

Sources: Van den Bergh 2004, 48, 50, 121, 208 ff.; Landbouwcijfers 1960, 37.

* Due to different sources this addition does not match the above figures.

affected but also provided more favourable financial conditions.

8.2.4.2 The 1941 Revision of the 1938 Land Consolidation Act

The above mentioned 1941 revision of the 1938 Act – imposed by the German occupying forces – was no doubt meant to further simplifying the procedures by including an option to proceed to the implementation stage before the ('single majority' of) stakeholders had approved the *Plan van Toedeling* ('allocation scheme'). Another important element of the revised Act was the introduction of an option for compensation in money rather than land.[299] This meant that land which was the subject of a consolidation procedure no longer needed to be exchanged for other land (or to remain with the same owner, depending on what was expedient) but that compensation in the form of its monetary equivalent became an alternative option.[300] Earlier, this had happened only in cases of a minor residual difference in value after an exchange, but after 1941 it became a 'regular form' of 'legal' expropriation. It must be noted that in a this development, the democratic nature of the land consolidation process was reduced after 1941. In fact the 1938/1941 Act was not much used during the German occupation, mainly because of the mid 1942 moratorium on most non-military construction work.

8.2.5 Legislation regarding Land Consolidation between 1945 and 1954

After the war, work was resumed on the basis of the 1938 and 1941 Acts. However, war damage and changing economic conditions made new legislation desirable as the necessity to reorganize both agricultural land and the procedures for its development was widely felt. Moreover, the post-war expansion of European and global agricultural markets called for upscaling. (fig. 151)
Truly innovative legislation was preceded, however, by a brief period of ad-hoc laws and regulations providing solutions for urgent cases and current projects. *Emergency laws* on a variety of issues were drafted, granting the government exceptional powers to take the necessary steps. The most far-reaching of those with regard to spatial issues were introduced in response to the war-time inundations and the subsequent 1953 North Sea flood in the south-west of the Netherlands. The 1947 *Herverkavelingswet Walcheren* ('Land Re-consolidation Act Walcheren'), for instance, used this approach to address the reconstruction and development of this heavily afflicted island. In a sense, re-consolidation is a form of 'ordinary' land consolidation (although the term is not defined as such in the 1947 Act) but with a broader legal scope. Re-consolidation might involve a complete repartitioning of the field system including farm relocation, other options being the phasing out of farms, or colonization.[301]
The main instrument for re-consolidation was expropriation in the public interest upon payment of the land's estimated value in compensation.[302] This was an extension of the 1941 revised Consolidation Act and it also echoed the pre-1924 discussion on the *de facto* or the administrative form of expropriation. In order to position farms more efficiently throughout the available area some of them had to be terminated so as to allow the others to expand. Phasing out farms was therefore an element of the Walcheren re-consolidation project while additional space was created by relocating almost 120 Walcheren farms to the then brand-new Noordoost Polder. Although the implementation of the emergency law ran into some problems, both the developers and the government nonetheless gained valuable experience. For the time being, Walcheren moreover seemed to be a unique case from which useful lessons could be learned for future legislation.
However, after the February 1953 North Sea flood and in that same year, a second emergency law for spatial intervention was introduced, the 1953 *Wet Herverkaveling Noodgebieden* ('Re-consolidation of Disaster Areas Act'). This Act replicated the Walcheren Act; among the areas targeted by it was the island of Schouwen-Duiveland (see also the relevant Box Texts on Walcheren and Schouwen-Duiveland).[303]
The 1954 Land Consolidation Act was introduced shortly afterwards, and unlike the 1941 revision and the two emergency laws it enjoyed parliamentary support. The new Act had a wider

299 *Ibidem* 47-48, 206, 209.
300 In fact this proved to be inflationary money.
301 The *Herverkavelingswet Walcheren* was an emergency law in the form of a *Koninklijk Besluit*, a Royal Decree, rather than following the usual parliamentary procedures.
302 http://wetten.overheid.nl/BWBR0002034/2002-01-01#TiteldeelI.
303 http://www.statengeneraaldigitaal.nl/document/tekst?id=sgd%3Ampeg21%3A19521953%3A0002861&pagina=1. The other areas were the island of Tholen and parts of the island of Zuid-Beveland.

151 A famous promotional image saying: 'Land consolidation – serves you and our country' (1946).

scope than its 1938 and 1941 predecessors and it built upon the experiences gained on Walcheren and with several (post-war) experiments and outcomes in other parts of the country, such as De Scheeken and Maas en Waal-West (see the relevant Box Texts).

8.2.6 The 1954 Land Consolidation Act

The 1954 Land Consolidation Act was the product of a significant shift in thinking with regard to land development in the Netherlands. While all previous legislation which affected land development and spatial planning had focused on agrarian functions and land use, the new 1954 Act was significantly broader in scope. It much more explicitly emphasized public interest in that it also considered other spatial interests besides agriculture, and no longer exclusively in the context of or as an argument for land consolidation. In practical terms, the Act no longer exclusively served the interests of agriculture (arable or livestock), horticulture and forestry but it also stipulated that 5% of the agricultural value of all acquired land could be used for 'purposes in the public interest'.[304]

[304] Of course, when necessary the proportion of land allocated to non-agrarian purposes could exceed 5%, but in that case any additional acreage had to be purchased separately.

Alongside this 5%-clause, the *Stichting Beheer Landbouwgronden* (*SBL;* 'Foundation for Agricultural-Land Management')[305] could also acquire land for the sake of public interest, for which it paid market prices. In practice, SBL accumulated a 'land stock' out of which agrarian as well as non-agrarian functions and interests could be served, either through purchase or in lease. These might include recreation, traffic infrastructure,[306] water management, urban development, industry or mining, but the term public interest might also be extended to include nature, landscape management and cultural-historical artefacts as elements of new development plans. (fig. 152)
The broader scope of this new Land Consolidation Act can be recognized in the so-called 'landscape plan'. The term landscape plan was being used already before WWII, but it only met with general response after 1945. The landscape plan (explained in more detail below) acquired a legal status and areas of significant landscape value could henceforth be protected. This was conditional upon the landscape plan's explicit listing of significant characteristic landscape features, qualities and assets as e.g. specific forms of vegetation, wooded banks, field patterns or typical geomorphological traits.[307] Yet another important feature of the new Act was that tenants – and not just land owners – henceforth would be regarded as stakeholders. The concept of 're-consolidation', which was part of the name of the emergency law for Walcheren but without receiving further

152 Road construction might be an incentive for land consolidation or land reclamation. Dual-carriage roads like this one were not always within the 1954 5% clause. Space for such roads and other infrastructural provisions had to be acquired at market prices or by expropriation.

[305] *Stichting Beheer Landbouwgronden* (1945) was the new name of the before mentioned *Stichting Landelijke Bezettingsschade* (SLB; 1941).
[306] In particular motorway construction.
[307] See also Driessen 1990, 92, 93.

clarification, is not mentioned in the 1954 Land Consolidation Act. This is remarkable, in view of the fact that farm terminations or relocations and the colonization of areas formerly exploited extensively or not at all were to be regular occurrences in the years that followed.[308]

The 1954 Act sparked numerous so-called '*ruilverkavelingen nieuwe stijl*', 'land consolidations in the new style'. In practical terms, this not only meant that the population became involved in the plans at a much earlier stage, but also, and especially, that cultural-historical aspects and values (assets) and recreational functions or road construction could be integral elements in the plan's execution. The above printed Table 8.1 shows a dramatic post war increase of applications for land consolidations. As a consequence the progress in implementation of land consolidations soon lagged behind. This problem even worsened after the 1953 North Sea flood, that unfortunately just preceded the new Act and its built in formal legislation of the landscape plan.
Yet the rapid adoption of 'new land consolidation' was apparent around 1960, when on the occasion of an imminent consolidation project one of the involved agro-engineers wrote: '*By now, the land consolidation in the new style has expanded into a comprehensive project in the context of which, in addition to the merger of plots and the construction of roads and water courses, soils are being improved through levelling, reclamation and re-reclamation,* [ground water] *drainage and* [permanent] *water management; possibilities are being created for farm relocation, reorganization of holding size, slum clearance, and the installation of water mains and electricity. At the same time the field complex is given – in accordance with spatial-planning concepts – a completely new appearance which as much as possible retains the beauty of the landscape or creates a new beautiful vista.*'[309] This is a neat summary of the new Act, albeit one which fails to explicitly mention the 'landscape plan' that was part and parcel of it. Equally omitted here is a reference to the fact that, around 1960, '*ruilverkaveling nieuwe stijl*' had become linked to another phenomenon, 'rural (social) improvement'. This might include the provision of utilities like electricity, sewers, or potable water. (fig. 153) (see below, 8.3)

8.2.6.1 The Landscape Plan in Land Consolidation and Reclamation

The 1954 Land Consolidation Act explicitly mentioned the term 'landscape plan'. Article 34, Section 2 states: '*The provisions mentioned in the first Section may consist of:* [...] *b. the landscaping of the block (landscape plan)*'.[310] However, the Act did not specify the details of the landscape plan. In fact, the term was used not only in land consolidation projects but also in relation to the structuring of newly drained land and other reclamations. Most landscape plans therefore combined many different elements.

153 Rural improvement programs might include connection to an electricity network. Sometimes a former network did not survive the war, but completely new connections were common as well. This 1954 transformer-station near Echteld / Lienden (Gelderland Province) is probably of the second kind.

Landscape plans became an incentive to move from 'preservation to construction'. The first landscape plans involved roadside vegetation and decisions such as whether to eliminate or maintain existing vegetation and whether or not to allow heavy machinery in certain parts of the area involved. At a later stage, the scope as regards landscape development and modification was extended and the architects of a landscape plan took into account *all* non-agrarian interests, e.g. towns and other residential and industrial areas and their (spatial) functions. As a result, the effect of landscape plans on the post-war development of the Netherlands can scarcely be overestimated, even though their execution was frequently more sober than the designs prescribed.

308 Bouwman 1958, 88-92.
309 Siepman 1960, 73.
310 *Ruilverkavelingswet* 1954. Article 79 explicitly assigns a specific task to the local committees: a local committee 'also produces a map of the landscape plan.' The term 'block' literally translates the Dutch term *blok* used in this quotation from the Act.

8.2.6.2 Landscape plans as a conservation and design success

The inclusion of the landscape plan in the 1954 Land Consolidation Act was a success for those who had actively championed them for many years, particularly for members of the *Contact-Commissie voor Natuur- en Landschapsbescherming* (CC), mentioned earlier and operating already before WWII, and members of the *Werkgroep voor Cultuurlandschappen* (WCL; 'cultural-landscape taskforce'). It was also the embodiment of the continuity in ideas on landscape development before and after the Second World War, for already before and during the war, landscape plans were optional elements in the design of reclamations and land acquisitions. The earliest sketches for a landscape plan for Noordoost Polder, for example, were made by *Staatsbosbeheer* (SBB) in 1942 and the concept had also featured on the occasion of waste-land reclamations in the province of Friesland as early as 1936.[311]
Some of the pioneering individuals and organizations behind the establishment of the CC and the WCL were also promoters of landscape preservation; in particular G.A. Overdijkink, J.T.P. Bijhouwer and their much older colleague, D. Hudig, played important roles. In a process analogous to the development of town planning and architecture, these individuals furthered post-war disciplines like landscape architecture or landscape building. Especially urbanist D. Hudig (1872-1934)[312] was an important figure; in 1928, he was among the first to design a landscape for the future IJsselmeer Polders. He saw what was happening there as an extension of the traditional Dutch land acquisitions and polders and he distinguished two main types of (polder) landscapes:

1. The 'expressive-pictorial landscape', which he believed to be manifest in the peat landscapes;
2. 'The architectural landscape', typical of the polders.[313]

In the first type, isolated elements such as tree clumps and farms largely shape the experience of space. In the second type, the dominant elements are the landscape's geometric linear configuration in the absence of pronounced relief. Hudig's ideas ultimately gave rise to the concept of continuity which is still current today.

His younger colleagues and fellow 'landscape preservers', landscape architects Bijhouwer[314] and Overdijkink, both had a background in garden architecture and mainly concentrated on vegetation along roads, water courses and dykes but also as a demarcation of the boundaries of farmyards and in historical stands of trees. Both were also experts in historical landscapes and as such strongly involved in their preservation.[315]

8.2.6.3 Designing Landscape Plans: a virtual SBB monopoly

Spatial development in the early post-war period often harked back to the basic principles established by these and other pioneers. For between 1940 and 1965, a new generation of landscape architects were ready to tackle the redevelopment of the Dutch countryside. Urban planning, architecture, spatial planning and aspects of botany, soil science, civil engineering, physical and historical geography and sociography were all part of this process. The first tentative beginnings of the pre-war period had now fully matured[316] and were even flourishing, thanks to a few major nature and landscape conservation organizations[317] who had been enthusiastic champions of existing natural and cultural assets. One of them was the above mentioned governmental *Staatsbosbeheer,* more specifically its department *Natuurbescherming en Landschapsverzorging* (1943; 'nature conservation and landscape maintenance').[318] It was due to the efforts of advocates such as R.J. Benthem and Overdijkink that the landscape plan was adopted by *Staatsbosbeheer,* which proceeded to design dozens of them. Examples are the plans for Beltrum I by H. de Vroome and for De Scheeken by R.J. Benthem (see relevant Box Texts). Quite a different example is the adaptation of a war damage region along the River Meuse at Mook / Middelaar, where a landscape plan helped turning a sand and gravel pit into a recreational zone. (fig. 154, 155)
For ca. 25 years, SBB was in fact a monopolist, the sole designer of landscape plans. This led to some uniformity in the results but it also guaranteed a broad view and prevented uncontrolled (private) excesses.

311 See *Nieuwsblad van Friesland: Hepkema's courant*, May 15, 1936.
312 See e.g. http://resources.huygens.knaw.nl/bwn1880-2000/lemmata/bwn3/hudig. Hudig died several years before the Second World War, but he witnessed the start of the *Zuiderzeewerken* and some of the economic depression of the 1930s and its ideas on the deployment of the unemployed.
313 Hudig meant the reclaimed land polders in former bodies of water, such as Beemster and Haarlemmermeer Polder.
314 See e.g. https://nl.wikipedia.org/wiki/Jan_Bijhouwer.
315 De Visser 1997, 14-16, but see also 138 ff.
316 Through publications by authors such as T.K. van Lohuizen, D. Hudig, H. Cleyndert Azn., J.T.P. Bijhouwer and M.J. Granpré Molière.
317 E.g. *Vereniging tot Behoud van Natuurmonumenten* (1905; Jac. P. Thijsse & E. Heimans), *Bond Heemschut* (1911) and *Contact-Commissie voor Natuur- en Landschapsbescherming* (1932). Also see: Purmer 2018, 182 and *passim.* Especially *Natuurmonumenten* had to accept upscaling (e.g. bythe closing down of farms on private reclamations followed by enclosures) and agricultural modernization (mechanization, market directed production) in their cultural landscapes were inevitable.
318 Siraa 1989, 165; Scheffer 1998, 40-41. Some prominent members of Dutch National-Socialist organization NSB also argued in favour of nature conservancy and the preservation of cultural assets, as for example in Wassenaar.

154 Landscape plan of the land consolidation Mook / Middelaar (Limburg Province). The post-war plans for this severely struck area integrated a gravel and/or sand pit in a former branche of the River Meuse. (Plan ca. 1949) Today this is a recreational zone.

155 A former gravel pit near Mook / Middelaar was turned into a recrational zone in the course of the realization of a landscape plan. The location includes a sweet water beach and a river marina. (Photo, Spring, 2006)

8.2.6.4 Landscape plans: landscape design as a mature discipline

Once the landscape plan had been introduced in landscape design in reclamations and new polders in the late 1930s and 40s it was soon embraced by the three or four disciplines involved in landscape design.[319] After test-cases in land consolidation and re-consolidation projects had been successful, it became formally acknowledged as an instrument.
With the landscape plan, the 1954 Land Consolidation Act really came into its own in the sense that, thirty years after the first Land Consolidation Act, it formally adopted 'quality' – defined as 'added value' – as a component of the spatial development process of younger landscapes.[320] Once this component was in place, all that remained was to wait for the planted

[319] Viz. Town planners, rural planners, sociologists, sociographers, etc.
[320] A former director of the Dutch Cultural Heritage Agency (RCE), C. van 't Veen, once defined quality as 'that which adds value'.

trees and other vegetation to mature. Inevitably, that took a while and the impatience which accompanied the waiting process may well have been one of the factors behind the widely felt disappointment with regard to the land consolidation landscape. What the architects envisioned at their drawing boards was the future; what the first residents saw through their windows was the (temporary) reality. Often, that reality also included social deprivation. In order to at least alleviate that situation, so-called rural improvement projects were carried out from the mid-1950s onwards.
The next pages will focus on this aspect of the efforts to improve rural conditions in the post-WWII period.

8.3 Rural social improvement projects

From the first decades of the 20th century there were iniatives were taken to improve social circumstances in rural areas. Especially farmer's wives were targeted and there at several places so called *landbouwhuishoudscholen* (agricultural domestic science schools) came into being. Likewise a handful of books, magazines as well as organisations contributed to the information flow on modernization. Soon all kinds of aspects of social and material life in rural areas were focused on – from sanity, comfort and living conditions to education and possible future professions of farmer's daughters and sons. Pre-war programs and initiatives were continued and/or reinforced in the reconstruction period on a much wider scale and became governmental spear-heads in the struggle against rural social deprivation.[321]
In addition to witnessing the land consolidation acts, legislation pertaining to reclamation and land acquisition by draining bodies of water, and the 1953 emergency laws, the 1950s were also the period when a set of tools was forged to deal with rural deprivation. The goal was to accelerate the development of deprived rural areas towards a modern society and to remove, or at the very least materially lessen, the (social and economic) contrasts between urban areas and the countryside. The programmes were marketed under the name '*Streekverbetering*', 'Rural Improvement'. Rural improvement projects varied considerably in scope but in spatial terms they often (largely) coincided with land consolidation (e.g. re-allotment) and/or land reclamation of waste lands.

8.3.1 Rural improvement as an umbrella concept

The concept of rural improvement became prominent in the second half of the reconstruction period; it was virtually synonymous with the elimination of a wide range of rural problems. Rural improvement was instigated by the Ministry of Agriculture, which in 1956 provided a legal basis for the earlier established *Landelijke Landbouwvoorlichtingsraad* ('national agricultural advisory council') and its provincial branches. One branch of the council was the *Rijkslandbouwvoorlichtingsdienst* (RLVD; 'national agricultural-education agency'). It was more practical in outlook than the council; it concentrated on domestic training and modern housekeeping for women and technical and economic training for men.
Some data on utilities illustrate the necessity of dealing with rural deprivation. In 1950, 63% of farms was not linked to a water supply network and 24% still lacked electricity (and by extension did not have a radio – remember the 1953-disaster). A sewage system was completely unknown in rural areas. Moreover, many older individuals were almost or completely unable to read so that they had only limited contact with the outside world, and information contained in newspapers or other printed media barely reached them.
In its intentions, rural improvement was a 'modernization campaign'. It comprised a wide range of farm-technical, domestic and social-agrarian educational programmes targeting a large number of rural families. Some programmes were adapted to specific local conditions but most were general information campaigns addressing mentality, behaviour, habits, lifestyle, living conditions, hygiene, education, finances, domestic management, household amenities, health care, and even religious and moral aspects of life. In addition, rural improvement might focus on eminently tangible issues such as home improvement,

321 Elpers 2019, 204-217. For instance, a Dutch concern, Bruynzeel, introduced all kinds of (interior) accessories, such as (standardized) doors and door-frames, window-frames and from 1937 kitchen elements, etc. Bruynzeel is still leading in kitchen-equipment and -design and doors, etc. Also see: https://nl.wikipedia.org/wiki/Bruynzeel_(bedrijf)

322 Karel 2005; Bouwman 1958, 34-37. Although rural improvement programmes and land consolidation were not intrinsically linked, in actual fact they often were.

slum clearance, employment programmes or (public) transportation.[322]
Rural improvement programmes – 140 in total – ran from 1956 until 1974, the year the last programmes ended.[323] The greatest number of them clustered on the poorer sandy soils in the east and south (in particular Noord-Brabant), on the alluvial clays of the major river plains, in Friesland, and in some isolated pockets of the marine clays in the south-west, on the islands of Zeeland and Zuid-Holland.[324] It is no coincidence that these were the same areas that were also the focus of land consolidation and landscape reconstruction. Nonetheless, some of the islands hit particularly hard by the 1953 North Sea flood were not targeted by the programmes, either because social and economic conditions there were deemed acceptable or because local residents refused to take part. The 'younger polders' in the former Zuiderzee were also conspicuously absent; vetting procedures for new farmers in these areas were already strict, and it was assumed that those who had received permission to start a farm there no longer needed a rural improvement programme.

8.3.1.1 Target programmes

Different educational programmes targeted different audiences. The most obvious distinction was that between programmes for men and those for women. Programmes for men particularly addressed technical, technological and economic aspects of farming, such as mechanization, farm size and farm management. Technical improvements were usually introduced during or shortly after a land consolidation or reclamation. Programmes for women addressed domestic issues like housekeeping, hygiene, tools and appliances that might assist them in this, and home improvement. Domestic education followed new ideas on farmhouse layout and furbishment whereby the traditional farmhouse which combined all functions under one roof was gradually abandoned, moving instead to segmented or isolated buildings and houses equipped with the comforts of modern living. Programmes aimed at children and older youth focused on education and career counselling, for in the programme instructors' opinion it was advisable for children to not automatically follow in their parents' professional footsteps. The overall aim of rural improvement was to 'elevate' the rural population.[325] This was achieved by broadening people's horizon by means of films, radio and television, by building low-threshold facilities for basic medical advice and first-aid, launderettes and libraries, and further by installing electricity, water mains and other facilities. Social matters were addressed as well, e.g. how to interact with persons or families with different convictions, or possible alternative ways to divide tasks among family members, visiting larger cities, or using facilities. (fig. 156)
One distinct aspect of rural improvement were the so-called 'model villages', where thousands of visitors could come and look around. Rottevalle in Friesland was one such model village, as was Kerkhoven in Noord-Brabant (although neither was a completely new settlement). (fig. 157) Besides these villages there were also model farms, some of which

156 One of the activities within rural improvement programs might be visiting big towns or relevant events. These women are on their way to a good housekeeping fair (Du: huishoudbeurs). (Unknown date and location)

157 An open cattle shed in the 'model village' of Rottevalle, Friesland Province. It is one of the surviving ca. 1953 agrarian example buildings.

323 Karel 2005, 251, 124.
324 *Ibidem, passim.*
325 Andela 2000, 140-145.
326 See e.g. Andela 2000, 133 ff.; http://landschapsbeheergelderland.nl/wp-content/uploads/Rapportage-Wederopbouw-Maas-en-Waal-West.pdf.; Van der Wal & Hoekstra 2010, 61.

could be found in the land consolidation Maas en Waal-West (see the relevant Box Text).[326]

8.3.1.2 Educational films

A specific means of communication frequently used in rural improvement projects was the educational film. Between 1948 and 1984, over 500 agricultural educational films were made of which the above mentioned *Rijkslandbouwvoorlichtingsdienst* (RLVD) was the main producer. The films were shown during local meetings for rural residents and used in agricultural colleges. Of course, they were inherently propagandistic in nature and presented examples of successful modernization projects, reclamations and land consolidations and, especially, of the social-economic advancement of those involved in them, besides showing how farmers might change their traditional ways. They also provided material for discussions; in schools they bridged the gap between teachers and pupils, and in society at large that between 'ladies and gentlemen from town' and the rural population, and they helped to lessen mutual distrust.[327] What the films failed to adequately address were the conditions for and consequences of upscaling. A large modern holding with gas pipes, water mains, electricity and farming machinery was only reserved for a select few, not for everyone who might be interested.[328] Just as Minister Mansholt did not openly mention the phasing out of farms as a negative (although implied) consequence of upscaling, the subject was also glossed over in the educational programmes,[329] making the hundreds of upbeat films complicit in their hidden agenda.[330] (fig. 158)

8.3.2 New urban-rural relations

One of the more radical consequences of rural modernization programs was the migration of farmers and farm hands to industrial regions. Policy makers had initially hoped to be able to limit those migration streams and they did in fact not even were part of the social improvement programs. On the contrary: through application of industrial incentive policies targeting so-called '*stimuleringsgebieden*' (economic development areas, empowerment zones), and also in view of the growing post-war economy, many former agricultural workers would be able to work in factories in their own region[331] whiles continuing to live in the countryside or in their own villages – or so it was believed. Henceforth their lives would span two worlds: their working lives would be spent in the towns or with a (large) company, while their private lives would be spent in familiar surroundings. The result was a stream of commuters between town and countryside, usually every day but occasionally every weekend, for many lodged in boarding houses during the week. For some decades, factories and other companies even organized busses to shuttle their own workers between their jobs and homes every day.
However, as people were becoming more familiar with town life a gradual but persistent drain of large swathes of the countryside set in.[332] Obviously, a smaller workforce was needed in places where phasing out and mechanization started to take hold. Over the years, tens of

158 Stills taken from the 1957 agrarian instruction motion picture 'Van oud naar nieuw' ('From old to new'), by Allan Penning and commissioned by the Ministry of Agriculture.

327 https://www.bureau-europa.nl/documents/Mansholt,%20Landsc(h)ap(e)%20in%20Perspecti(v)e(f).pdf
328 E.g. Veer 2013.
329 Bogaarts 1989, B, 1552-1553.
330 See e.g. Andela 2000, 133 ff.; http://landschapsbeheergelderland.nl/wp-content/uploads/Rapportage-Wederopbouw-Maas-en-Waal-West.pdf. Before the Second World War, model farms were built in Warnsveld, Overveen (1884) and Spoolde (1909). See e.g. http://www.delfgou.nl/portfolio/modelboerderij-elswout/ and also http://www.joostdevree.nl/shtmls/modelboerderij.shtml.
331 Moerman & Wentholt 1959, 266 ff. In one case in Overijssel, the fact that farmers who were made redundant arrived at the factories virtually uneducated was mentioned as a drawback.
332 See e.g. Groenman 1958-1959, 461 ff.

thousands of people – agricultural labourers but also numerous independent smallholders – moved from the countryside to the towns or even abroad. The result was a negative net migration in northern Groningen, northern Friesland, northern Noord-Holland, and the islands of Zeeland and Zeeuws-Vlaanderen (Zeeland south of the estuary of the river Scheldt), particularly in the period 1945-1965. It marked the start of an accelerating rural population decline.[333] The opposite effect could be observed in the growth of existing towns and cities and in the new overspill towns, where new suburbs and housing developments started to encroach upon the surrounding countryside. As a result, many villages in a sense moved closer to urban areas or were even absorbed by them.

8.3.2.1 Different answers to comparable problems

At first, the officially anticipated decrease in the number of farms mainly affected the sandy soils of Noord-Brabant Province, where around 1950 the vast majority of holdings was less than 5ha in size.[334] Despite twenty-four land consolidations (affecting ca. 16,500ha in total) having been carried out there between 1924 and 1950, ca. 65% of the young people born and raised locally had to look for other sources of income. It explains why at least three of the model farms and/or model villages were located in Noord-Brabant, including the above mentioned hamlet of Kerkhoven. Attempts to induce farmers to give up farming depended heavily on persuasion by means which included demonstrations and examples. Ultimately, many yielded. The transition from farmer or farm hand to factory worker was even a fairly smooth one in Noord-Brabant, where the population rather than leaving the province altogether often moved to towns like Tilburg, Breda or Eindhoven. Unlike Noord-Brabant, Friesland soon experienced an emigration to the urbanized west of the Netherlands, as many failed to see any opportunities for farming in the future. Not only farmers on the sand and peat soils south and north of the major river plains were the focus of attention during land consolidation and rural improvement projects. The river plains were likewise targeted, an area of over 70,000ha most of which most had been inundated during the Second World War. It was here that land consolidation Maas en Waal-West was situated, in 1956-1962 the focus of a rural improvement project. This particular land consolidation became famous for its colonization of the central alluvial clays but also for its noticeable slum clearances and the introduction of 'modern living' in dozens of farms. Not only did the area serve as a showcase of modernization for farmers in the rest of the country, but it was also a favourite destination for (coach) trips from the cities. It seemed that citizens were becoming curious about life in the country.

After this chapter on legislative aspects of rural modernization the next one will focus on tangible post-WWII developments in three different types of land development: reclamations of former water surfaces (land acquisition), reclamations of waste land (cultivating the wilderness) and land consolidation (land repartitioning and rural improvement). The *Deltawerken* (Delta Works) in the south-west of the country constitute a fourth topic.

159 An early model farm: diary farm Lactaria in the village of Stevensbeek (Noord-Brabant Province) (Photo ca. 1930).

333 See also *Atlas van Nederland*, 1963-1977, Map XI-3; *Atlas van Nederland*, 1984-1990, Vol. 1, 1984, 17.

334 In the provinces of Noord-Brabant and Limburg, virtually the entire population was and for generations had been Roman Catholic. In the context of the highly factionalized nation the Netherlands was at the time, the effects of this situation can hardly be exaggerated. They were the only provinces where one centralized faction, other than the central government, was able to dominate society and where modernization was not universally welcomed.

Beltrum I, 1952-1961

Land consolidation and rural improvement, Berkelland Municipality

Identification

- Beltrum I is situated in an area of mixed farmland surrounding the former hamlet of Beltrum, between Groenlo and Borculo, east of the river IJssel in the Gelderland region of Achterhoek.[1] Its southern and south-western boundaries are marked by the small brook Slinge, canalized in the first half of the 19th century.
- The land consolidation plan for Beltrum I (ca. 2,770ha) was drafted in 1950; architect of the landscape plan was H. de Vroome of *Staatsbosbeheer*. The land consolidation was implemented between 1952 and 1958 under the supervision of *Nederlandsche Heidemaatschappij* and partly coincided with a rural improvement programme (1956-1961).

Problems

The environment of land consolidation Beltrum I had always been a fairly fragmented bocage landscape with mostly irregular fields and winding, usually unmetalled roads. Because land ownership was fragmented and mixed farming was practiced, local holdings were no longer commercially viable but merely sustained those who lived on them.

Land consolidation Beltrum I was one of the last to officially proceed from the 1938 Land Consolidation Act and its 1941 Revision. At the same time it already anticipated the 1954 Act. Instead, Beltrum I became one of the type cases for the 1954 Land Consolidation Act. Henceforth land consolidation would involve much more than just the rationalization of land ownership and land use; (new) landscape assets and recreational facilities would also be an integral part of the plan. In a continuation of what was already common practice, the 1954 Act made the drafting of a so-called *landscape plan* obligatory. By the time the earlier, apparently 'rational' plans for Beltrum and surroundings were drafted they were already as good as obsolete.

Realization

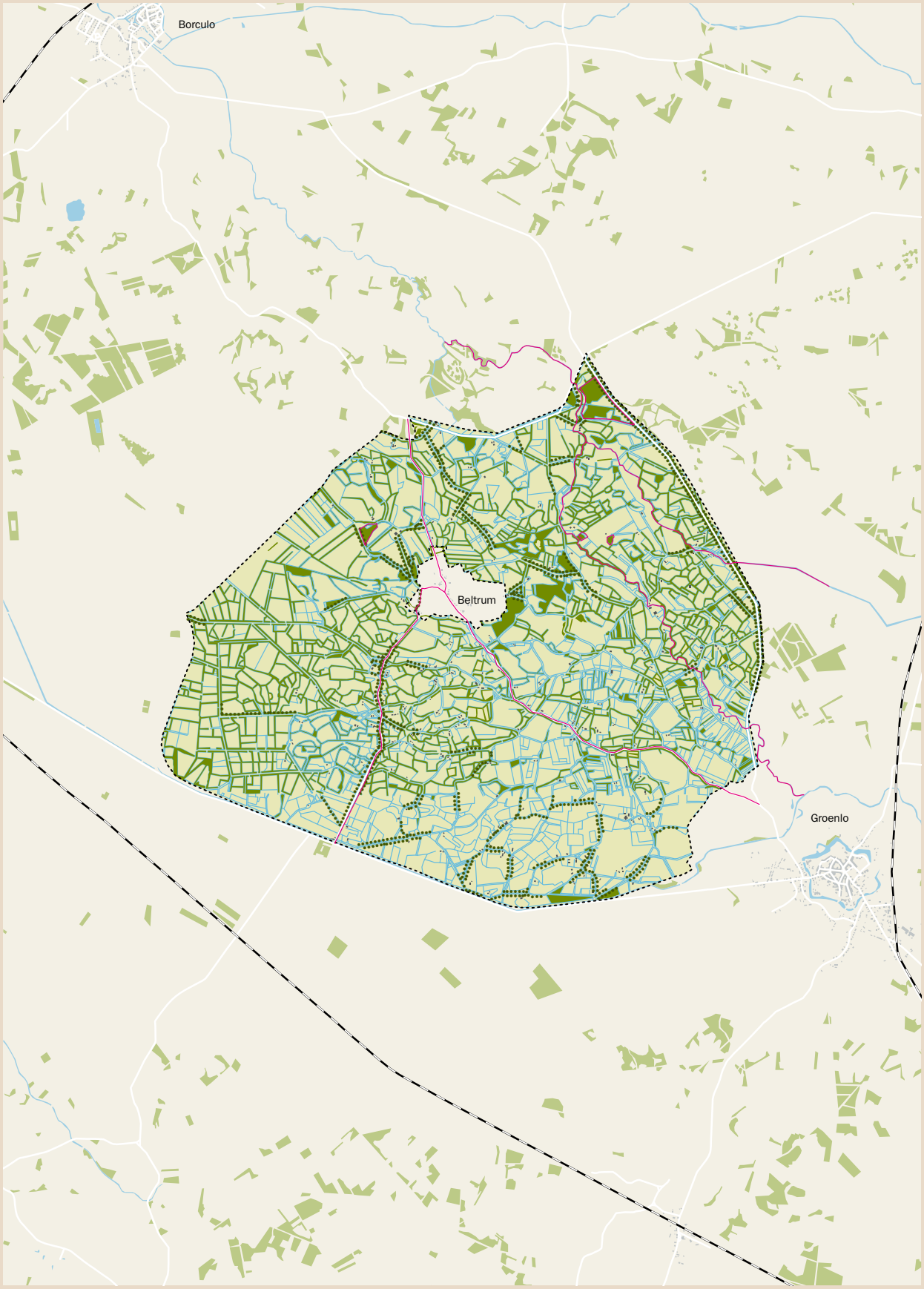
The hamlet of Beltrum was situated at a crossroads of three country lanes amidst slightly undulating terrain, with in the south-east mostly (raised) arable fields, later reclaimed fields in the west, and lower stream valleys in the north and east. In his plan for Beltrum I, H. de Vroome left the typical Achterhoek landscape largely intact and instead concentrated on a form of 'pruning' on top of the regular land consolidation. He also proposed a limited rationalization of the access infrastructure. An unusual aspect of the Beltrum I consolidation was that it saw the first practical application of aerial photography in the context of an uneven bocage landscape, cutting in half the time the land registry needed to survey the area.

The land consolidation led to a reduction of the original number of plots from 5400 to 1400. Stands of timber within a bocage landscape, unexpected vistas, irregular fields, winding country roads and similar elements were largely preserved, with a limited degree of upscaling. Importantly, existing agricultural buildings were also retained to a degree, and both during and after the reconstruction period the location of new farmsteads took into account the landscape's original, somewhat haphazard spatial structure. An unusual aspect of Beltrum I is that some of its buildings had already been rebuilt once before; relevant in this regard are the mementoes, in the form of repairs and new constructions, of a devastating tornado which ravaged the area in 1927. (fig. 160) The result was a mixture of mainly 19th-century and just short pre-WWII farms as well as post-war (reconstruction-era) holdings. Rationalization of the internal road infrastructure was fairly limited; some stretches were 'streamlined' and most roads became metalled, but some unmetalled roads and paths were preserved in consideration of their landscape qualities, the cultural-history assets and their attractiveness for tourists.

In the eastern sandy regions, the plan for land consolidation Beltrum I is one of the chief projects to have influenced the 1954 Act. Although the final results had not yet materialized by 1954 – after all, a landscape first comes into its own when all its components and particularly its vegetation have matured – the concept appeared highly promising. The plan retained the sharp contrast between the organic, ad-hoc structure of the fields of the 'Beltrumsche Es' north of the canalized brook Slinge and the 'Beltrumsche Veld' to the south, which had been reclaimed in stages in the late 19th century. There, the wasteland reclamation and ensuing cultivation were more organized, and in appearance Beltrumsche Veld conforms much more to the general (maybe 'prejudiced') idea of a 'land consolidation landscape' than the northern Beltrumsche Es. These contrasts can still be observed in today's field patterns, also because the subsequent compartmentalization (in the context of land consolidation Beltrum II) of Beltrumsche Veld has obliterated some of the details.[2]

Rural improvement programmes in this area comprised e.g. information campaigns on agricultural-social and housekeeping issues as well as eleven organized excursions to gather information elsewhere, in which 630 people participated.

160 A devastating whirlwind crossed the Beltrum area in 1927; this is what remained of a farm.


Borculo
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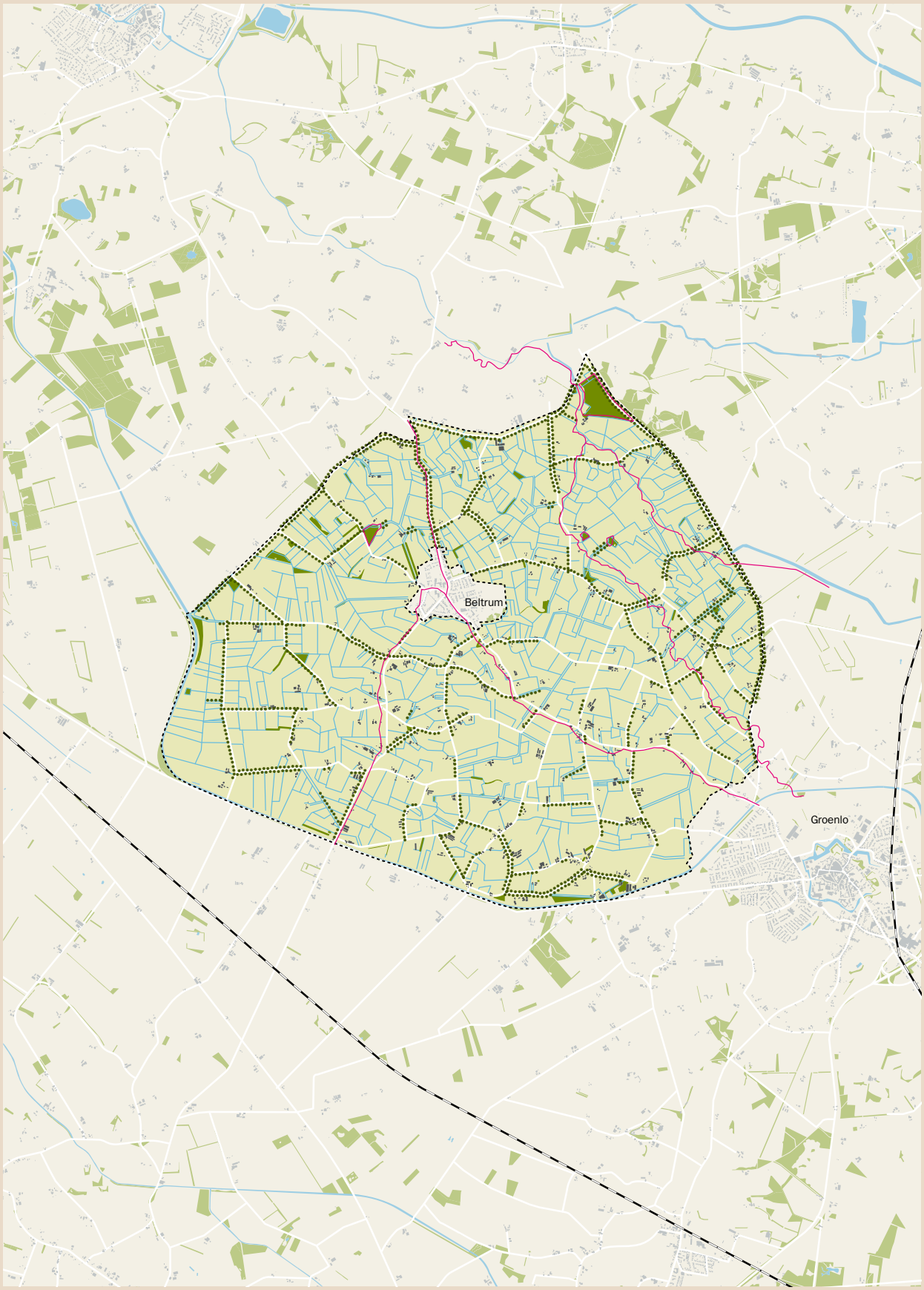
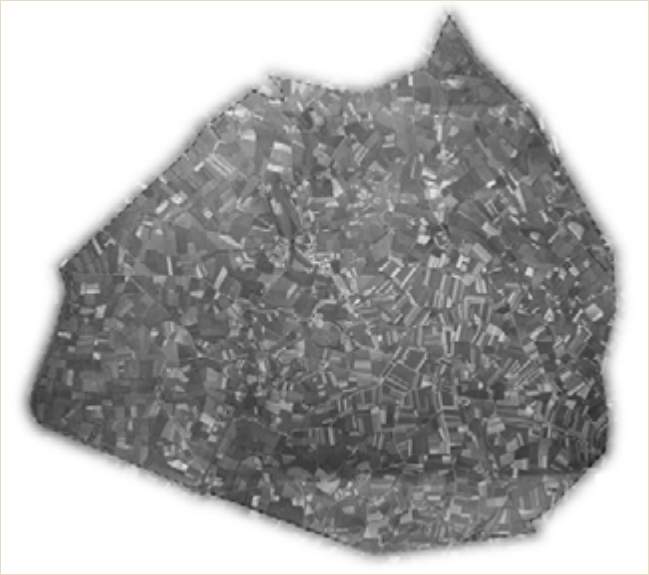


Beltrum
Left: Simplified map image ca. 1930. Scale: 1:50.000
Right: Simplified map image ca. 1970. Scale: 1:50.000 The Beltrum landscape was mainly 'upsized' during its land consolidation, but its character remained mostly intact.



161 This vertical aerial photograph shows the immense fragmentation in Beltrum land use. The picture was framed after the planned land consolidation. (Photo ca. 1950)

162 The Beltrum land consolidation led to streamlining and/or metalling of many lanes. Even today old trees may show former road courses. (Photo 2014)

The results were usually satisfactory and especially the modernization of housekeeping practices was popular. As part of the rural improvement programme and consolidation, extra space was set aside to the north-east of the village of Beltrum for, among others, a sports field (which still exists). What is most remarkable in view of the project's exemplary function is that over 108 excursions to Beltrum I were organized, involving a total of ca. 3200 participants. (fig. 161, 162)

Key qualities

The land consolidation Beltrum I to a significant extent preserved the character of the existing landscape and where necessary even re-emphasized it. Beltrum I is a (slightly opened up) small-scale, disorganized bocage landscape that could be called idyllic and picturesque. Contributing elements are its winding, largely hedged-in roads. The usually short ditch segments (wet or dry) were somewhat straightened out; since they, too, are partly lined by low vegetation they likewise contribute to the landscape's original appearance. Using DEM / AHN (*Actueel Hoogtebestand Nederland*) in the Beltrum case traces of former unmetalled (private) roads can be spotted here and there as well as a series of former small, individual reclamations, the so-called *kampen* or *one-man's essen*, probably on sandy tops. Beltrum shows a palimpsest type more common in the sandy areas of the Netherlands.[3] (fig. 165)

With the exception of the Slinge, which marks the area's southern and south-western boundaries and is mostly tree-lined, no water courses function as structural elements. A few years ago, the Slinge was partly given back its gently meandering, 'natural' channel by widening its floodplain, in the process also extending the retention capacity in the event of excessive precipitation.

163 The Beltrum land consolidation is outstanding for its mixture of reconstruction period and historical farm buildings as well as for an alteration in open, closed and bocage sceneries. (Photo 2011)

Despite agricultural modernization and upscaling the landscape remained small-scale, a characteristic many visitors find authentic and appealing. Agricultural buildings are a mixture of pre-WWII (especially after 1927), reconstruction-period (mainly 1950s) and later styles. A particularly attractive aspect is their independent situation relative to traffic infrastructural elements, and their random distribution; there is little clustering. Buildings tend to be relatively small, comprising many different farm and house types, mostly with roofs covered in red or dark-grey roof tiles. In recent years some compaction has occurred as new, larger farms were established and older, smaller ones phased out. The contrast with the late-19th-century reclamations south of the Slinge is an

164 Aerial impression of land consolidation and rural improvement program area Beltrum I. Although a land consolidation took place, this picture clearly shows the regional landscape character remained intact, or was only reconstructed on a larger scale. The north is bottom left. (Photo June, 2011)

165 Using DEM / AHN in Beltrum may show palimpsest traces of former unmetalled roads as well as former small, individual reclamations, the so-called '*kampen*' or 'one-man's *essen*'

interesting additional quality, while the residents themselves also perceive contrasts with other nearby areas. (fig. 163, 164) Recently, another land consolidation was carried out which however was mainly administrative and left few visible traces in the landscape. South-east of the land consolidation Beltrum I, but not contiguous to it, is National Landscape Winterswijk. The preservation of both original idyllic landscapes have made the village of Beltrum popular among visitors and tourists.

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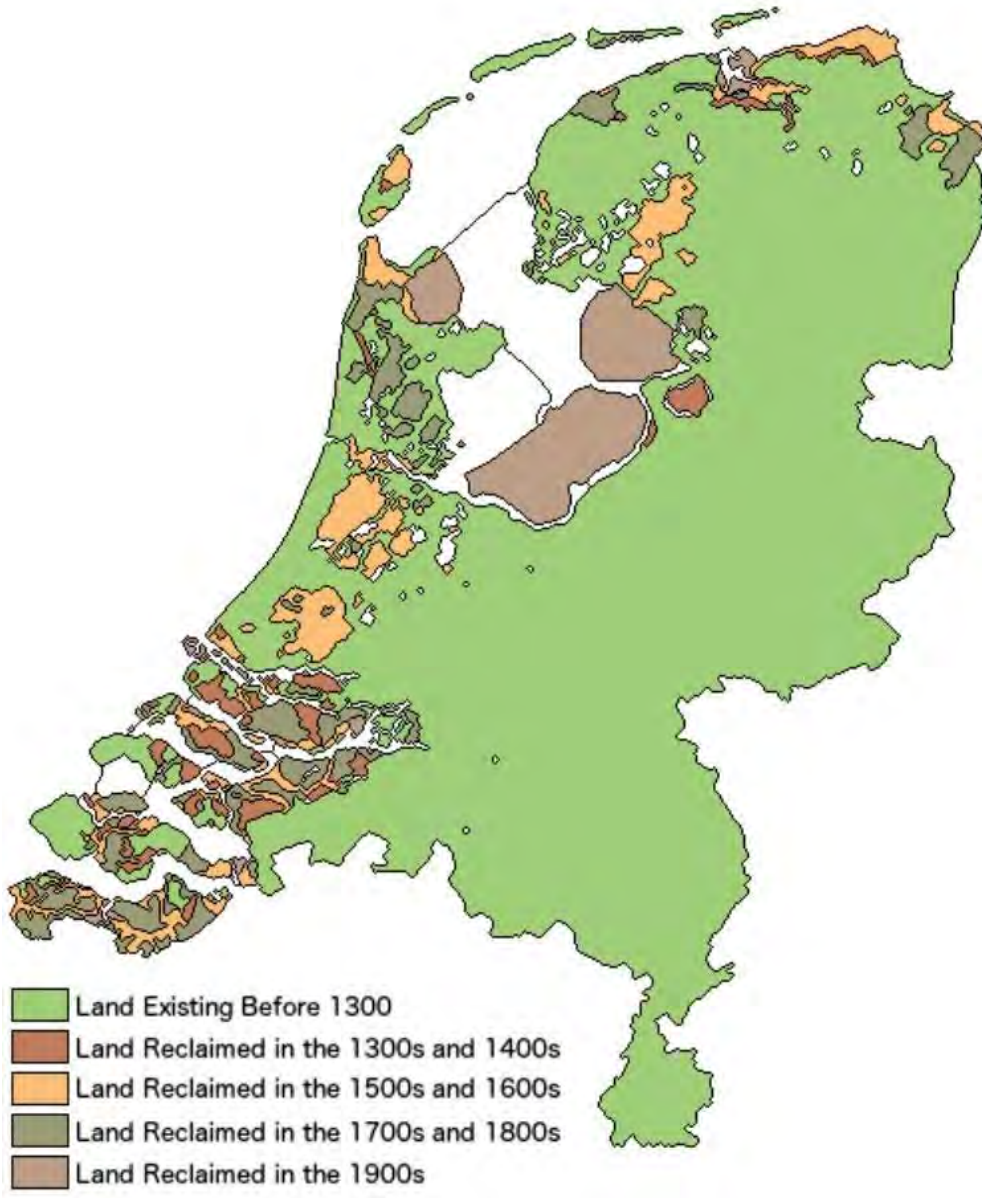
Notes

1 Beltrum I and II form two separate but contiguous land consolidations. Beltrum II is to the south-west of Beltrum I on the other side of the canalized brook Slinge. The layout of Beltrum II is the product of the fairly orderly and systematic 19th-century reclamation, which resulted in the later land consolidation having a different, and contrasting, spatial effect compared to that of Beltrum I.
2 See http://www.topotijdreis.nl/, especially the period after 1965.
3 Compare: Purmer 2018, 135.

9 New land, reclamation of wastelands and land loss after 1930

This chapter will focus on the expanding of the Dutch area potentially to be used for diverse agrarian purposes. After 1930 the map of the Netherlands changed dramatically, the most obvious change being the drainage of a substantial part of the Zuiderzee – renamed IJsselmeer after being dammed up – which from that time onward was carried out in stages. Creating new land has always been a peculiarly Dutch trait.[333]
At the same time, large reclamation projects continued; tens of thousands of hectares of so-called wasteland were still waiting to be brought under cultivation. Ultimately, however, all these activities barely added to the total supply of farmland. This was due to two parallel processes. On the one hand, land was increasingly being given other functions; on the other, reclamation was initiated for the purpose of establishing forest plantations. Although tens of thousands of hectares of farmland were thus newly acquired since the start of the 20th century, yet by the end of the reconstruction period other functions had gobbled up land to such an extent that the net increase was zero.



166 Survey map of Dutch Land acquisitions by drainage from ca. 1300 to 2000.

[333] The famous saying 'God created the earth, but the Dutch created the Netherlands' probably dates to the mid-17th century, the period when a Scotsman, James Fraser, recorded it in similar words. See: Niemeijer 2016a, 6-13.

It is a matter of course through the ages new land was created with a view to colonize it and to build farms and dwellings, etc. on it. This was no different in the 20th century and (potential) newcomers in the IJsselmeer Polders could not bear to be admitted to the new land. The government maintained strict entry and immigration rules for the first polders however and only a select group of chosen ones was allowed to start farming there. We will not dwell on this subject but refer to some items in the list of literature.[334]
In this chapter we will first pay attention to creating new land, than on reclamation of uncultivated grounds and land losses. We will finish this chapter with assessing the net results.

9.1 Creating new land: a traditional Dutch activity

As was said earlier, the Dutch boast a long tradition of transforming water surfaces into dry land. In many instances these reclamations involved not the acquisition of pristine new land but rather the reconquest of once dry land that was lost.
From about 1550 until ca. 1650 a considerable amount of new land was reclaimed in the west of the country. In total, ca. 30,000ha were newly reclaimed before 1650, not including several thousand hectare of embanked and reclaimed foreshore in the north and south-west of the country. In the second half of the 18th century a second period of reclamation started. By then, vast stretches of former peatland dug away earlier had been replaced by equally vast stretches of open water. Despite its extensive expertise in civil engineering, the province of Noord-Holland had been hollowed out from within. Between ca. 1750 and ca. 1875 reclamations led to the creation of dozens of new polders in the western and northern provinces, at least 85,000ha in all.[335] Between ca. 1875 and 1925 the pace of reclamation slowed down, but only temporarily.

9.1.2 IJsselmeer polders: land acquisition by drainage (again) and 'stranded' cultural-historical assets

The decision to dam up and partly drain the Zuiderzee, the large inland sea which stretched between the provinces of Noord-Holland and Friesland and penetrated far into the nation's interior, was a response to the constant dangers of flooding and food shortages.
The construction of the Afsluitdijk – the dam which closed off the Zuiderzee – and the drainage of the Zuiderzee polders were entirely state-controlled enterprises, with the Kingdom of the Netherlands becoming both owner and manager of the newly formed land.
The 1918 Zuiderzee Act contained no clues as to the appearance or size of the landscape that would surface after drainage, but in previous decades, Minister C. Lely (1854-1929) – then still acting in his professional capacity of civil engineer – had already prepared preliminary plans.[336] In 1925 these plans, accompanied by maps, were submitted to parliament. The broad outlines of an anticipated division of IJsselmeer into a number of polders were in place well before the Second World War, but ideas changed through time and as experience accumulated. For instance, the order of the projects was altered to the effect that the polders in the former Zuiderzee were completed clockwise, contrary to the original planning. The first polder and test case, the polder Andijk near the town of Enkhuizen, was followed by Wieringermeer Polder (see Table 9.1). In the end, the last of the planned polders, Markerwaard (or '*Zuid-westelijke Polder*'), was first postponed (in 1986) and then definitively cancelled (in 2003),[337] in part out of concern that the resulting fresh-water buffer might be inadequate, and also because growing environmental awareness demanded that no further encroachment on flora and fauna habitats should occur.
Meanwhile, in the period 1963 – 1976, some of the dykes and dams for Markerwaard had already been completed, the most conspicuous among them being the so-called Houtribdijk (1963), a dam between Enkhuizen (Noord-Holland) and Lelystad, and another dam linking the island of Marken to the Noord-Holland

334 e.g. Van der Wal 2007, 47 ff.; Dronten 1972, 92 ff.
335 Niemeijer 2020 (in preparation).
336 See Van der Ham, 2007. The following paragraphs and sections are partly based on Van der Ham.
337 The planned Markerwaard owed its name to the island of Marken.

mainland. Today, a project involving the creation of a few artificial islets, called the Marker Wadden, in the stretch of lake within the boundaries of the cancelled Markerwaard is still ongoing. This archipelago-to-be is primarily intended as a habitat and feeding ground for aquatic fauna.[338]
Another important revision of the original plans concerned the physical relation between the polders and the mainland. A conspicuous element of Lely's design is that it left permanent strips of open water, *boezemwateren* (drainage reservoirs/buffers), separating the future Noordoost Polder and the nearby mainland of the provinces of Friesland and Overijssel. Probably in order to avoid the expense of additional dykes, this reservoir was largely omitted from the final plans and never materialized.[339] With hindsight an unfortunate decision, for it adversely affected the groundwater table on the mainland. Below we will briefly describe some (aerial) particularities on the IJsselmeer polders. (fig. 7, p. 15)

9.1.2.1 Wieringermeer Polder

The Wieringermeer Polder was the first of the large Zuiderzee polders and as such the immediate predecessor of the Noordoost Polder. Because the Wieringermeer Polder comprises a canal system which functions both as a watershed and as a reservoir between the mainland and the polder itself, it was not affected by the same problems with regard to its water table as the Noordoost Polder was.
The Wieringermeer Polder (ca. 20,000ha), which became dry land in 1930, features a strictly rational internal organization with a tripartite layout.[340] More or less centrally situated are its main settlements Middenmeer, Wieringerwerf and Slootdorp; later, the growth of the latter would slow down.[341] The polder was divided into 800 x 250m modules corresponding to a standard plot size of 20ha, of which one holding might comprise several. The plots and blocks are largely rectangular in shape. In theory, plots were accessible both by road and by water, but after the Second World War the second option was little used. By 1940, national motorway *Rijksweg* 43 (today the A7), which cuts across the polder from south to north and near Den Oever links up with the Afsluitdijk, was already under construction. (fig. 167)
Late in 1932, the Wieringermeer directorate ('*Directie*') – a division of Rijkswaterstaat – proceeded to put the polder up for lease. Over 500 farms were established, built according to a number of standard types. Some of them featured barns in a concrete prefab system

167 The new village of Middenmeer along the crossing of waterways in Wieringermeer Polder. (Unknown date, prior to 1950)

338 See e.g. https://nl.wikipedia.org/wiki/Markerwaard; https://nl.wikipedia.org/wiki/Marker_Wadden; https://nl.wikipedia.org/wiki/Houtribdijk; https://www.natuurmonumenten.nl/projecten/marker-wadden/english-version

339 https://upload.wikimedia.org/wikipedia/commons/9/9c/Zuiderzeewerken_-_Lely_plan.jpg (1925 map).

340 Occasionally (e.g. Scharp, 1949, 516) a fourfold division is mentioned.

341 Some topographic maps erroneously state 'Middelmeer'; see also https://nds-nl.wikipedia.org/wiki/Wieringermeer. A fourth settlement, Kreileroord, remained significantly smaller than the other three.

168 A series of farms in Wieringermeer Polder, symbolizing continuity in rural settelement and agricultural use of reclaimed, inundated and reclaimed again former sea bottom. (Undated)

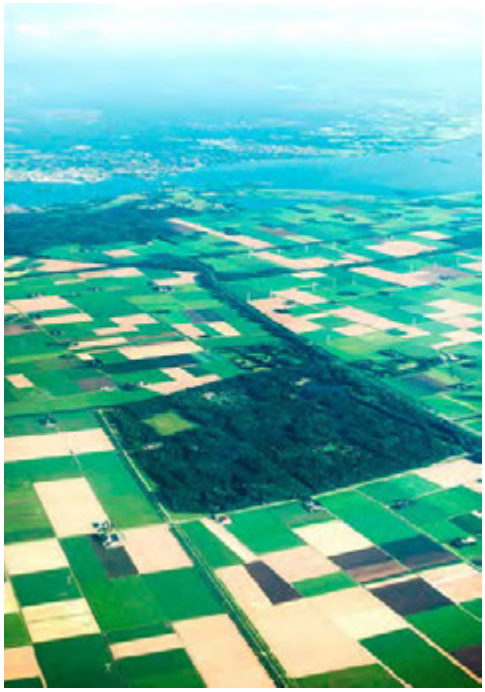
designed by Dutch company (at that time) Schokbeton.[342] The farms' functional designs drew on an inventory of Dutch regional types and on foreign examples (e.g. from Denmark and Germany). By the standards of the time they were hypermodern, in most cases featuring a semi-detached residential section positioned left or right in front of the barn section, which itself had large doors. The farm buildings were placed at the top end of the plots.[343] By the end of 1940 nearly 400 farms (ca. 15,000ha) were in lease for private exploitation (ca. 80% arable). Just over 100 of them counted 40-50ha but there were over 200 smaller ones and dozens of bigger farms too.[344] In the post-war reconstruction period 20ha was to become the rough minumum size for competitive arable production.
Among the individuals charged with the landscaping of the polder were architects J.T.P. Bijhouwer and M.J. Granpré Molière.[345] Their vegetation plan was based on several principles: the vegetation had to tone down the vast expanse of the landscape to a level human beings could digest ('*taxeerbaarheid*') and it had to provide both shelter and shade. However, picturesqueness was not a requirement. Bijhouwer believed that farmyard hedgerows had to be functional, and while not all of his suggestions were followed they were nonetheless highly influential.[346]
Shortly before the end of the Second World War the German occupying forces inundated Wieringermeer Polder, leading to an almost total loss of buildings and infrastructure. Repair efforts commenced already in 1945, with the intention to rebuild the pre-war buildings and other constructions whenever possible. Wieringermeer Polder consequently reflects both the continuity of pre-war spatial planning and the agronomic ideas of the post-war reconstruction period. (fig. 168)

9.1.2.2 Oostelijk (East) Flevoland and Zuidelijk (South) Flevoland

The second major polder in the former Zuiderzee is the Noordoost Polder (ca. 48,000ha; see the relevant box text for a more detailed description). After the Noordoost Polder (dry by September, 1942) two more IJsselmeer polders were created, Oostelijk Flevoland and Zuidelijk Flevoland. The experience gained during the work on the Noordoost Polder had indicated that the water table on the mainland would be adversely affected if a new polder abutted directly upon it: as the groundwater was drained away towards the new, much lower polder the mainland would dry out. Oostelijk and Zuidelijk Flevoland were therefore separated from the mainland by so-called *randmeren*, buffers which also functioned as reservoirs and waterways.
Farms in these two polders were even larger with standard plot sizes of respectively 30ha (300 x 1000m) and either 62.5ha (500 x 1250m) or 85ha (500 x 1700m).[347] At the same time, the proportion of agricultural land in relation to non-agricultural functions was slightly modified

169 Soil exploration in Eastern Flevoland during the last phase of its reclamation. (February, 1957)

342 http://www.schokbeton.info/schokbeton.info/english.html
343 Stuvel 1967, 45-87.
344 Verslagen 1943, 56-61.
345 D. Hudig, who in the late 1920s wrote about the polders' future landscape, died in 1934.
346 Andela 2011, 56 ff.; Van Duin 1984, 80 ff. Compare: 8.2.6.2
347 Feddes 2004, 62 ff.



170 The Larserbos (Larser forest) in Eastern-Flevoland. In the background one of the so-called Randmeren: the Veluwemeer or Lake Veluwe and the city of Harderwijk, Gelderland Province. (Unknown date)

in that significant residential areas arose on the former sea bottom. (fig. 169)
In both Flevoland polders the pattern which had characterized the two earlier polders was abandoned. No more relatively centrally positioned, small, equal settlements (as in Wieringermeer Polder) or one larger central place (Emmeloord) surrounded by a ring of smaller satellite villages (as in Noordoost Polder). Instead, the Flevoland polders received a limited number of larger or medium-sized, non-central towns: Almere (population over 200,000 and still fast growing), Lelystad (ca. 80,000), Zeewolde (23,000) and Dronten (ca. 41,000) and a few smaller, semi-autonomous places. Both Flevoland polders were also explicitly meant to serve as overspill areas for the rapidly expanding population of the 'Randstad'.[348] The different ratio of agricultural versus non-agricultural land also meant that substantial stretches of (recreational) woodland were planted. These woods are scattered throughout the polders but cluster mostly in the east and south-east, along the *randmeren*. (fig. 170) To this was added, in Zuidelijk Flevoland, a gradually developing wilderness area north-east of its main town of Almere: the Oostvaardersplassen, which today has become an official 'nature' preserve. Today there is a controversy on expansion of a regional airfield south-east of Lelystad and development of it into an international hub. A visible marker of the chronological gap between the formations of Oostelijk and Zuidelijk-Flevoland is the Knardijk which runs from north-west to south-east, separating the two polders. Both polders are moreover transected by a network of (in part navigable) drainage canals, '*tochten*', used by both recreational and professional waterborne traffic. The vegetation along these canals is part of a latticework of green veins across the landscape.

9.1.2.3 'Stranded' cultural-historical assets

All IJsselmeer polders have a few typical cultural-historical features in common. First and foremost, there are the numerous wrecks of vessels from all periods; the Zuiderzee was always a well-travelled inland sea. There are also remains of Second World War airplanes and a treasure trove of archaeological sites, some dating back millennia (e.g. the Dutch coastal, late Mesolithic Swifterbant culture, ca. 5300BC to ca. 3400BC.)[349] A completely different category comprises assets (qualities, values) that are particularly conspicuous in the landscape, such

171 The former jetties or piers of Elburg harbour (Province of Gelderland). Today they have partly been integrated in its connection to Eastern-Flevoland. (Photo ca. 1955)

[348] 'Randstad' (or formerly 'Randstad Holland') is the current name for the horseshoe-shaped chain of urban areas, or 'megalopolis', from Utrecht in the east to Amsterdam, Haarlem (north), Leiden, The Hague (west), Rotterdam and ultimately Dordrecht in the south.

[349] https://en.wikipedia.org/wiki/Swifterbant_culture

as old dykes, settlements or other features. A striking example of a historical landmark or relic is the Kuinderdijk, once defending the Zuiderzee coast and today the visible boundary between the Noordoost Polder and the 'old' mainland. Other astonishing examples are some former islands. When the polders were created a number of islands and shoals in the former Zuiderzee were also incorporated, the most important being the islands of Wieringen and Urk, situated at the outer rim of Wieringermeer Polder and Noordoost Polder, respectively. Wieringen is by far the larger of the two; since 1932 it has been the western terminus of the Afsluitdijk. Urk is still a close-knit community in the west of the Noordoost Polder; as on Wieringen, sea fishing has always been an important economic activity on Urk.
A remarkable feature is the former island of Schokland. Uninhabited since 1859, today Schokland lies stranded high and dry in the south of the Noordoost Polder. In 1995 this former island and its surroundings were placed on the UNESCO list of World Heritage sites.[350] (see the relevant Box Text) Another noteworthy feature, also in the Noordoost Polder, is the former estuary of the river Zwolsche Diep / Zwarte Water, protected by jetties.[351] A similar feature can be observed at the harbour of the historical town of Elburg, where both jetties today partly extend into the adjoining reservoir (here called Veluwemeer), from where they stretch another 500m into the polder of Oostelijk-Flevoland. (fig. 171)
Equally remarkable is the complex of the Houtrib locks and sluices near Lelystad, built during the reconstruction period. These were intended as part of the shipping route between Oostelijk-Flevoland and Markerwaard, but they ended up serving mostly to regulate the different water tables on both sides of the Houtribdijk between Lelystad and Enkhuizen (Noord-Holland). A recreational zone was developed nearby, Zuigerplas Park – named after the Dutch words '*zuigen*' ('dredging up'), i.e. sand from deeper soil strata, and '*plas*' ('lake') – a small artificial lake that was the result. Finally, in the context of the planned Markerwaard polder, the island of Marken was linked to the mainland by a dyke which was then extended towards the north. It ultimately remained purposeless and today forms an odd 'Land's End'. Like Urk, Marken was a fairly close-knit fishing community. Since the rise of tourism, however, the island has first and foremost become a curiosity due to its colourful local costume and its houses built on piles and terps. (fig. 172)
Together, the polders in the former Zuiderzee are a monument of international standing to civil and hydraulic engineering. What they have in common is that in a sense they are all manifestations in solid form of the energy of half a century of unceasing effort by people and machines. The Noordoost Polder's pioneering role in urban planning lifts it above the others (see for more details on the Noordoost Polder the relevant box text).

172 Aerial view of the Island of Marken today. Both dykes are fragments of the never realized Markerwaard Polder. The southern fragment serves as connection with the mainland on the left. The bowed structures on the island are relics of an early-19th century endeavour to construct a canal.

9.1.3 Other post 1930 land acquisition projects

Besides the IJsselmeer polders other, much more modest land acquisition projects were carried

[350] See https://whc.unesco.org/en/list/739
[351] See Huisman & Mauro 2012, 406 ff.

Table 9.1 Chronology of the polders or reclamations of new land in the former Zuiderzee and the main dikes

Realization period	Name	Surface (ha)
		Length (km)
1926-1927	Pilot polder Andijk	40
1927-1930	Wieringermeer Polder	20.000
1936-1942	Noordoost Polder	48.000
1950-1957	Oostelijk Flevoland	54.000
1959-1968	Zuidelijk Flevoland	43.000
1941/1963-1975/1986	Markerwaard (never completed)	41.000
Total realized		165040,0
1920-1924	Amsteldiepdijk or Short Afsluitdijk	2,5
1927-1932/1933	Afsluitdijk	32,5

out. Examples are the polder Braakman (Zeeland; 1950-1952) and the former inlet Lauwerszee (Groningen/Friesland; 1960-1969), both dammed and partly drained. In both cases large sections of the polder were turned into a nature preserve or used for recreational or military purposes.[352] Moreover, the provinces of Groningen and Friesland have a long tradition of taking measures to encourage coastal accretion along the Waddenzee. Numerous dams and ditches were dug perpendicular to the coast and, once accretion had progressed sufficiently, were 'brought within the dykes' (*binnengedijkt*).[353] This process continued during the reconstruction period, and hundreds of hectares of fertile clay soils have been added since. The remarkably modern appearance of the actually traditional field patterns of the northern Dutch coastal areas is a clear testimony to the continuity of this particular form of land acquisition. (fig. 173) From the 1930s onwards polders were also created in the delta of the major Dutch rivers in areas like the Biesbosch near Dordrecht (Zuid-Holland). (fig. 174) After 1940, however, such projects were not everywhere resumed, due to factors such as a growing awareness of the value and qualities of natural landscape dynamics and of the need to leave habitats for flora and fauna intact.[354] On the other hand, some land acquisition projects in the south-western

173 In the north of Friesland and Groningen Provinces acquisition of new land in the Waddenzee is continued in a traditional way. (Photo near Holwerd, 2011)

estuaries received a boost after the 1953 North Sea flood and the start of the Delta Works. New land was also created in consequence of a number of international treaties. For example, shortly after 1963 the so-called *Schelde-Rijnverbinding* (a partly canalized international shipping route from Antwerp in Belgium to Germany through the south-western parts of the Netherlands) led to the formation of a few strips of new land near Bergen op Zoom. Land acquisition in the context of these projects was usually on a relatively small scale but the economic or ecological impact could be considerable.[355]

352 https://nl.wikipedia.org/wiki/Lauwerszee; https://nl.wikipedia.org/wiki/Braakman ; For this section also see 2.2.1

353 Embankment would start when a land surface was no longer prone to flooding except during extreme storm surges; this part of the foreshore is called 'kwelder'.

354 http://library.wur.nl/ebooks/hydrotheek/1874617-weblin.pdf

355 https://en.wikipedia.org/wiki/Scheldt%E2%80%93Rhine_Canal

174 The island of Dordrecht and surroundings contains examples of land acquisition in the 1930s.

9.1.4 It is true: the Dutch made their own country by pumping out the water

Of course it is impossible here to explain the specilized ins and outs of Dutch hydraulic engineering, if only it were because there were many different solutions for comparable problems. One main trait is that polders distinhish themselves from their surroundings by a different ground water- level (lower *or* higher). Therefore they are surrounded by dykes and/or water (canals, open water, etc.) that help maintaining the necessary level contrast. Dykes and canals or ditches used to be constructed through manpower (spades, wheelbarrows) and horsepower but in more recent times mechanization took over the heavy job.

For ca. 350 years hundreds of windmills (polder mills) were the main 'engines' to help pumping out the water, but from the early 19th century steampower slowly took over the job. The mills and pumping stations brought water from within the enclosing dykes into the encircling canals, into open water or directly into the sea. And the sea itself is kept out by dune rows as a natural a defense line and immense dykes as man made or artificial supplements. (fig. 175) In the case of the IJsselmeer Polders the land could only be drained by the bringing into action two (Wieringermeer Polder) or three pumping stations together. The realisation of the IJsselmeer Polders (as well as some of the shallow sea polders in the Provinces of Groningen, Friesland, Zuid-Holland, Zeeland) in the period ca. 1930 to 1965 were huge enterprises that usually meant the involvement of big companies like the *Nederlandsche Heidemaatschappij* and *Staatsbosbeheer*, partly with the use of manpower from the *Rijksdienst voor de Uitvoering van Werken (DUW)*. In the case of the foundations of the Afsluitdijk between Friesland and Noord-Holland and the enclosing dykes of the polders lay on or even below the natural bottom of the Zuiderzee or IJsselmeer and could only be realised with heavy duty equipment (cranes, dumping barges, etc.). The bottom of the IJsselmeer is ca. 5 metres below sea-level; the crowns of the dykes are on respectively +7.7m asl and +5.5m asl (Dutch NAP).[356] Digging ditches and canals in shallow water in order to fastening the draining of the polders were the next steps in the making of new land. Especially the digging of ditches for drain-pipes was a hell of a job: only in the

[356] The Afsluitdijk is over 100m wide on the water surface; the polder dykes about 80m wide; NAP = Normaal Amsterdams Peil, Ordnance Datum.

175 This sea-bank – called Hondsbossche Zeewering – is a sea-defense of nearly mythical history and proportion. It is situated in Noord-Holland Province, north-west of the city of Alkmaar. Its roots go back to the middle ages; from the 1870's it was finally fixed at its present location. (Photo October, 2005)

Wieringermeerpolder they count about 40,000 km! Another impression: in rural Oostelijk Flevoland only about 570 km of roads were paved in the 1950s. The third step was the arrangement of the polders: landscape plans (compare: land consolidation) or other academic forms of organizing space were most common in the new land, although relatively traditionally inspired landforms and built up areas do happen here and there, especially in the Noordoostpolder.[357] Of course the land surface of the IJsselmeer Polders is ca. 5 m below sealevel, so the dykes that keep the water out manifest themselves as huge 10 metres high banks. A trait of spatial character many – if not most – reclaimed polders share is their highly rectangularly and/or orthogonally defined ground-plans. Although usually the 20th-century polder plans are not as rigid as their 17th- to 19th-century predecessors, they clearly show a highly mathematical pattern and often the use of modules (within larger scaled ground-plans). The IJsselmeer Polders are clear examples, but Polder Biesbosch can also be mentioned. Other polders may not be as extensive as the IJsselmeer Polders, yet there is no doubt: from the far north-east to the south-west the Dutch themselves made impressive sections of their own country by age-long reclamation and converting bodies of water into cultivated land.[358] (Also see the Box Text on Noordoost Polder).

9.2 Reclamation: the royal road to land cultivation

Quite another way of expanding the cultivated area of a certain population is reclamation of the (natural) wilderness. Traditionally, 'wasteland' reclamation was an important method to increase the stock of farmland; for thousands of years it had been a widespread and in fact essential condition for a sedentary lifestyle. As experience accumulated, reclamation went through several stages and the process was further influenced by various push factors and social or economic forces. In the Netherlands, where rigid social stratification started to break down early on, private or at least unenforced reclamations prevailed. By the time they took off, feudalism and even statute labour were a thing of the past in most of the country. Instead,

357 Van der Wal, Bruggenkamp & Oterdoom 1992, 47 ff.

358 Gedenkboek Twee eeuwen Waterstaatswerken [1959], 503-527; Van Rijn & Polderman 2010, 212-229, 248-252.

176 Waste lands in the Bakelse Peel (Gemert-Bakel municipality, Noord-Brabant Province), May, 1952.

177 Dyke construction to prevent inundation damage. These labourers are employed through the so-called *Nederlandsche Arbeidsdienst* (NAD), better known as the German organized and obliged *'Arbeitseinsatz'* (Du: *Werkinzetdienst*). (Zevenhuizen, Zuid-Holland Province, probably 1944 or 1945)

from the late 18th century onwards promotional pamphlets proliferated and experiments were set up to promote wasteland reclamation. In the 19th century and afterwards the State facilitated these processes in several ways: through subsidies, incentive policies, planting schemes and even direct state involvement. Reclamation could proceed in a number of ways, the most important of which were digging up heathlands, sand drifts and dunes, drainage and/or improvement (for agricultural purposes) of (partly) dug peat soil and bog, and drainage of salt marshes. Unlike the creation of new land, wasteland reclamation continued unabated after the turn of the century; after 1888 several commercial enterprises were established to facilitate reclamation.[359]
Occasionally an increase in farmland was paralleled by losses elsewhere, e.g. due to raw material extraction (sand, gravel) or the construction of infrastructural features. In the reconstruction period the reclamations were gradually phased out but at the same time the loss of farmland increased. The net result was that the total area of farmland in the Netherlands in 1965 was the same as it was in 1930!

9.2.1 Reclamation of wasteland

As was mentioned in earlier chapters, in the Netherlands the economic crisis of the 1930s was a period of extensive reclamations. While around 1930 the 'stock' of wasteland in the Netherlands still amounted to 370,000ha, ten years later it had been reduced to ca. 270,000ha. (see Table 9.2) This had been possible by the deployment of cheap labour in the form of a large number of unemployed individuals who through the *(Rijks)dienst voor de Uitvoering van Werken* (DUW) were put to work. Projects in (former) peat extraction areas, on heathland, and in drained and reclaimed foreshores near the Dutch sea inlets all qualified for this approach, as did infrastructural works and forestry. (fig. 176)
Main employers were *Nederlandsche Heidemaatschappij*, *Grontmij* and *Staatsbosbeheer*, who through the DUW scheme were each being offered personnel on favourable terms (read: at low wages). The projects operated on the principle that the work was to be carried out by hand and that the use of machines was to be limited as much as possible. During the Second World War these projects continued, although some of the labour force was diverted towards military goals or even drafted directly for German projects (whether or not in Germany itself), the so-called *Arbeitseinzats*.[360] Some reclamation projects or military works were carried out by (military) prisoners, but on occasion contractors would bid as well.[361] (fig. 177)
Soil reclamation continued for some time after the Second World War; in the period 1940-1960 the amount of wasteland shrank by several ten thousand hectares. Nonetheless, there was a change. Up until ca. 1950, the decrease in wasteland was almost automatically paralleled by an increase in farmland, a pattern which

359 It could even be argued that the 1818 'Maatschappij van Weldadigheid', established in 1818, was the first commercial enterprise in this field. See: https://en.wikipedia.org/wiki/Society_of_Humanitarianism
360 https://en.wikipedia.org/wiki/Forced_labour_under_German_rule_during_World_War_II
361 See also paragraph 7.4

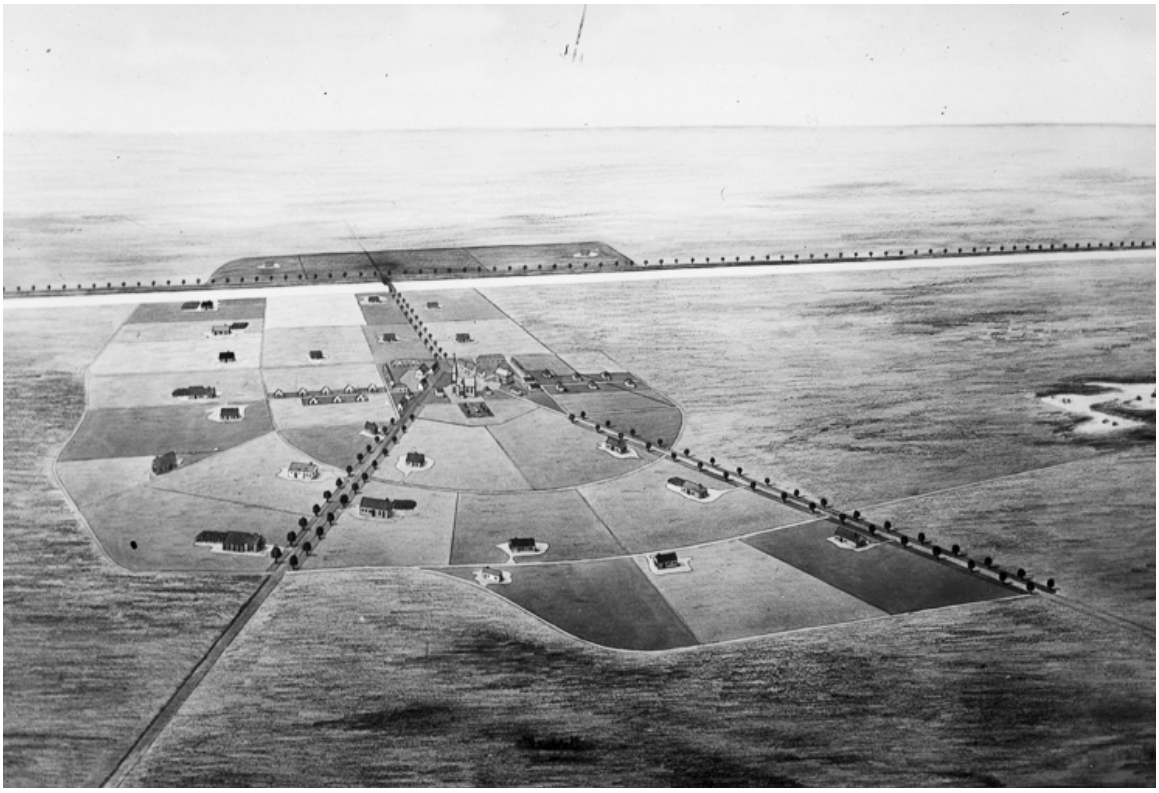
clearly emerges from a comparison of topographic maps from the 1930s and from ca. 1950. Reclamations in for instance Drenthe and Noord-Brabant continued but rarely on a substantial scale.[362] After the war, however, the extent of heath or marshland dug over and transformed into arable fields or (intensive) pasture was very small as the focus in reclamation shifted towards forest plantations. Indeed, from ca. 1960 onwards the total forest cover in the Netherlands expanded.

178 Heavy machinery - such as bulldozers, deep ploughs and this dragline were important additions to the often muscle powered groundworks and land consolidations.

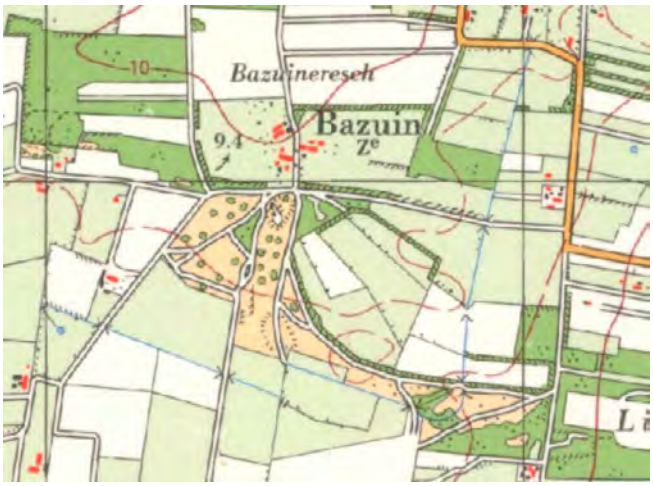
9.2.2 Reclamation of wastelands; the physical process

When sandy areas, fenns, moors, peatgrounds (often re-reclamations[363]), dunes, etc. were going to be converted into cultivated land usually detailed ground plans were made in advance. Until well in the 20th century locals did the job in mainly regionally traditional manner and with not much more than spades, wheelbarrows and horse and cart. From ca. 1900 big companies like *Nederlandsche Heidemaatschappij*, *Grontmij*, *Staatsbosbeheer* (SBB) and a series of provincial or communal enterprises took over the activities. They not only organized the plans and progress and not only introduced narrow-gauge railway and other appropriate equipment but they also provided for scientifically based projects.[364] This meant the companies took care of radical improvements in draining, local acces and a functional parcellation. Just as in the case of land consolidations the companies used manpower and/or machinery, such as draglines, bulldozers and deep tillage ploughs. (fig. 178)
In this regard reclamation of wastelands and re-allotment and/or land consolidation look very much alike. And in fact they were two sides of the coin. That is why the several of the same institutions and organisations we heard of above are involved as well: *Cultuurtechnische Dienst* (CTD / CD), *Kadaster* and *Stichting Bodemkartering* (*Stiboka*) for instance. And besides these some ministries were involved, such as the ministry of *Binnenlandse Zaken* (Interior), *Landbouw* (Agriculture), and (after WWII) the ministry of *Wederopbouw en Volkshuisvesting* (Reconstruction and Public Housing).[365] An important facet of their cooperation was subsidizing farm establishment in reclamation areas[366] and insisting on keeping to legislative do's and don'ts. From 1920 there were advances free of interest for erecting farms on reclamated wastelands. Reclamations slowed down after WWII and then ended but from 1930 to 1965 thousands of hectares had been cultivated, being crossed by roads and ditches or canals, supplied with farms and sometimes even completely new villages (such as Ysselsteyn) and furnished with trees and all kinds of greenery. (fig. 179)
Landscape plans applied as much for land consolidations as for reclamations of wastelands. The visible and 'carthographic' results of 1930 to 1965 reclamations of wastelands are relatively diverse. The range is from rectangular and orthogonal ground-plans (within larger scale structures) to seemingly organic landscapes. The latter seem to be pre-existing landscapes with bending roads and integrated real historical or totally artificial features. One might suppose the older reclamations show a simpler and more rectangular drawing-table influenced lay out than younger ones. Such a thing could not only be a logical consequence of prevailing agricultural purposes but could be the result of a still upcoming profession of landscape architecture and functional landscape designing.[367] Several early plans seem to have been based on a *tabula rasa* way of thought whereasin later and more 'modern' designs more often the qualities and elements of the already written underground or *palimpsest* are taken into account. (fig. 180, 181)

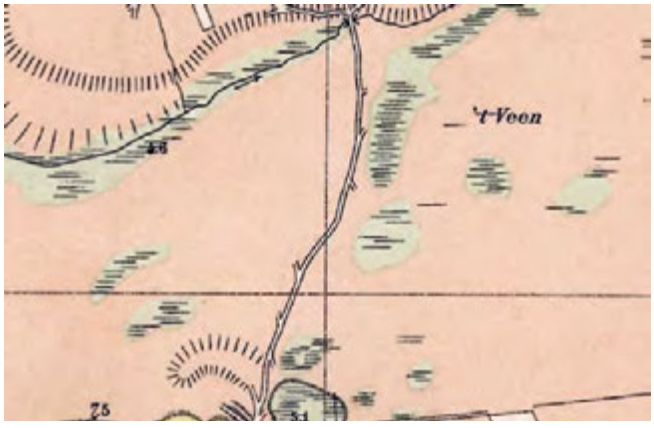
362 See e.g. De Vegte 2018, 152-159; https://landschapinnederland.nl/ontginningstypen, Section 'Jonge heideontginning met bos (na 1850)'
363 Such as near Giethoorn (Province of Overijssel), from the late-1920s.
364 Here too they used manpower from DUW and its pre-war predecessor Rijksdienst tot Bestrijding der Werkloosheid ('State service for combatting unemployment').
365 See for instance: http://www.gahetna.nl/collectie/archief/ead/index/eadid/2.17.03/anchor/descgrp-context-custodhist/nodes/YTooOntpOjA7czo2OiIjMDE6MC4iO2k6MTtzOjY6ImMwMToyLiI7aToyO3M6NjoiYzAxOjIuIjtpOjM7czoxMjoiYzAxOjIuYzAyOjEuIjt9/open/c01%3A4.
366 For instance remember the 1918 Landarbeiderswet, or 'Farm Labourer Act', that made it easier to work a smallholding thanks to profitable loans. From the early 1950s on there were 40 % subsidies too.
367 Functional must be understood here as a contrast to esthetical. Esthetic landscape design roots in the 16th and 17th centuries already.



179 A bird's eye impression of wasteland reclamations near village Ysselsteyn, Venray municipality, Limburg. (1921)



180 An example of respecting the historical private clearing (?) 'Hooge Slooten' (maps 1930 and before) within a later waste land reclamation (maps 1965 and after). This principle might be interpreted as '*palimpsest aware reclaiming*'. (De Wolden municipality, Drenthe Province)



181 An example of reclamation of waste land near Ommen, Overijssel Province, as if it were a *tabula rasa*. The original conditions (maps until ca. 1930) can no longer be traced on maps from 1954.

As we saw before landscape plans came forth from Hudig's vision on the new polders in the (former) Zuiderzee. (see 8.2.6.2) Although these polders are mainly based on rectangular modules their landscape plans show well-thought out detailing. This was a learning process that was could be applied in several younger reclamations as well. The use of pre-existing objects, structures and valuable assets in newly reclaimed landscapes became a challenging task for SBB. Landscape plans in reclamated wastelands could be – if not sometimes should be – furnishing ánd preserving in character. Yet there is hardly a predictable congruency between former landscape characters and qualities and their reclaimed and cultivated successors. Later development of the furnishing and preserving task became obstructed anyhow because reclamations were put on hold and most of them even shelved completely.

9.2.3 The end of agricultural reclamation

The Queen's Speech marking the start of the parliamentary year 1961 presented the outlines of an imminent change in agricultural policy: the government announced a moratorium on state-supported reclamations. This translated into a virtual halt on the growth of farmland stock outside the IJsselmeer polders.[368] A ban on heath reclamations followed in 1964. By then, the total area of wasteland had contracted to ca. 230,000ha, excluding ca. 275,000ha of woodland.[369] Table 9.2 shows the development of wasteland reclamation and the conversion of the resulting land into forest. The moratorium on reclamation was part of a reorientation in the context of a broader perspective on land consolidation and landscape management. In 1963, this new approach was labelled '*landschapsbouw*', 'landscaping'.[371] As Staatsbosbeheer stated in its annual report for that year: '*In fact, the present situation is such that in large sections of the Netherlands, the existing landscape no longer tallies with the way of life of a heavily urbanized population. In many places, land use and land development no longer or insufficiently cater to the needs of the residents who, at least as regards the working population, are predominantly employed* [...] *in industrial and service professions. As is also the case with regard to housing and traffic, the tensions resulting from this situation in relation to recreational possibilities are growing every year. It is because of this that an active policy on open-space*

Table 9.2 Total area of wasteland and woodland in the Netherlands in hectares (ca. 1830-2010).

Year	Wasteland (ha)	Woodland (ha)	Total (ha)
1830	906.000	169.000	1.075.000
1870	± 800,000	± 200,000	± 1,000,000
1890	693.000	220.000	913.000
1900	590.000	248.000	838.000
1910	543.000	260.000	803.000
1920	482.000	240.000	722.000
1930	370.000	254.000	624.000
1940	270.000	258.000	528.000
1950	273.000	242.000	515.000
1960	236.000	268.000	504.000
1970	199.000	298.000	497.000
1980	156.000	295.000	451.000
1990	144.000	304.000	448.000
2000	133.000	350.000	483.000
2010	146.000	360.000	506.000

Table 9.2 was composed of various sources.[370]

[368] De Visser 1997, 54 ff.; Bouwman 1958, 12. In the 1950s, the total amount of land which still qualified for reclamation for agricultural purposes (other potential destinations being nature areas or military activities) was ca. 40,000ha.

[369] In the last few decades the total surface of unexploited land in the Netherlands has grown again. This process is most pronounced in the 'sandy provinces', e.g. Gelderland and Noord-Brabant, but it is also manifest in the 'returning to nature' of parts of the Holland-Utrecht peat areas, and in a stop on the construction of yet more dykes along certain coastal segments in the northern and south-western Netherlands. In Groningen, for example, the ancient privilege of embanking coastal accretions has been suspended; http://www.marnelandschap.nl/Doc/bastiaanse2005.pdf; Nota Ruimte [2006], 113. Today, the Dutch Ecologische Hoofdstructuur (National Ecological Network) programme aims to set aside 728,500ha with 'nature' as its primary function. To reach this target, tens of thousands of hectares still need to be 'found' and secured.

[370] Contradictions in land area of wastelands between Tables 2.3 and 9.2 are mainly caused by differing sources and differing definitions. Since 2011 the total area of woodland has slightly decreased every year.

[371] Over the next few years this concept would be widely accepted and ultimately replace that of the 'landscape plan'.

planning is urgently required. Open-space planning in this context evidently entails furnishing the landscape with vegetation, trees, parks and water features. The sum of these activities is referred to as landschapsbouw [landscaping/landscape planning], *in analogy and complementary to stedebouw* [urban planning].'[372]

Although this new approach to land consolidation, landscape management and reclamation did not instigate a sudden course change it was nonetheless a clear sign of an ongoing societal reorientation. For the time being, however, continuity and innovative impulses still operated side by side. Continuity was particularly manifest in private reclamation projects, which – provided they met with the approval of the appropriate authorities – could carry on as usual.

In addition to their forestry-related function, many of the reclamations of the 1950s and 1960s also had an agricultural purpose. Due to their comparatively small size they are no longer labelled separately in the *Atlas van Nederland* (1963-1977), with the exception of those carried out in a few coastal salt marsh zones. Yet a little known and small reclamation along the Belgian border, Rijtsche Heide and Peelsche Heide near Reusel (Noord-Brabant; ca. 1955-1959), illustrates two interesting points rather well: on the one hand, the sharp contrasts between and within these two (former) stretches of heath; on the other, the impact on the terrain of the presence of a national border (see the box text on Peelsche Heide and Rijtsche Heide)

Contrasts within a landscape often take the form of gradients which stimulate flora and fauna biodiversity. Whether these gradients owe their existence to historical differences in the terrain or to recent, 'imposed' changes is immaterial. In the case of the implementation of a landscape plan, the impact of a meticulous approach on landscape quality therefore outweighs the effects of authenticity. The emergence of landscaping is a logical extension of this principle.

9.3 Land loss

Parellel with gaining new territories of arable and pasture in polders and former wastelands there were losses of land too. In the Netherlands, the tens of thousands of hectares involved in land acquisition and reclamation were balanced by land loss in several places and for various reasons, e.g. peat extraction; sand, clay or gravel pits; the construction of additional facilities for shore and water recreation; or the formation of freshwater reservoirs or buffers.[373] Fresh water reservoirs can for instance be found in Zuid-Holland: Beerenplaat, south of Rotterdam (realized 1961-1965). The best examples of sand or gravel extraction are the very deep (up to several dozen metres) artificial lakes near recent urban extensions, overspill towns and motorways, e.g. those near Leiden (Zuid-Holland) and south-east of Amsterdam. The often vast former sand, gravel or clay pits along the major Dutch rivers represent an irreparable loss of land, albeit usually with a happy end as so many opportunities for shore and water recreation. This applies to many areas where soil had been removed, in part thanks to the 1954 Act. In the land consolidation area Tielerwaard-West, for instance, a sand pit (servicing the construction of the A15 motorway) after the 1960s was transformed into the recreational area Lingebos.[374] Similar recreational areas were formed near e.g. Alphen aan den Rijn (Zuid-Holland) and along the inner dunes on the coast. The largest pits were dug along the river Meuse – especially near Gennep and around Roermond – leaving behind huge bodies of water. In this particular region, the extraction of resources was administratively fairly simple because much of it had already sustained heavy damage during the war. It was one of the reasons why thousands of hectares of unused or extensively exploited land have been dug away for sand and gravel extraction since the Second World War. Here, too, some of the exhausted gravel pits were developed into recreational areas, resulting in one of the largest aquatic sports regions in the Netherlands which draws visitors even from Belgium and Germany.[375] (See the relevant Box Text: Maasplassen.)

9.4 Balancing land gains and land losses

Gains and losses of cultivated land for agrarian uses and rural functions can be exactly measured,

[372] As quoted in De Visser 1997, 62-63.
[373] Bouwman 1958, 10. Evidently, farmland was also sacrificed to e.g. housing developments or infrastructural projects.
[374] De Visser 1997, 76-79; Van den Bergh 2004, 179.
[375] Helmer, Overmars & Litjens 1991, 39-41; Peters & Janssen 2001, 89-106; Van den Berg & Van den Bergh 2008; Van den Broek 1966, 17.

Table 9.3 Increase and decrease of farmland area (= cultivated land) in the Netherlands ca. 1900-2018.

Year	Surface agricultural land (ha)
1900	2.081.000
1910	2.121.000
1920	2.184.000
1930	2.257.000
1940	2.324.000
1945	2.168.000
1949	**2.406.000**
1950	2.337.000
1955	2.308.000
1960	2.317.000
1965	2.256.000
1970	2.143.000
1990	2.056.000
2000	1.975.000
2018	1.770.000

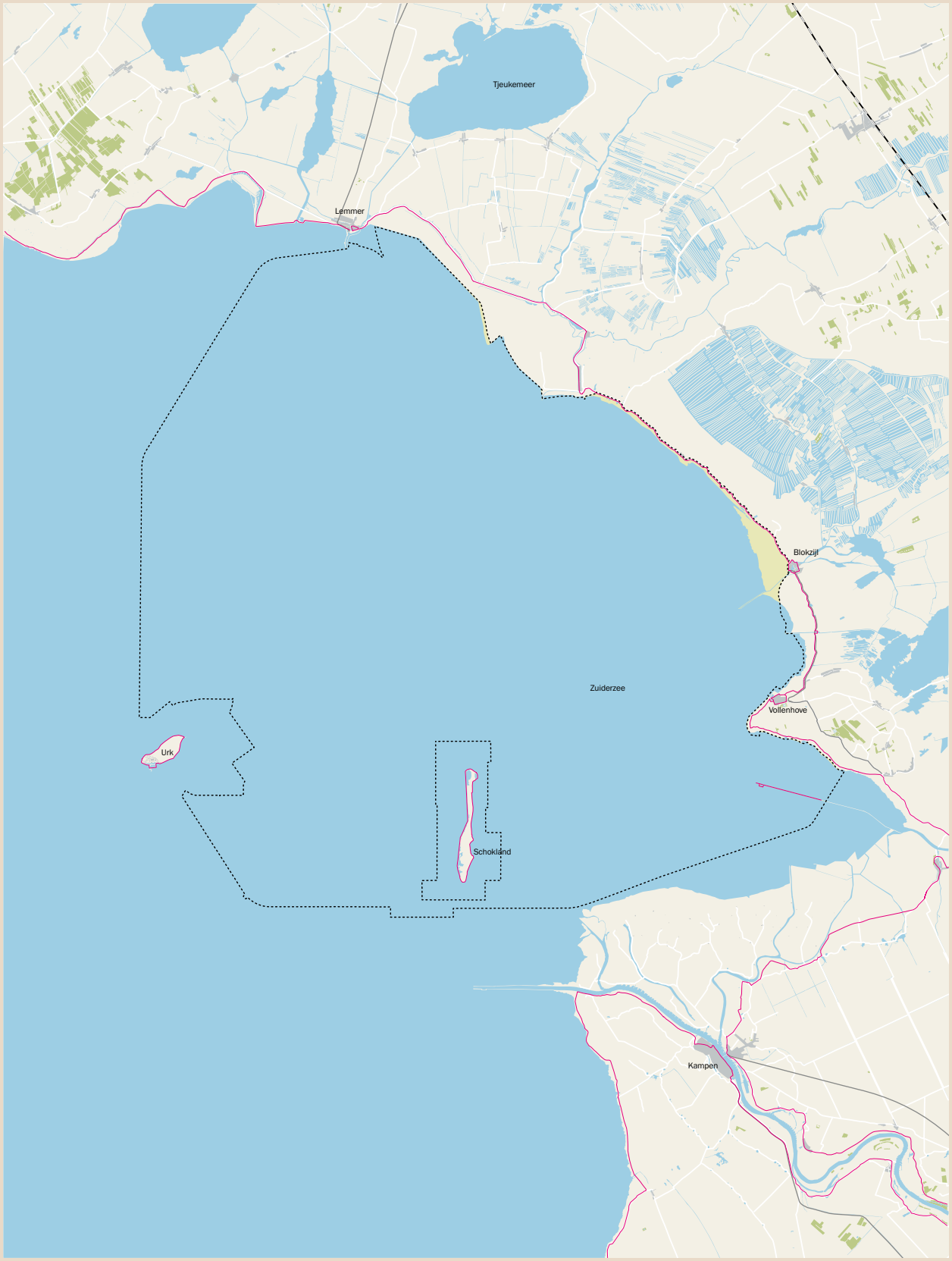
Source: Van der Bie & Smits 2001, 27-30; CBS Statline.

but they are by definition instantaneously and remain subject to permanent change.
Reclamations and land acquisition by partly draining IJsselmeer were a response to the growing demand for extra space in the Netherlands. As was mentioned earlier, that demand was to a large degree driven by a desire to maximize agricultural production. More land means more space for cultivation, grazing and horticulture, making the tens of thousands of hectares of new fertile IJsselmeer land very welcome indeed. Reclamation was another traditional method to render previously unproductive soils suitable for agriculture. It seemed a win-win situation, but appearances can be deceiving. For the gains, in the form of 145,000ha of post-war IJsselmeer polders[376] and several thousand hectares of soil newly reclaimed between 1945 and the 1960s, were devoted almost entirely to activities other than farming. Data collected by Dutch government statistical agency *Centraal Bureau voor de Statistiek* (CBS) show that the amount of land dedicated to farming peaked shortly before 1950, when the two Flevoland Polders – together 97,000ha – had not yet be realized. The loss of farmland was linked to the earlier mentioned urban expansion and increase in woodland. Other factors included the construction of recreational and traffic facilities, groundworks, the realization of business parks, airports or harbour facilities. Of course, equal losses of farmland occurred in former land consolidation areas; the potential allocation of farmland to other functions was inherent in the '5% scheme'.[377]
The data in Table 9.3 illustrate the stagnation in the growth of the total area of farmland shortly after the war, and the decrease which followed soon after. As was stated earlier, the total amount of cultivable land around 1965 was almost the same as in 1930. Another paradox, in a nation which for centuries had been creating new land: by 1970, the total stock of farmland was ca. 2,145,000ha, or roughly the same as it had been during the First World War. What was gained in the context of the Zuiderzee polders was lost to other 'projects'. Whether policy makers at the time were fully aware of this is doubtful. After 1970 decrease of cultivated land fastened because of various reasons, city growth and infrastructural investments not being the only ones. Changing farmland into waste lands (again) is one other point in case, turning land into water (again) another. An example of the first type is the so-called Oostvaardersplassen area in Flevoland; the second type can be represented by the Hedwige Polder near Antwerp, Belgium.
What we can learn of it today is that land hunger might never be over, but that land use is unpredictable.[378]

376 The Wieringermeer Polder (20,000ha) is a pre-war polder.
377 The '5% scheme' was the option included the 1954 Land Consolidation Act (see earlier chapters) to set aside 5% of the land involved in a consolidation for non-agricultural purposes.
378 For instance: some have suggested to realize a new national airport on an artificial island in the North Sea.

Noordoost Polder (1936-) 1942-1962

Polder and development of new land, Noordoostpolder Municipality



Noordoost Polder
Left: Simplified map image ca. 1930. Noordoost Polder is not yet in existence, but the islands of Urk and Schokland are. Scale: 1:220.000
Right: Simplified map image ca. 1970. Clearly visible the former islands Urk and Schokland (and Surroundings) – the latter an UNESCO World Heritage site. Scale: 1:220.000
Its modern-rational parcellation and its tripartite vegetation scheme, together with a ring of satellite villages around a main centre, greatly contribute to the Noordoost Polder's iconic status.

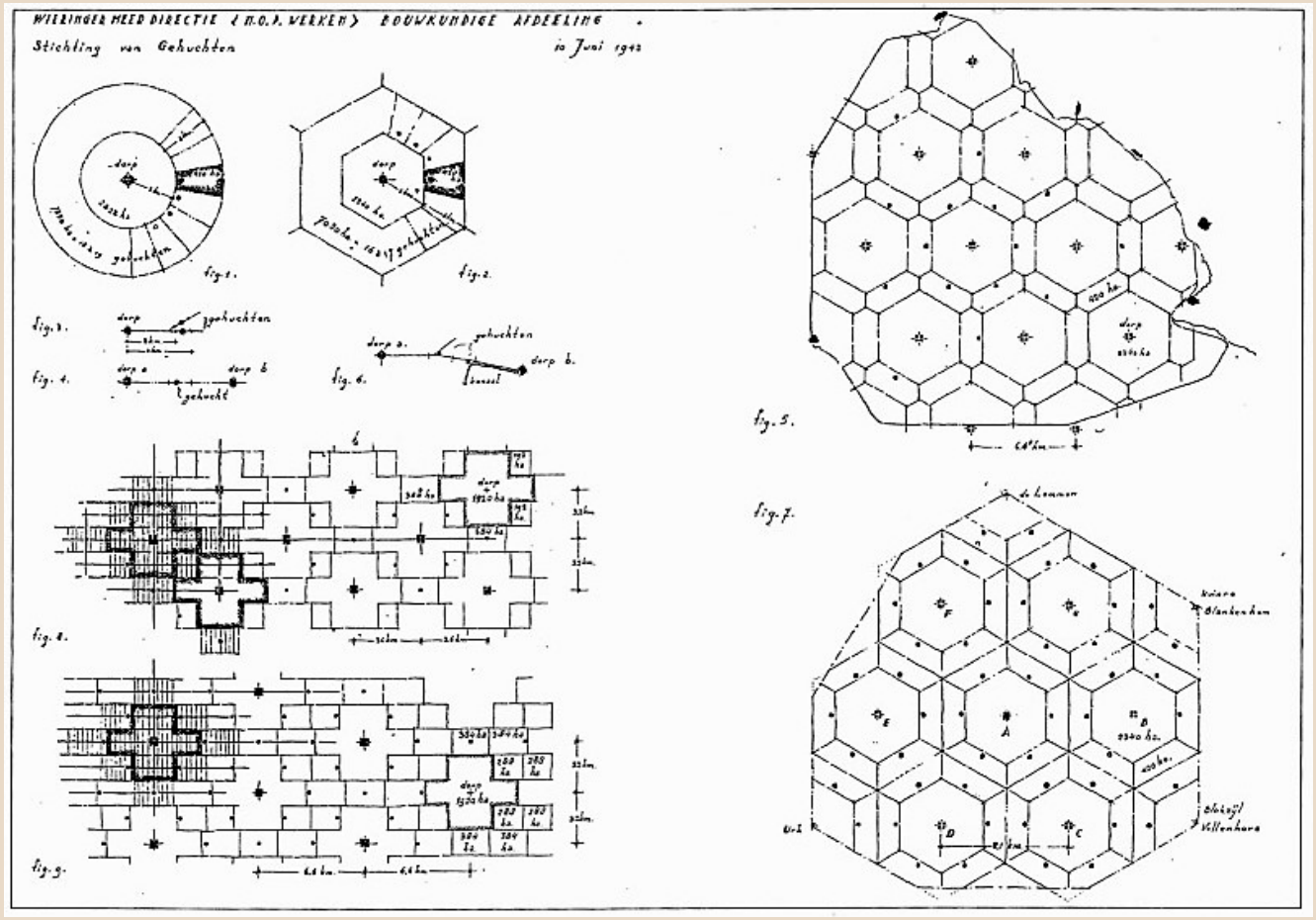
Identification

- The Noordoost Polder is a fully planned agricultural area containing hundreds of farms and farm labourer dwellings as well as a number of villages arranged around a central place. Two former Zuiderzee islands – the fishing village of Urk, still an independent municipality in its own right; and Schokland, evacuated in 1859 and since abandoned – both lost their island status.
- The plan for the Noordoost Polder (48,000ha, 1932) was drafted by the *Dienst der Zuiderzeewerken* and the *Directorate for Wieringermeer*. The project was put to public tender in 1936; by 1942, the polder was completely dry. The final plan for its development after the Second World War involved the combined and/or successive contributions of several disciplines: urbanists (A.J. Granpré Molière, C. Pouderoyen) and sociographers (E.W. Hofstee, S. Groenman), landscape architects (J.T.P. Bijhouwer). *Staatsbosbeheer* was responsible for the vegetation scheme which was adjusted to accommodate the traffic situation. The polder was completed between 1960 and 1962.

Problems

Repeated flooding of the land along the shores of the Zuiderzee as well as uncertainty regarding the national food supply were among the main problems the Netherlands were facing in the early 20th century.[1] By damming the Zuiderzee (by means of the Afsluitdijk) and partly draining the thereafter renamed IJsselmeer (Lake IJssel), these two birds could be killed with one stone. The main purpose of the creation of the Noordoost Polder was to add to the existing supply of agricultural land. This goal became more pressing after 1942 due the acute food shortages which existed during and after the Second World War.

After the polder's completion a specific technical problem surfaced. As a result of the manner in which the polder abutted upon the mainland, the groundwater situation in the latter became problematic and, more specifically, the adjoining clay and peat soils started to dry out.[2]



182 A theoretical village plan for Noordoost Polder, probably based on German geographer W. Christaller's 'Central Place theory' (1933). This further elaboration is by Dutch architect L. Brandts Buys and dates from 1942.

183 Noordoost Polder farms near Creil village, 1953. Note the single, dual, triple and fourfold arrangements of farms and dwellings.

184 Noordoost Polder model farm H.D. Louweshoeve on lot nr. M 109. This concrete barn assembled at location out of prefab elements by Schokbeton Ldt. dates from 1949 and is the first of this type. (Photo 1950)

185 Deep ploughing in Noordoost Polder with two 'Caterpillar machines' in line drawing the ploughshares. (Exact place and date unknown).

Realization

The realization of the Noordoost Polder partly coincided with the economic crisis of the 1930s, which meant that the earthworks could benefit from a large pool of manual labour. Much of the work was carried out by unemployed persons who participated in an employment scheme by the *Dienst der Zuiderzeewerken*.

Work began in 1936 with the construction of immense dykes in the Zuiderzee, towering up to ca. 5m above sea level, followed a few years later by the construction of a pumping station (1941) powered by a combination of steam and diesel (gasoline) and two electrical pumping stations (1942 and 1943).

In December 1940 the circular dyke was complete and in 1941 the process of pumping and the construction of drainage canals could begin. At first, it seemed the Second World War would put a stop to the plans, but because the occupying powers regarded the creation of the polder as an important means to increase agricultural food production, work was resumed. In September, 1942 the polder had become dry land (average surface level ca. 4.5m -asl). The project continued despite a moratorium on construction projects, for the Noordoost Polder idea suited the Nazi ideology and the project moreover was a test case for the so-called '*Ostkolonisation*'.[3] At the start of the project several plans had been drafted for the development of the new land, all centred on the idea of the 'makeable society'. This ideology touched upon the social and religious composition of the polder's future population, its buildings, its mathematical field systems, its accessibility and its drainage infrastructure.

Studies covering a number of social-demographic topics finally coalesced into a consensus on a development plan. Emmeloord was to be the main settlement surrounded by a ring of smaller satellite villages, a layout probably inspired by German geographer W. Christaller's central place theory (1933) which revolves around hexagons (a 'honeycomb structure'). The best known of these satellites are Nagele (the only village with functionalist features), Creil and Marknesse. In total, the Noordoost Polder contains eleven new settlements and one old one: Urk.[4] This former island and fishing village ended up as a beacon on the new polder's westernmost border, while the long, uninhabited island of Schokland remained stranded high and dry.[5] (fig. 182)

Beyond these villages and a few main roads the rural area was divided into field systems which radiated out from Emmeloord, each section subdivided by roads and water courses at right angles to each other. Seen from above (or on maps) this 'embedded' orthogonal spatial system can be experienced as extremely modular and regular, but at a lower scale (or in the field) there are striking local variations and lots of 'irregularities'. Farmsteads were built along one or both sides of each of the roads and their relative locations differ too. Unusually, many of them were variations based on modern standard types and the barns were prefabricated with concrete facades. The smaller farms often show traditional regional characteristics however,

186 This Waterloop Bos (Watercourse Forest) model is a scaled-down experimental water-hydraulic installation for the Haringvliet flood barrier. (Photo probably ca. 1957)

187 Aerial impression of new land reclamation Noordoost Polder. Central feature is the former Schokland island. Today Schokland and Surroundings are listed as a UNESCO World Heritage site. The north is top left. (Photo July, 2013)

a consequence of the colonization of the Noordoost Polder by farmers from different parts of the country. According to the 1947 projections ca. 1,500 new farmsteads were to be established, each a standardized holding of 24ha (800 x 300m). However, in fact, hundreds of holdings materialized that were derived from these measurements (12, 6, 3ha and 48ha), bringing the total number of farms up to nearly 1,800. (fig. 183, 184, 185)
In the decades following its initial colonization the Noordoost Polder was developed further by planting and expanding green features. The vegetation scheme emphasized the area's triple spatial hierarchy of the polder, its residential nuclei and its individual farms. At polder level, it entailed green zones along the dykes, canals and roads. At village level, it provided green belts around and near the settlements, and at its lowest level, that of the farmyard, it involved plantation schemes which usually took the form of windbreaks. Forests were planted on poorer soils, covering several hundred hectares in total. A unique element in the Noordoost Polder is the so-called Waterloop Bos (*Watercourse Forest*) north-east of Kraggenburg.[6] The forest contains many relics of scaled-down experimental water-hydraulic installations and models of harbours all over the world. Several models were built as test installations for the Delta Works. The site is listed as a national monument.
Of particular significance are the Noordoost Polder's archaeological assets, which cluster on and around the former island of Schokland. This area is listed as a Dutch UNESCO World Heritage site specifically illustrating the age-old war between the water and the Dutch. The site represents highly important palimpsest values because of known and recognizable geological, archeological, historic-geographical and spatial values. Of equal archaeological importance in Noordoost Polder are the many wrecks of ships and airplanes (the latter mainly Allied forces airplanes brought down by the Germans during the Second World War). Drainage of this former sea bed has made the archaeological assets of all periods contained in it visible and accessible. But their coming to the surface also endangers their survival because of oxidation. (fig. 186, 187)

Key qualities
Even today, the Noordoost Polder contains some interesting features typical of its large-scale land development during the 1940s and 50s. The polder represents a milestone, both in the battle against the water and in Dutch spatial-planning history.
It can be justly regarded as an impressive symbol of concerted and massive human manipulation of the physical environment and it typically represents extreme antropogenic dynamics. Its physical surroundings, with a recognizably tripartite vegetation scheme and a ring of satellite villages around a main centre, greatly contribute to the Noordoost Polder's iconic status. The interplay of forces – human zeal and energy, both only observable indirectly but transforming the water and later the land – which ultimately resulted in this masterpiece should definitely be counted among the polder's qualities. Its (clusters of) standardized farms with prefabricated barns, its farm buildings with regional characteristics, its blocks of farm labourers' houses, its hydraulic works and its three pumping stations which are national monuments are all valuable icons on a par with its planned villages. (fig. 188) Yet another important quality is the sharp contrast between the polder and the mainland. The polder still reflects to a significant extent its original plan, despite the many later additions of new, large agricultural buildings for which some of the original farmyard vegetation was sacrificed. Some roads were expanded or added to accommodate increased traffic, and today the open polder is also being used to generate wind energy, the serried ranks of the wind turbines emphasizing the grid pattern of the polder. (fig. 189)

188 Another characteristic aerial impression of the new land reclamation Noordoost Polder: straight lines and squarish plans. The north is right. (Photo April, 2012)

189 So-called windmill park in Noordoost Polder. Apart from public resistance this relative new use of space also meets much approval. No doubt it elaborates the Dutch tradition of using windforce.

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Notes

1 The last major flood was in 1916, in the middle of the First World War (1914-1918) which despite Dutch neutrality had also created acute food shortages. In the course of about seven centuries, the Zuiderzee (which itself had formed out of an older vast freshwater lake, Almere) gradually encroached upon and eroded its coasts before reaching its greatest expansion in the early 20th century.

2 This is why the later IJsselmeer polders Oostelijk and Zuidelijk Flevoland were not attached directly to the mainland but, in a sense, were made into IJsselmeer islands separated from the mainland by so-called 'randmeren', 'marginal lakes'.

3 Bosma & Wagenaar 1995, 46-53, 144-166.

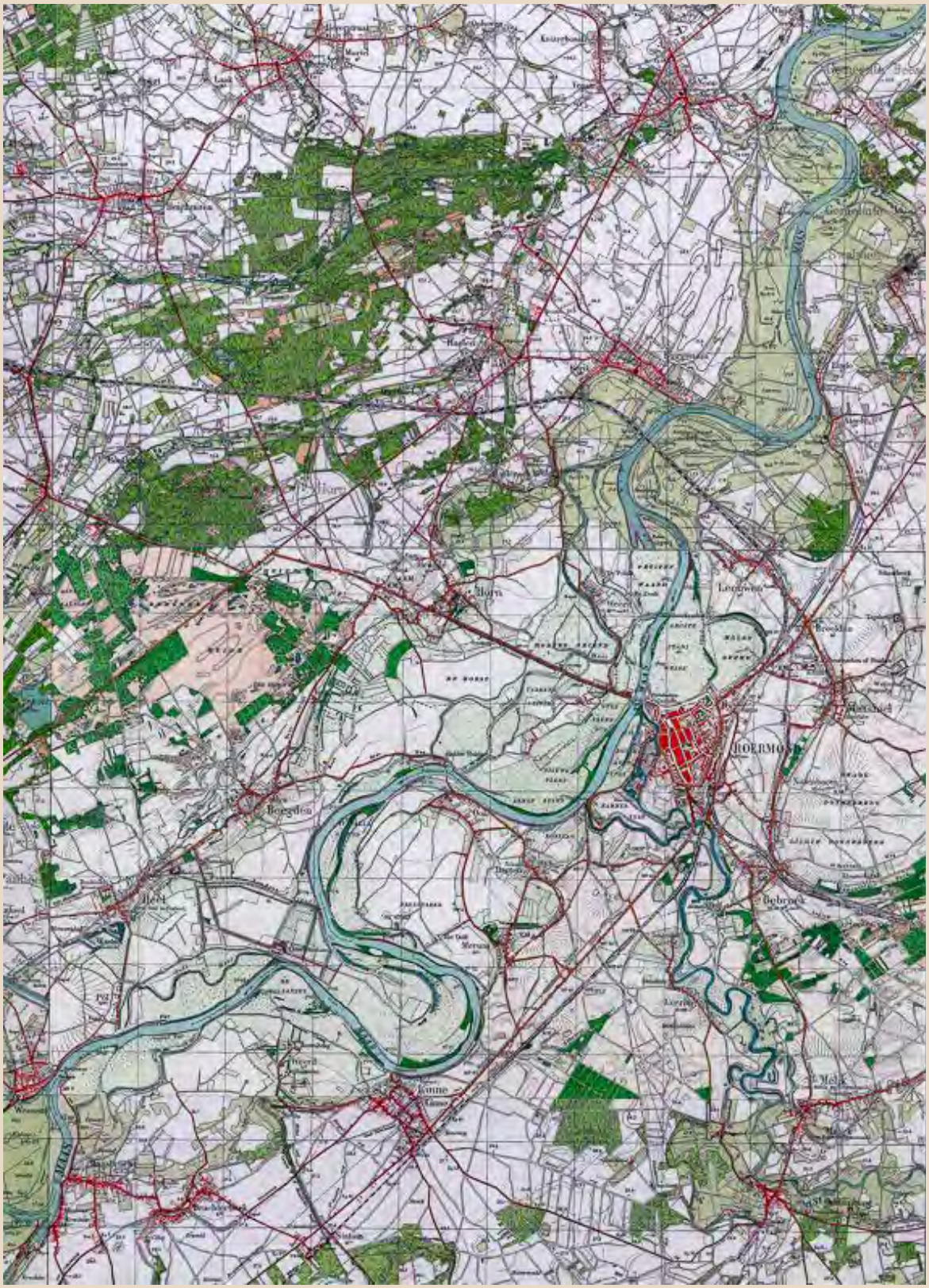
4 Compare Van Duin & De Kaste 1995, 104-117. See also http://www.topotijdreis.nl/ and especially – after zooming in – the 1944 and later maps.

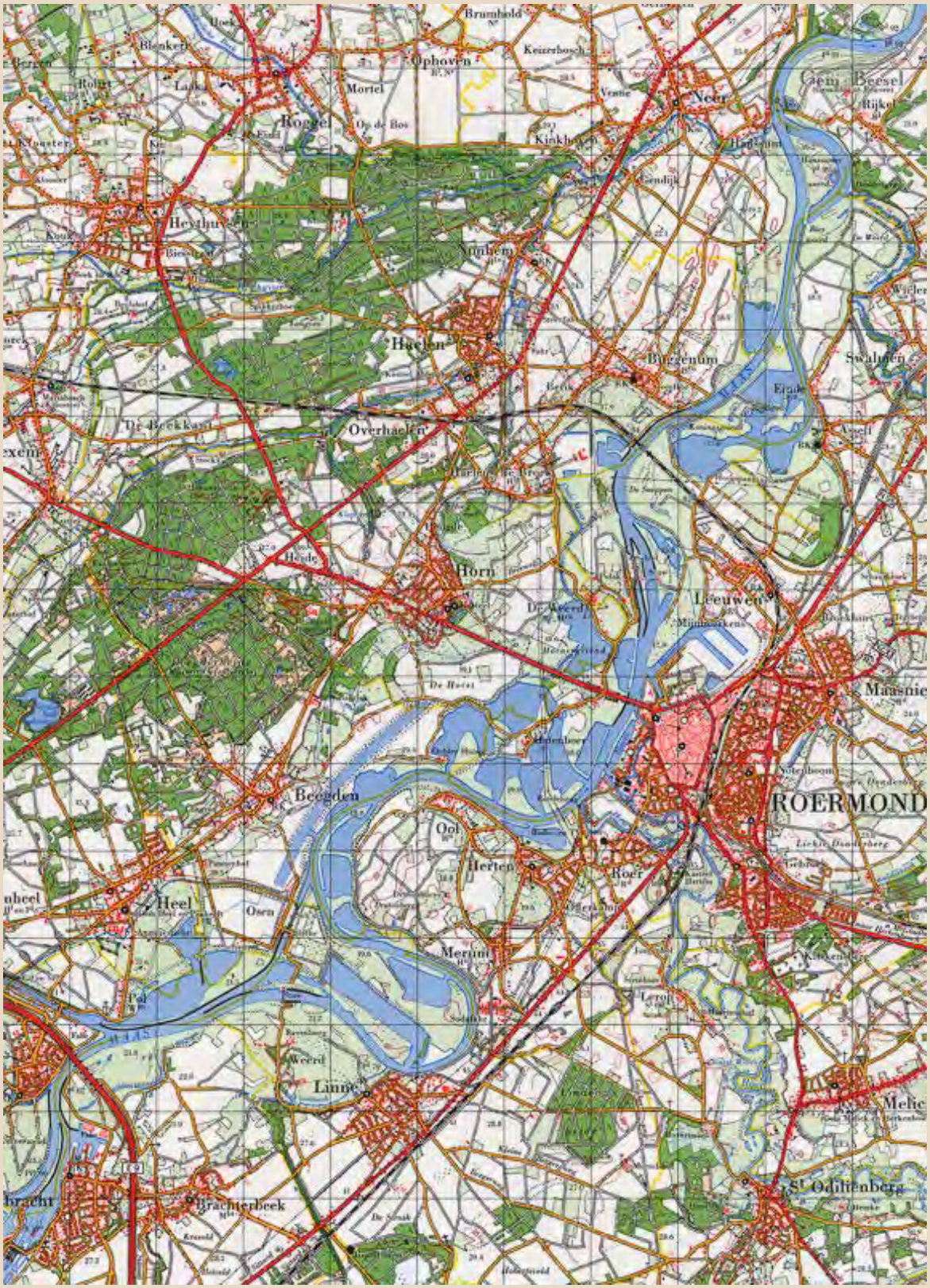
5 Around 1960 and in response to problems arising out of the desiccation process the former island of Urk was physically separated from the rest of the Noordoost Polder by means of (circular) canals. Desiccation is also an issue on Schokland; in order to protect the island's archaeological assets, protective measures have been introduced in the last few decades, in the form of locally raising the water table.

6 The name Waterloop is a playful reference to the Dutch words water (water), lopen/loop (to walk/a walk) and waterloop (water course).

Maasplassen, 1940-present

Reclamation and earthworks (gravel pits), Beesel, Maasgouw and Roermond Municipalities





Maasplassen
Left: Topographical map with situation around 1935, map 58 W, Roermond (1938). Scale: 1:65.000
Right: Topographical map with situation around 1965, map 58 W, Roermond (1967). Scale: 1:65.000
From the late thirties the Maasplassen area went through radical changes as a result of gravel extraction in the River Meuse valley, leaving vast water surfaces.

Identification

- The Type area comprises the banks and foreshore of the river Meuse near Roermond. Since the end of the Second World War the area has been utilized for, and fragmented by, earthworks, specifically gravel pits.
- The Maasplassen (Du. '*plassen*' = lakes) and surroundings have replaced what were once many separate plots of land on the banks of the river Meuse, which in this area strongly meanders. Today, the entire area comprises a water surface of over 3,000ha, most of it formed after 1965.

Problems

In the post-WWII period the demand for building materials was insatiable. Reinforced concrete in particular was relatively cheap and some of its components, especially sand and gravel, could be procured in the Netherlands. (Fossil) channels of the Limburg section of the river Meuse contain large quantities of gravel, which for decades was dug away (and later dredged away) in the floodplain and especially along the foreshore, which until then had been used for agricultural purposes. From a civil engineering perspective, gravel and sand extraction was facilitated in part by the construction of the Juliana Canal (completed in 1935) and the so-called *Lateraalkanaal* (= 'lateral canal') *Linne-Buggenum* (completed in 1972).

The exploitation of these resources could not proceed without a transfer of ownership to a number of concessionaires or to a public institution such as the State, the Province or the Municipality, while also public interest might make expropriation desirable. Until 1956, land prices in the case of sale for purposes other than agricultural use were regulated by a national price policy, but when this was abandoned it became attractive to sell land containing resources suitable for surface mining, such as gravel or sand. Despite growing opposition against the gravel industry since the late 1950s, in 1961 attempts were made to modify the Expropriation Act to accommodate the exploitation. This resulted in a special *Ontgrondingenwet* (Earthworks Act) which settled a few issues; it made all earthworks subject to a permit, but once one had been issued exploitation of a gravel pit was allowed to proceed on a large scale.[1]

It was common practice to fill in some of the resulting pits with clay and sludge or with waste from the (closed) Limburg coal mines.[2] In the long run, however, this no longer sufficed and the gravel pits expanded to their current size. Incidentally, the dumping of mining waste was the cause of extensive soil pollution, a problem which still persists today.

The sand and gravel operations resulted in a highly fragmented landscape, poor access to a number of villages and hamlets, and occasionally even their complete demise. They also sparked off border issues, both municipally and nationally, for the gravel operations extended into Belgian territory. (fig. 194, 195)

Realization

The period 1940-1965 witnessed the rapid spatial expansion of gravel extraction operations in the central part of Limburg Province. Once a few river bends had been straightened out or channels had been shifted it became possible to exploit (adjoining) areas whilst retaining a connection with the river by which the material could be directly shipped off. Dredgers and barges could arrive by the same route. The gravel pits were usually worked in sections so as to keep shore erosion to a minimum, a practice reminiscent of the method used in the 16th-century and after peat operations in the two Holland provinces for instance, where dams and strips of land were deliberately left standing. (fig. 190, 191)

190 Former gravel pits along the River Meuse near Roermond, Limburg Province. Left and far right dredged out gravel winning locations now in use for watersports and as a marina. (Photo 2008)

191 Aerial picture of a gravel pit along the River Meuse near Wessem, Limburg Province. (Photo November, 1979)

Both the gravel operations and the subsequent (active and passive) development of the resulting pits have left behind various traces and relics. In several places remains of former summer or winter dykes of the river Meuse are preserved in the fragmented landscape, as are blind river arms and other interesting features. A number of infrastructural features have also survived, such as (useless) relics of sluices, landing stages and buildings. In addition – and this is the most radical transformation – facilities for aquatic sports and inland beach were built in the area on a substantial scale. In total the area comprises almost forty distinct lakes, together covering ca. 3,000ha. Today, these lakes form a coherent and fascinating landscape thanks to the fact the (former) quays, dykes, river banks and such have by no means all been dug away. The expansion of the Meuse quarries has slowed down, in part due to environmental concerns and complaints of noise nuisance. (fig. 192)

192 Recreational use of former gravel pits along the River Meuse, such as here near marina The Spaanjerd, near Ophoven hamlet, Limburg Province.

Key qualities

The older sections of the Maasplassen illustrate the onset of a development which in several parts of the country has resulted in an 'earthworks landscape – new style'. These gravel pits are not merely a few metres deep, as the above-mentioned peat operations from the 16th century onwards tended to be; rather, they extend dozens of metres beneath the surface. Since the introduction of concrete as a building material, and in the wake of (rail)road construction and urban expansion, sand and gravel pits have become an unavoidable nuisance. Central Limburg is a typical case, also as regards the subsequent handling of its former quarries.

In several places where concessions expanded not at all or only very little the landscape as it was formed in the reconstruction period 1940-1965 can still clearly be recognized. The best example is an area contained within a bend of the Meuse between Merum and Linne, south-west of Roermond (e.g. Spoorplas, Gerelingsplas and their sluice complexes and a few pre-WWII gravel pits, now partly filled in).[3] (north of Roermond, near Buggenum, Neer, Swalmen and Beesel, the Asseltse Plassen and the Rijkelse Bemden and surroundings contain several relics and traces of gravel extraction during the reconstruction period (see 1967 map, north-east). Here, the Hanssumerweerd is something of a curiosity: due to a relocation of the Meuse river channel it 'moved' from the left bank to the opposite shore.

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Notes

1 The Earthworks Act, which succeeded the Verveningenwet ('Peat Operations Act'), first came into force in September, 1971. In the meantime several provinces, Limburg and Friesland among them, had already introduced their own ordinances with regard to earthworks.
2 Van den Broek 1966, 17.
3 See also http://www.topotijdreis.nl/ and zoom in on 1938 and later maps. Due to the extensive dumping of mining waste in this area successive maps may show different, fairly small lakes.

10 Land Consolidation

The former chapter mainly focused on land acquisitions by draining lakes and shallow coastal areas and by reclamation of wastelands. Besides polder projects, reclamations of wastelands and land loss attention payed to there was yet another important factor driving the major changes in the appearance of the Netherlands from the 1930s onwards. Following a slow start in the first decades of the 20th century the planned interventions by re-allocation or land consolidation gathered speed during the economic recovery which followed the crisis of the 1930s. After the Second World War a number of other factors also played a role, particularly modern technological applications and the opportunities provided by the new legal framework.[379]

10.1 Work in progress

By the late 1930s the first stirrings of innovation were visible. A significant element in this process was the fact that the newly revised 1938 Land Consolidation Act provided the State with an instrument to take the 'public interest' into account and even invoke it to enforce a land consolidation. Furthermore, in 1941 the German occupying authorities had made it possible to start an implementation phase even before a land consolidation proposal had been formally approved by the landowners. Another new instrument was the expropriation of land, an option frequently resorted to by the Dutch government in the post-WWII period. Legislation was payed more attention to in chapter 8. Although the 1954 Land Consolidation Act elaborated on existing legislation it also contained a number of sweeping innovations. After WWII and particularly after the 1954 Act had come into force both the number and the scope of applications for land consolidation grew sharply, as did government expenses (see Tables 10.1 respectively 10.2).
The vast majority of land consolidation projects, and certainly the largest, took place after the Second World War. By the end of 1945 less than 25,000ha had been subjected to a land consolidation, but only fifteen years later that number had exploded to over 130,000ha (see Table 10.1). That frantic speed continued: by 1965 another 100,000ha had been nearly completed and in 1970 the total area involved had expanded to 650,000ha. By 1980 this fifure had risen to over 1,000,000ha. Notice that this number doubles the earlier *Heidemij* estimation of ca. 500,000ha. Ultimately, most of the Netherlands was overhauled in some way. Today, of the 2,300,000ha of the nation's land surface 75% has been through one or more (!) cycles of land consolidation. Also notice the mean size of land consolidation blocks must have risen dramatically in the post war years.
In the mean time the net expenses of the Dutch Government on land consolidation grew – especially after 1953 (= the North Sea flood) but the inflation corrected figures show a relatively constant level of 400 million guilders a year at price level 1990. The total post war expense (1947-1985) on land consolidation therefore may have amounted about 14 billion guilders (1990 level), or nearly 11 billion euro's in today's currency.[381]
The pre-WWII consolidations favoured extensive manual labour, in part because it provided tens of thousands of unemployed individuals with a living. After 1945, however, the thousands of heavy American army trucks left behind came in handy during large-scale, mechanized earthworks. So did the many imported chisel ploughs, draglines and

Table 10.1 Accumulated number of completed land consolidations; blocks and total land areas by the end of 1945-1980. Sources: Year-reports CCC and CTD; Van den Bergh, 2004, 207 (Appendix C).[380]

Total land consolidations (completed)	End of 1945	End of 1950	End of 1955	End of 1960	End of 1965	End of 1970	End of 1980	End of 1985
Blocks	50	67		146				
Hectares	23.776	42.850	ca. 85.000	131.592	383.381	650.937	1.046.723	1.215.436
Mean size (ha)	475			900				

[379] A relatively simple but critical explanation of land consolidation goals and processes is Van der Linden-Nijdam 1974.
[380] See: Kamerstuk Tweede Kamer 1952-1953, Kamerstuknummer 2063, ondernummer 4, p.3; ibidem 1953-1954, Kamerstuknummer 2063, ondernummer 5, p.3; Kamerstuk Eerste Kamer 1960-1961, Kamerstuknummer 6100 C, ondernummer 59, p.12. Number of blocks 1961 and after uncertain. Also see Table 10.3
[381] Van den Bergh 2004, 223, 224, Appendix 1; http://www.iisg.nl/hpw/calculate2-nl.php

Table 10.2 Government expenses in relation to land consolidation, 1947-1985. Comparison of today's value in euros and inflation compared to 1990 shows differences, but gives an indication of the expenses.

Year	Guilders x million	Euros 2016 x million	Corrected for Inflation
			Price level 1990 / 2016
1947	5.2	25	32
1948	22.9		
1949	21.4		
1950	19.2	75	101
1951	24.4		
1952	30.3		
1953	29.6		
1954	53.9		
1955	87.9	300	400
1956	101.1		
1957	104.0		
1958	95.2		
1959	85.7		
1960	78.7	230	303
1961	77.5		
1962	88.2		
1963	88.0		
1964	119.9		
1965	139.4	350	450
1970	236.0		621
1975	260.5		380
1980	259.7		333
1985	318.2	250	332
Total	5872.0		13.881
1990			100
In Euro's 2016			10.730

Sources: Van den Bergh 2004, 223, 224, Appendix 1; http://www.iisg.nl/hpw/calculate2-nl.php

193 Large scale bulldozering as part of landscape intervention. (Drieban, Drechterland municipality, Noord-Holland Province, 1963)

bulldozers financed by the Marshall Plan, impressive machinery which before the war had been in short supply. Significantly, in 1955 *Heidemij* deployed over 300 draglines against 'only' 15,000 personnel, while only a few years earlier that same *Heidemij* had employed 30,000 people.[382] A dragline of that period could do the work of thirty people, a bulldozer that of twenty. Chisel ploughs and cultivators were in a class of their own; they could turn over the soil down to a depth of several metres and if necessary break through or pulverize hardpan. This was crucial for water management and for the manipulation of soil fertility. Such machinery could only be operated with tractors or vehicles with caterpillar traction. (fig. 193)

The earlier mentioned *DUW* scheme had made it financially attractive (besides being a useful means to keep people in employment) to use manual labour, but in the mid-1950s the scheme was terminated, making further mechanization of earthworks in the context of land consolidation (and obviously also land acquisition, reclamation, sand and gravel extraction and infrastructural projects) unavoidable. The reduction in manual labour was paralleled by a steep decline in the number of draught horses: tractors and continuous-traction vehicles were more reliable and more powerful. Between 1945 and 1965 the number of draught horses fell from 230,000 to 90,000; in the same period the number of tractors exploded from almost 0 to 110,000.[383] Today a selection out of those new modern work-horses have become collector's pieces. (fig. 194)

The utilization of the most up-to-date instruments available went beyond earthworks. Training, expertise and experience and above all a host of technical appliances were also in other ways drafted into the service of land consolidation. As had happened during the Zuiderzeewerken, land consolidation was now likewise preceded by intensive soil surveys.

A major actor in this regard was the *Stichting Bodemkartering* (Stiboka), which collected and analysed soil samples and assessed the water balance and soil composition. Likewise, the *Landbouw Economisch Instituut* (LEI), mapped the

382 In 1957 the total number of draglines in the Netherlands was ca. 1,500.

383 Van der Poel 1983, 254. Obviously, this growth was not limited to land consolidation and other earthworks but it also extended to the agricultural sector; Andela, 2000, 45. She mentions 4452 tractors in 1940 and 130,418 in 1965. Over 4,000 were stolen or damaged during the war; Segers (ed.) 2018.

194 Many antique and early-industrial machinery have become collectables. Today pre- and early-post-war tractors are being cherished and can be admired in museums. (June, 2016, unknown location in the Netherlands)

social and economic situation, while the *Kadaster* (Land Registry) provided geodetic data by painstakingly conducting land surveys and assessments prior to, during and after every land consolidation. The result was a large stack of reports before a single spade went into the ground – or rather, a single dragline started to dig.

10.2 National dispersion; national involvement

The goals of the 1954 Act included the securing or reinforcing of non-agricultural values by means of a *landscape plan*, and the inclusion of aspects of public interest. The Act also aimed to expand the number of those involved by granting a vote to tenants, as interested parties. The steep rise in the number of applications for land consolidations from 1954 onwards reflects this: from a total affected area of ca. 500,000ha to ca. 1,300,000ha in the mid-1960s. In 1960 over 130,000ha were realised – the great majority in sandy the sandy areas of the provinces of Overijssel, Gelderland, Noord-Brabant and Limburg: these four provinces count up to nearly 90,000ha. Finally all provinces were to be affected by consolidation projects to a greater or lesser degree: from the 1950s there was a great national dispersion. An interesting fact is the evidence of rapid (further) growing interest in land consolidation in Gelderland, Noord-Brabant, Limburg and Zuid-Holland – the latter no doubt as a consequence of the North Sea flood. (See Table 10.3)
By 1985 the consolidation of ca. 1,200,000ha was completed but other primary, secondary or even tertiary consolidations followed, affecting a further 600,000ha and bringing the total up to well over 1,600,000ha.[384]
The maps produced by the *Cultuurtechnische Dienst* (CTD or CD) clearly illustrate the expansion of ongoing and completed consolidations in the period 1945 – 1975 (- 1985), from a relatively small number of isolated pockets in the Dutch sandy areas to larger mosaics of contiguous areas.[385] Isolated pockets were to be expected in the case of applications initiated by the farmers themselves and

[384] Van den Bergh 2004, 207. By the time the 1953 North Sea flood struck ca. 80,000ha had been completed. The disaster delayed the process.

Table 10.3 State of land consolidations and their dispersion by province in September 1960.

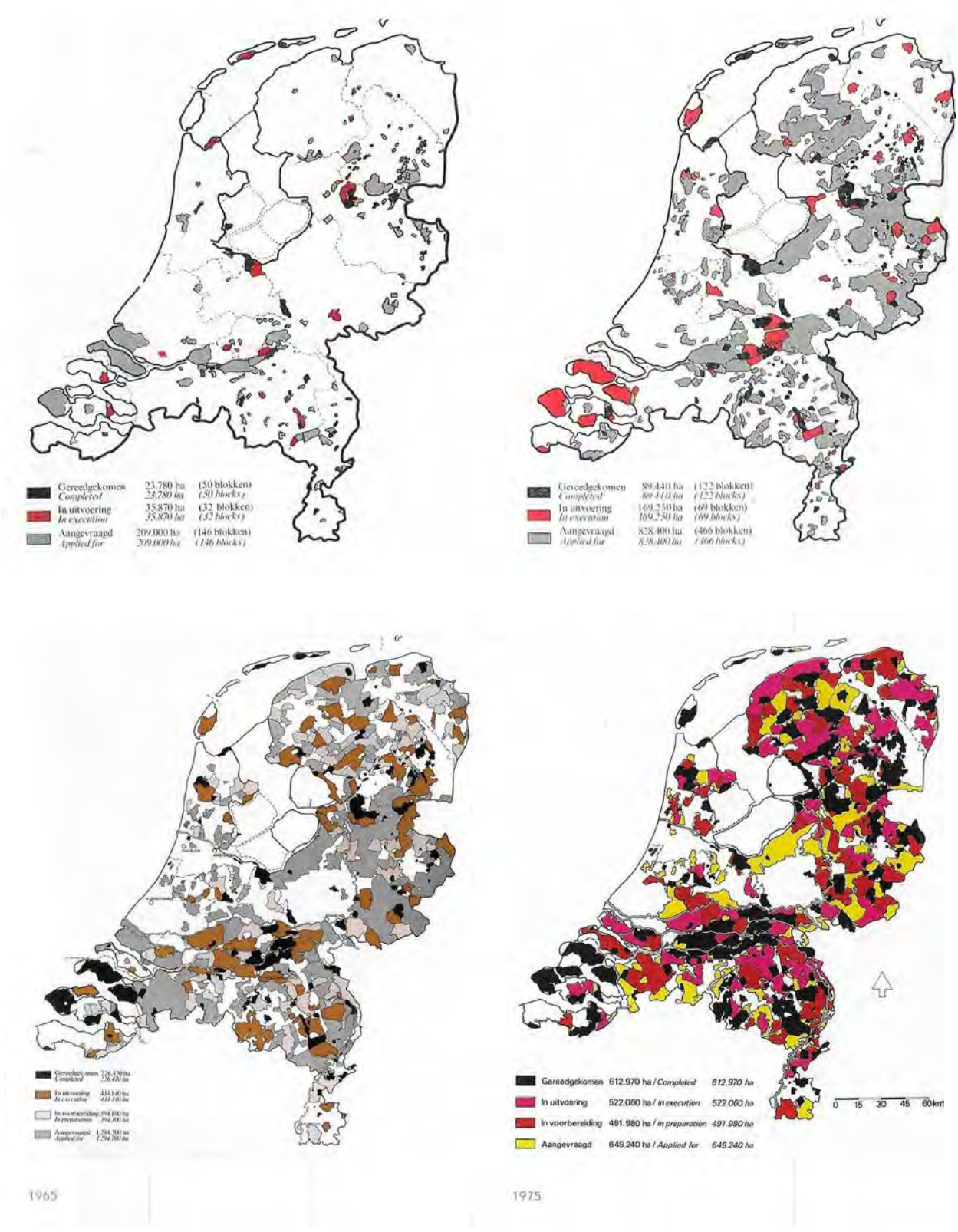
Province	Requested and in preparation		In implementation		Completed since 1924	
	Number of blocks	ha	Number of blocks	ha	Number of blocks	ha
Groningen	27	44.000	5	8.000	5	3.000
Friesland	54	20.000	6	22.000	8	5.000
Drenthe	52	88.000	8	16.000	25	9.000
Overijssel	109	24.000	17	38.000	25	24.000
Gelderland	41	265.000	8	43.000	15	21.000
Utrecht	23	37.000	5	7.000	2	7.000
Noord-Holland	36	53.000	9	17.000	10	5.000
Zuid-Holland	56	114.000	5	5.000	0	0
Zeeland	16	29.000	3	36.000	5	21.000
Noord-Brabant	123	203.000	13	46.000	30	22.000
Limburg	50	127.000	5	8.000	21	14.000
The Netherlands	587	1.401.000	84	245.000	146	132.000

Sources: Van den Bergh 2004, 223, 224, Appendix 1; http://www.iisg.nl/hpw/calculate2-nl.php

(therefore) primarily intended to improve agricultural conditions. Where the State was the initiator, an approach involving larger areas was more efficient. (fig. 195)
This to some extent proceeded from the 1958 so-called *Meerjarenplan voor ruilverkavelingen en andere cultuurtechnische werken in Nederland* ('Multi-annual Plan for Land Consolidation and other Civil-Engineering Projects in the Netherlands') which among other issues also addressed financial aspects and urgency assessment and which prioritized certain areas.[386]

Remarkably, the plan omitted to mention many of the pre-1955 applications for land consolidation, including those in the Gelderland region of Achterhoek and in south-west Friesland. On the other hand, the north of Friesland, large sections of Noord-Brabant and the south of Limburg are emphatically mentioned as having priority. (fig. 196)

[385] Andela 2000, 178, 179.
[386] See also Oosterbaan 1981, 62-69.



195 Survey maps showing state, progress and spreading of land consolidations in respectively 1945, 1955, 1965 and 1975. Note that the centre of gravity has been in the sandy eastern and southern provinces and in the fluvial clay zon. Yet the south-western marine clays (after 1953) and the northern clay zones followed.

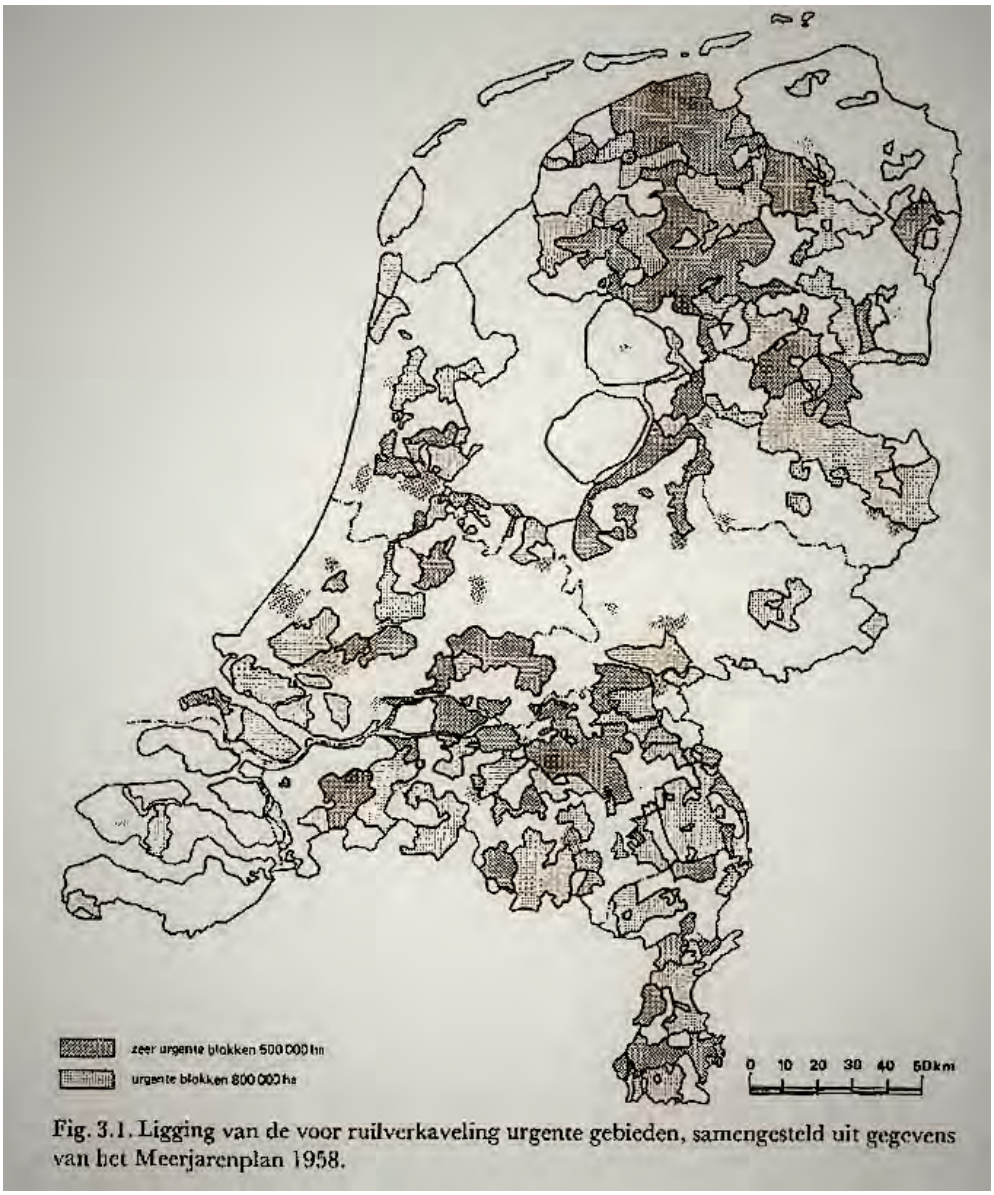


Fig. 3.1. Ligging van de voor ruilverkaveling urgente gebieden, samengesteld uit gegevens van het Meerjarenplan 1958.

196 Areas qualifying for urgent reclamation, based on data derived from the 1958 Meerjarenplan.

10.2.1 Involvement of many ministries

Responsible for the *Meerjarenplan* was the Minister of Agriculture, in this case the before mentioned Mansholt, and upscaling was one aspect of it.[387] Many other ministries were involved as well, as stated in the explanatory memorandum to the 1959 government budget: *'The intensive collaboration in this matter with his colleagues of Verkeer en Waterstaat (specifically water management and roads), Economische Zaken (i.e. regional industrialization policy and electrification), Volkshuisvesting en Bouwnijverheid (particularly spatial planning and slum clearance), Maatschappelijk Werk (relevant social measures), Sociale Zaken en Volksgezondheid (i.e. employment, realization of water supply network) Binnenlandse Zaken, Bezitsvorming en Publiekrechtelijke Bedrijfsorganisatie (specifically municipal boundary issues) gives the undersigned much satisfaction, because it is only through collective efforts, together with lower corporate institutions and business organizations, that the deprivations in the various agricultural regions can be remedied. Only a robust*

[387] Comparatively few projects were actually implemented, especially in the south of Limburg Province.

agricultural area will be viable.'[388] Although the Ministry of Defence's involvement is not explicitly mentioned, the 1952 Act *Bescherming Waterstaatswerken in Oorlogstijd* ('Protection Water Management Infrastructure in a Wartime Situation') in particular gave it vested interests in and certain responsibilities relating to land consolidation, more specifically, it entailed guaranteeing the security of civil engineering objects and water management infrastructure and keeping them in operational order, a task in which provincial administrations played a significant role as well.
Involvement of different ministries may also apparent through the planning of large scale works parallel with land consolidation projects. Occasionally a planned motorway construction provided a strong incentive to more or less simultaneously start with the consolidation of a number of contiguous blocks, as e.g. in Drenthe and Noord-Brabant, or to combine them into one huge block, as in central parts of the major river plains in e.g. Tielerwaard-West. A rural improvement programme or regional (industrial) development plan could provide an argument for opening up the area at the same time, leading in turn to a reorganization of adjoining areas. A subsequent road construction might call for a landscape plan due to the need to integrate the project into the landscape and to provide a suitable vegetation scheme for its roads. The spatial and temporal overlap of such programmes and developments is a measure of the (potential) complexity of land consolidation in its wider social context.

10.3 Land consolidation: doing the job

The realisation of land consolidation projects usually lasts several years and in several cases it even takes over 10 years. The reason for this is not only the physical part of the job – such as digging ditches, road and farm building or planting vegetation – but also all kinds of preparation of it. Not all phases of the implementation can be explained here but in short the process is as follows. Remember the 1924 Act was accommodated over time, but the broad outlines remained comparable.

Two slightly different models of land consolidation can be distinguished: A. land consolidation by agreement or voluntariness and B. land consolidation under the law. The first usually occurs between a limited number of land-owners and mostly just involves the swopping of grounds (or simple parcel exchange) and subsequent cadastral processes. We will not concentrate on this – although frequently occurring – process.[390] The second model is much more intricate and must contain certain ingredients. Just to mention a few points in case: 1. there must be an application[391], 2. there must be an exact overview of the starting-point, 3. there must be shown a provisional plan, and 4. the then operative democratic course must be followed (unless the public interest is prevailing).
Especially the ascertaining of the starting-point and the making of a provisional plan are complicated processes. Both include cadastral measuring (viz. in advance as well as in planning a new lay out). Nr. 2. further includes describing and estimating the value of the particular grounds (soil, arable, pasture, etc.) and thereafter it includes the assessment of necessary and possible improvements and their costs. Nr. 3, making of a provisional plan includes planning a new lay out, allocating grounds, planning roads, water and utility works, planning of reclamations and landscape plans, etc. In this phase it also became clear if new farms were to be established and/or others had to terminate and soon had to vanish.[392]
Paragraphs 7.2 and 7.3 focus on institutions and organizations involved, but the ones mentioned there (such as the pivotal *Cultuurtechnische Dienst* [CTD or CD], for agro-engineering service and accompanying, *Kadaster* – for land measuring and registry – and *Stichting Bodemkartering* or [Stiboka] – for soil quality assessment) are just a few out of many more.[393]
Only when no. 4, the democratic course was completed and voting the (definitive) plan of allocation (*plan van toedeling*) had resulted in sufficient acceptation, physical implementation of the land consolidation program could start. From that moment companies specilized in transformations of rural areas like *Nederlandsche Heidemaatschappij*, *Staatsbosbeheer*, local or regional companies and/or sub-contractors might begin their jobs. They did the engineering,

388 Rijksbegroting 1959, XI, Memorie van Toelichting No. 2, 22. (http://resolver.kb.nl/resolve?urn=sgd:mpeg21:19581959:001412&role=PDF)
389 See e.g. Staatsblad van het Koninkrijk der Nederlanden, 1952, No. 367, 23-06-1952; 01-01-1952; Siertsema 2017, 91 ff.; Provinciale Zeeuwse Courant, 04-30-1958, 9.
390 Today (WILG) this is defined: "A voluntary land consolidation is the agreement to be laid down in writing and to be registered in the land register whereby three or more owners commit to merge certain immovable goods belonging to them, to divide the given mass in a certain way and to allocate it amongst each other by notarial deed."
391 As said before: from 1938 applications might – and often did – come from public institutions, etc.
392 Bouwman 1958, 88-92.
393 Bouwman 1958, 49 ff. and passim.

ground-works and drainage, they built pumping-stations, farms, etc. They used manpower and/or machinery – draglines, bulldozers, drain ploughs, etc. – but it was their theoretical and practical knowledge and their technical experience that brought them to the most visible forefront of land consolidation.[394] And it was their furnishing of the new landscapes that impressed (or disappointed) most. This furnishing of the Dutch land surface was part of the landscape plans.

10.4 The role of landscape plans in land consolidation

Although the landscape plan became a mandatory component of land consolidations 'in the new style' from 1954 onwards, the instrument in fact merely formalized current practices made possible by the 1938 Act, which contained provisions regarding the 'common good'.[395] This concept was defined as that which benefits the entire population or at least a significant portion of it.[396] Nonetheless, 'the common good' is by definition open to multiple interpretations and the concept can be stretched quite far. This became apparent in 1944 when *Staatsbosbeheer* drafted the consolidation plans for De Scheeken (Noord-Brabant; see the relevant Box Text) and Staphorst-West (Overijssel), among others. On that occasion 'the common good' also encompassed issues like planting schemes, forestry and water management. To suggest that the entire population saw the benefits of these examples would be an overstatement, but after a while the landscape plan – i.e. 'furbishing' the landscape – nonetheless became regarded as being in the interest of the common good. Although the architects of (re-)consolidation plans did not in all cases explicitly refer to the concept they were careful to always include landscape furbishment in their plans. (fig. 97)
The devastations on the island of Walcheren in 1944/45 presented a perfect opportunity to test the new concept in the field. Walcheren's re-consolidation became a crucial pilot for a new approach towards the reorganization of seriously damaged former war zones, and for the landscape aspects of land consolidation. In this specific instance, the characteristic vegetation and assets of the former landscape were painstakingly restored or reconstructed, with the addition of new elements. (see Box Text on Walcheren)

10.4.1 Landscape plans need regional knowledge and a specialist view

Such an approach obviously required detailed knowledge of the involved areas, and this was one of the arguments for collaboration with regional specialists. The starting point was a region-specific landscape plan. This did not necessarily translate as an inclusion of local assets in the landscape plan for the area in question, but it rather called for a pro-active approach. For, since the 1954 Land Consolidation Act had come into force, any natural assets (qualities, values) or cultural-landscape assets not included on the (obligatory) zoning maps still risked being obliterated.[397] This potential threat placed a heavy responsibility on the shoulders of the landscape architects and called for not only a pro-active attitude but also, and more specifically, a natural-historical and cultural-historical outlook. It was because of this that the primary emphasis during the implementation stage of most landscape plans was not on 'creativity' but on the practical realization of landscape restoration (and by extension, re-creation), an approach for which a thorough underpinning was essential. It specifically called for expertise in plant species, plant communities, vegetation schemes and the utilization of indigenous species. Such expertise and principles made it possible – provided it was also spatially feasible – to retain or supplement existing vegetation. (fig. 197)

10.4.1.1 Names and places

H.W. de Vroome, a pioneer and on behalf of *Staatsbosbeheer* involved in implementation, applied these principles in his many designs for the eastern Dutch sandy areas, as did his colleague, N.M. de Jonge, for the western and south-western Netherlands. Examples of De Vroome's work include the landscape plans for the land consolidations Vriezenveen and Beltrum. De Jonge was responsible for the

394 Bouwman 1958, 47-103.
395 See also Van den Bergh 2004, 47. The Act itself uses the term algemeen nut, 'general usefulness'.
396 https://en.wikipedia.org/wiki/Common_good.
397 Driessen 1990, 92, 93.

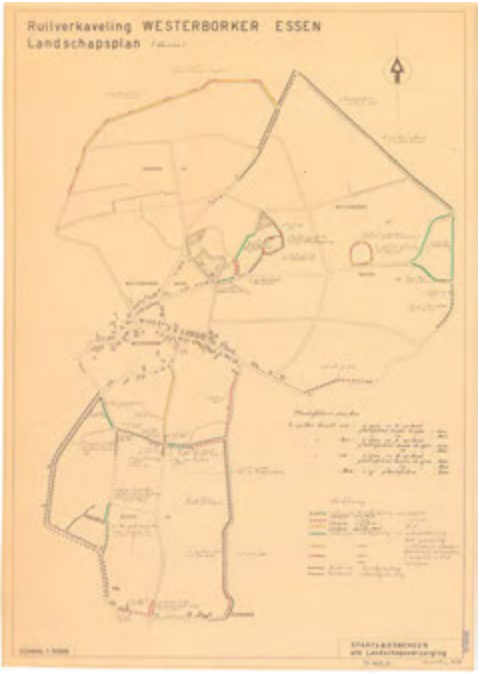
197 Duck decoys (Du: eendenkooien) might be saved as integral parts of land consolidations and landscape plans. Usually they can be recognized as 'forested pillows' in open fields. This 1954 photo shows a duck decoy in land consolidation Hedel-Ammerzoden (Gelderland Province).

landscape plan for Maas en Waal-West, while a third influential *Staatsbosbeheer* landscape architect, R.J. Benthem, drafted the plan for De Scheeken (see the relevant Box Texts for these four plans) Despite the reorganization of these landscapes on the basis of cultural and – especially – natural-historical information, all three architects also successfully added new qualities. Their extensive practical knowledge of the areas concerned and their ability to incorporate existing vegetation in their designs enabled them to preserve or even enhance a landscape's character in addition to increasing its potential for exploitation. Their goal was an optimal balance between nature, (cultural) landscape and farming. The government subsidized the operational costs of a landscape plan up to 70 to 100%, depending on the type, property situation, or intended function of the vegetation in question.[398]

10.4.2 Landscape plans: zoning maps and execution

Dozens of zoning maps – the crucial element of any landscape plan – produced by *Staatsbosbeheer* have been identified. They were prepared in the context of a land consolidation, and in many cases several versions or drafts have been preserved. A good example is the zoning map marked as '*Voorlopig* [i.e. preliminary] *Landschapsplan*', one of a series of designs for the land consolidation Haskerveenpolder (ca.1953). The 1945-1946 design maps for the isle of Walcheren contain other good examples.[399] Most designs contain an overview of existing green elements and vegetation zones along roads, water courses and dykes, as well as proposals for their extension, thinning or modification. The designs have been drawn on a large scale, sometimes requiring multiple sheets for one consolidation.
Landscape plans often list specific plant species and provide indications as to the height and width of vegetation zones, the latter in terms of tree-top width as well as the number of rows: everything was planned in great detail.
That being said, a comparison of the zoning maps with their actual realization in many cases reveals a less than perfect match. Usually there was some trimming down in terms of the number of planted trees and shrubs and the number of different species. In many cases the selected species were cheaper varieties than

398 Driessen 1990, 92, 268. (1987 data).
399 http://library.wur.nl/tuin/images/42.0541.01.jpg; http://library.wur.nl/WebQuery/tuin?q=walcheren



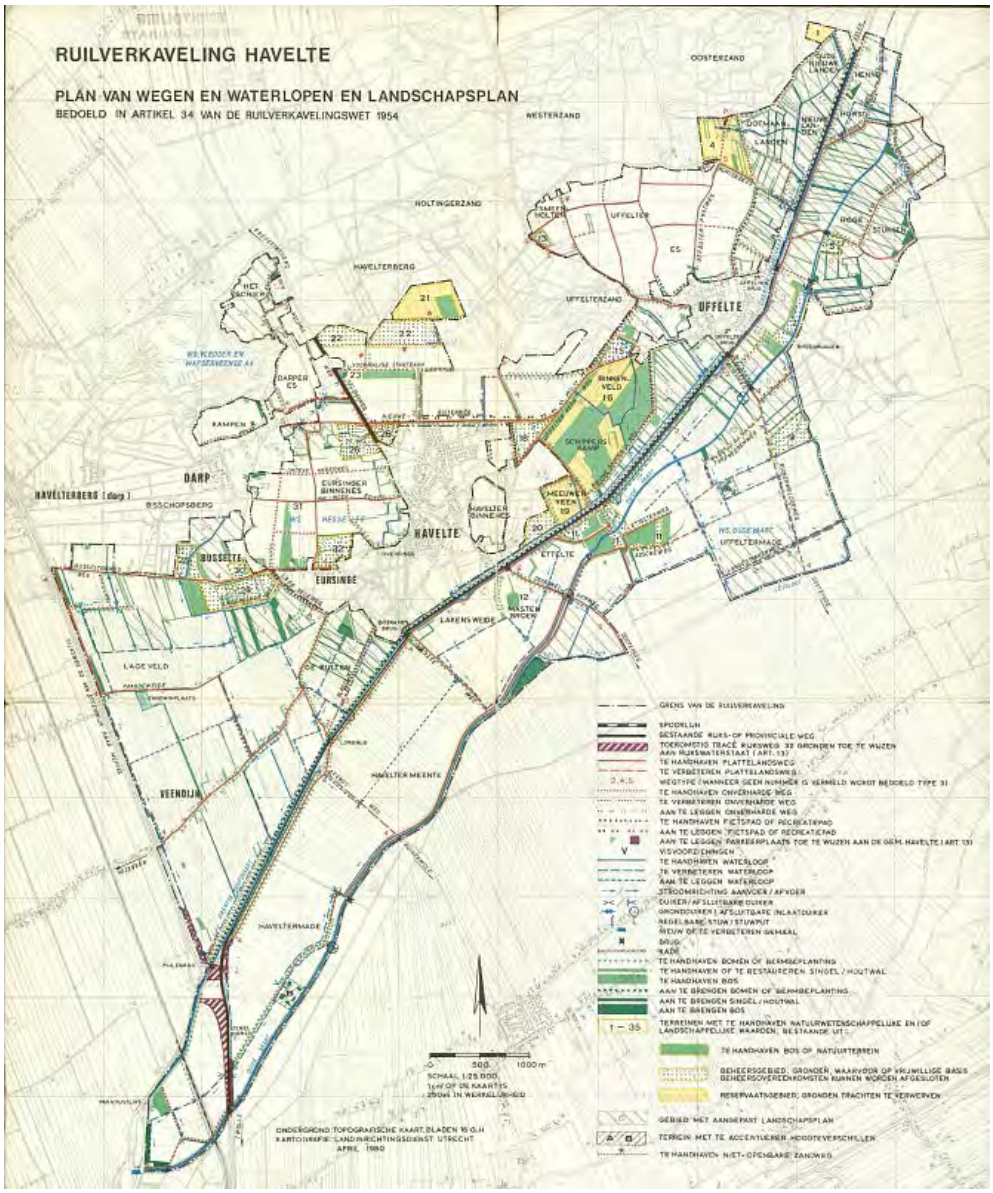
198 Landscape plan by Harry Vroom and belonging to land consolidation Westerborker Essen (Drenthe Province, 1948)

those the plan prescribed, something which obviously had an impact on the landscape. An example is Beltrum, which in any case was implemented on a larger scale than De Vroome had intended and moreover received less, and also less varied, vegetation.[400] Such economizing may or may not have contributed to the landscape plan's apparent fall from favour around 1965. Certainly from that time onwards both the landscape plan and land consolidation as such were looked upon differently. The timing coincided with the introduction of the *Wet op de Ruimtelijke Ordening*, in which agricultural interests yielded to those of nature and the landscape, which through the regional plan became more firmly embedded in the land consolidation process. At the same time the role of *Staatsbosbeheer* in the process was strengthened.[401] (fig. 198)
The numerous executed designs based the 1954 Land Consolidation Act and its Landscape Plans show a great variety of physical results, just as in the case of the reclamation of wastelands. Comparison to the original of (today's) visible, carthographical or aerial photographical outcomes may reveal unrecognizable alterations: fragmented and/or irregular parcellation may have made way for highly 'academic' and rational ground-plans based on rectangular modules. Orthogonal patterns of roads, canals and ditches are their main feature; none or hardly any relic survived. Their opposite is a new land division highly based on respect for the pre-existing landscape character, qualities and assets. In this case many authentic features remain in place and in functional – or at least in recognizable interdependence. There are many in betweens these two extremes. Many landscape plans respected the cultural-historical and natural values; that's why local and regional knowledge playedan important role in them. But as shown before in chapter 1 quite different starting-points could result in comparable outcomes.

10.4.2.1 The landscape plan's post 1965 successor: Landscaping

Towards the end of the reconstruction period a new and more 'creative' wind started to blow.[402] Landscape preservation, which hitherto had dominated the landscape plan, took a step back in favour of what was being called '*landschapsbouw*', landscaping. The term met with some scepticism since it might introduce an element of 'historical falsification' in spatial planning. That this was indeed a potential risk became evident when the general public responded to a number of landscapes in Drenthe as if they were authentic, although in fact they were almost entirely produced on the drawing board. Some tree-furbished and untidily re-consolidated bocage landscapes from the 1970s were occasionally interpreted as having been formed spontaneously. The addition of an occasional sheepcote or rustic cottage only added to this illusion of authenticity. Many a tourist was under the impression that these landscapes were among the few that were still pristine. Although the rise of the phenomenon of landscaping did not spell the end of the landscape plan it did consign it to a secondary position. The prime position of landscaping was consolidated after the introduction of volume 3 of the '*Derde Nota Ruimtelijke Ordening*' [Third National Policy Document on Spatial Planning], called: 'Nota landelijke gebieden' [Policy Document on Rural Areas] (1977-1979). In 1992, landscaping as defined in the *Derde Nota* was described as: '*the integration and realization of*

[400] Wederopbouwgebied Beltrum 2014, 41.
[401] Van den Bergh, 2004, 16, 56, 180.
[402] See e.g. De Visser 1997, 17-61.



199 Land consolidation Havelte, Drenthe Province. Combined and rather detailed plan for roads and ditches and landscape planning, 1980/1981 by H. de Vroome. The map shows the character of the new 'landscaping' trend.

functions and their interdependent relations in rural areas. [...] *Landscaping covers the entire spectrum represented by landscape preservation and landscape development.'* In 1992, the *Nota*'s architects saw landscaping as an extension of the reconstruction period. In their words: *'Walcheren's reconsolidation (after 1944) and the land consolidations were incentives for landscaping to aim rather for the development of the landscape in its entirety. It was also perceived as being directly linked to the IJsselmeer Polders.'*[403] The concept of landscaping marks a shift in the thinking about land management in the period 1965-1975. At the same time it illustrates the increasingly more physical and theoretical underpinnings of landscape and land management.[404] A passage in *Staatsbosbeheer*'s annual report for the year 1972 illustrates the difficulty of having to integrate existing assets into a new landscape: '[...] *the work involved in landscaping is complicated in areas where the historical assets and beauties of the old cultural landscape are pre-eminent but*

403 Nota Landschap 1992, 15-16.

404 De Visser 1997, 105-106. Among other things, De Visser stated that the Visie landschapsbouw (1966, by Th.A.M. van Keulen) argues that a landscape is not a given but a coherent entity reflecting its natural genesis, its utilization by human beings, and its occupation history.

adaptations nonetheless are essential.'[405] This was a novel way to formulate the well-known problem the *Contact-Commissie voor Natuur- en Landschapsbescherming* (CC) and the *Werkgroep voor Cultuurlandschappen* (WCL) had faced earlier, in the 1930s and 1940s, when confronted with the recovery of ravaged areas where the landscape had degenerated. (also see section 8.2.6.2) (fig. 199)

10.5 The 'common good': the 1954 Act and its 5% clause

The 1954 Land Consolidation Act made it possible to include items that were in the public interest in the overall plans. Henceforth, such items were (partly) covered by the Act's earlier mentioned 5% clause, which in fact might result in a net reduction of the land consolidation area. Examples are road construction and other infrastructural projects, recreational facilities, land earmarked for urban expansion and housing developments or business parks, extraction zones for raw materials, and the protection of landscape and natural assets not covered by the landscape plan. Some of them are typical for the reconstruction period, and we will therefore briefly discuss them in more detail. Mansholt, then minister of Agriculture, admitted that the 5% clause bordered on expropriation and should therefore be invoked sparingly.[406] Whether that was what happened in later years is beyond the scope of this discussion. Certainly, agricultural interests lost in significance and in the amount of space allocated to them in comparison to roads, recreational facilities, and space set aside for nature, landscape and the extraction of raw materials. The following sections list some of these items.

10.5.1 Roads

Under the 1924 and 1938 Acts local access roads were integral components of a land consolidation, a situation which continued under the 1954 Act. These so-called 'land consolidation roads' therefore fell outside the scope of the 5% clause. In addition, from the early 1930s onwards the necessity of larger, ongoing roads was more urgently felt. Motorways and other roads often cut across fields, which would seriously hamper their exploitation and made land swaps imperative.[407] In several cases infrastructural projects were therefore made integral components of a land consolidation or even formed its primary incentives. Since such roads were regarded as a function in the public interest they fell within the scope of the 5% clause, which provided compensation for all parties involved in the land consolidation in question. The impact of the Act on major road construction projects is also apparent in the layout and furbishment of motorways.[408] In all instances where it was feasible, more space was set aside for roads and their green elements were more varied than previously, and the roads themselves were better integrated in the landscape. In the wake of motorway construction followed numerous fly-overs and modifications to parallel roads to prevent any local routes from interfering with the new motorways.[409] Nonetheless the new roads also functioned as regular access routes, as in a number of land consolidations in the central Dutch river plains, in Drenthe and on the islands in the south-western delta. Thanks to careful road planning these areas became much better accessible which facilitated their integration in the national society and economy. (fig. 200)

200 Construction of (national) roads, bridges and crossings helped disclosing regions. This 1965 photo shows the crossing and connecting national road 26 (now part of A2) and road 41, south-west of Culemborg. The works were part of land consolidation Tielerwaard-West (1958-1972), the largest ever.

405 As quoted in De Visser 1997, 60-67.

406 Handelingen Eerste Kamer 1954-1955 November 2, 1954, 3050, 3051, in response to a question by Delegate Roebroek, who also explicitly asked the Minister whether the 5% clause came in addition to the space allocated to agronomic measures (answer: yes, it did).

407 A similar situation occurred in the 19th century with regard to railroads, canals and national roads, but in that case the solution resorted to was expropriation while organized voluntary land exchange was rarely involved.

408 And in other types of infrastructural projects, as for example railways or canals

409 See e.g. Nijenhuis & Van Winden 2007, 69 ff., 134 ff. This was in part an imitation of, and an elaboration on, pre-WWII German examples by F. Todt, Hitler Germany's main road architect, and by A. Seifert. Both were pioneers with regard to the integration of motorways in the landscape.

10.5.2 Recreation

The new Land Consolidation Act's 5% clause also made possible the realization and integration of recreational functions. Road construction and recreational facilities were to some extent complementary. The demand for both soared as the reduction in working hours, the introduction of longer vacations and the growth in prosperity continued. Shortly after the Second World War the transition from a predominantly agrarian to a more industrial and service-oriented society was made one of the national policy goals. Henceforth, not the farmer on his farm but the factory worker and the office clerk typified the Netherlands; increasing intercity traffic was the inevitable outcome of a changing and more prosperous society. Many aspired to have their own motorcycle or car, to go on vacation, and to have more options for spending their free time. All those activities demanded more space and facilities. One typical and fairly early effect of the growing number of roads, cars, scooters, motorcycles and mopeds was the rise of a popular pastime called '*bermtoerisme*', 'verge tourism': roadside parking and picnicking along routes leading through nature and rural areas. The government considered it a dangerous and undesirable activity and responded by building official service and picnic areas along motorways and, in 1965, by making it illegal to park or stop on or alongside a motorway.[410]

The 1954 Land Consolidation Act also enabled the realization of many other types of leisure and recreational facilities, sparking off a nation-wide boom in (privately built) appropriate facilities catering to the emerging phenomenon of (mass) recreation. Examples are bicycle roads and footpaths, outdoor pools in nature areas, a wide range of playgrounds and sports facilities, numerous camping grounds, holiday parks, marinas and, later, amusement parks. Several of the land consolidations mentioned in this publication contained such facilities. Because the Act provided for them the 5% clause was also instrumental in the creation of a large number of recreational facilities on the Zeeland and Zuid-Holland islands after the 1953 North Sea flood. (fig. 201)

201 Recreational zone De Gouden Ham along the River Meuse in land consolidation Maas en Waal-West. A sand- and gravel extraction pit was within the 5% clause and was transformed into a recreational zone afterwards. (August, 1970)

[410] See http://nl.wikipedia.org/wiki/Bermtoerisme (in Dutch).

10.5.3 Geological, natural and cultural-landscape assets

After the Second World War and particularly from the 1960s onwards cultural-historical, geological and natural assets started to receive more attention. Here, again, the 1954 Act was instrumental since 'the common good' benefited from the preservation of a wide range of characteristic, rare or potentially threatened, visible and invisible rural elements and structures. By that time the emphasis in land development trajectories had shifted from land consolidation for strictly agricultural purposes towards landscape preservation. Among other things it also resulted in the (partial) protection and preservation of significant landscape elements and assets and values such as duck decoys, kolk lakes (the relics of dyke breaches), forests and wooded banks and many other, mostly region-specific phenomena. It now became possible to turn them into integral elements of properties owned by one of the larger land management or nature management organizations. A good example are the duck decoys that came into the hands of *Staatsbosbeheer* (ca. 30) or *Natuurmonumenten* (ca. 15), and the many kolks now being managed by these organizations. In the past these decoys and kolks were usually leased out to farmers who could generate some extra income by utilizing them for fowling or fishing. In the context of a land consolidation such areas were classified as non-specific remnants, the so-called *overhoeken*. Another kind of relics are hundreds of *terpen* or *wierden* (dwelling mounds) in the north and the smaller *vliedbergen* (artificial refuge mounds) in the south-west of the country, both types dating from the old days. (fig. 197, 202)
The post-WWII land consolidations also increasingly focused on archaeological, historical-geographical, geomorphological and water-management related assets or values, thus assigning a more substantial role to land management and landscaping in the creation of landscape 'quality'. The 1961 Monument Act was the first legislative tool to enable the protection of archaeologically valuable areas. The *Boswet* (Forest Act), which in that same year succeeded earlier legislation[411], helped to foster a growing awareness of landscape values, and once again the 5% clause served as a reliable tool to secure some of them, especially after 1965 when the concept of landscaping slowly became more widely established.
One more special – but usually non-intentional and even casual – spatial value must be mentioned here: the '*palimpsest asset*'. Thanks to what might be called 'translucency' of modern culture layer(s) or sometimes through modern techniques hidden or covered older layers with traces of human activities become visible or recognizable. This is not only the case with archeological assets, but might be true for older forms of cultivation or land use etcetera. After they were erased through land consolidation they may leave vague traces and may be of special interest for study and even for reconstruction of cultural-landscape purposes.[412] At several places in this book examples of palimpsest landscapes are shown – especially in box texts.

10.5.3.1 Palimpsest layering and palimpsest landscapes

In Chapter 1 (1.3.1.2) *palimpsest* layers in landscapes were mentioned as integral assets or possibly valuable ingredients of today's landscapes. They may be 'shimmering through', be recognizable or clearly visible in modern terrains and so may add cultural, historical-geographical or archeological importance and (known) qualities or values to those terrains.

202 Many – but far from all - Vliedbergen (artificial refuge mounds) in the south-west archipelago region were saved in land and re-consolidations. This mound near Coudorpe counts two neighbouring farms dating from the reconstruction era, ca. 1955. (Photo 1965, Zuid-Beveland, Zeeland Province)

411 e.g. the 1922 Boswet.
412 Antrop 2007, 101, 147 ff.

203 Deep ploughing might cause totally erasing or heavily injuring traces and relics of former land use. This picture was taken in Vriezenveen, September, 1957.

A usual way to trace palimpsest landscapes is by accurately investigating *digital elevation models* (DEM). In te Netherlands this is called *Actueel Hoogtebestand Nederland* (AHN).[413] AHN contains several layers; in this book we used: the grey-shaded AHN 3 (and 2) '*maaiveld-Hillshade*'.[414] At many locations very surprising 'hidden' details became visible. We only present a few examples. A palimpsest can be described as a manuscript page from which an older text has been scraped or washed off so that the page and has been reused for another text but with the old text shimmering through. By definition any palimpsest document therefore contains (at least) two layers of written information, not necessarily (and usually not) directly related to each other. Many antique or middleage parchments are palimpsests. Archeologists, geomorphologists and others adopted the concept as did many historical-geographers. Renes seems to distinguish separate and continious layering when he writes: "*[...] Thirdly, we find landscapes in which the surface changed only little during the centuries or even millennia. Here, every new phase in history reuses and transforms the older structures, in this way creating inextricable and dynamic palimpsests. In this last group of landscapes, traces of many different periods are found intermixed.*"[415] It is our opinion here that many a time palimpsests are *not* (necessarily) *continiously* layering landscapes but that they may be (and often are) separatedly layered on top of each other or intermixed. 'Erasing the past' hardly ever was a (main) purpose of land consolidation after WWII and especially not under the vigour of the 1954 Act.

Yet it can not be denied soil movement, deep ploughing etcetera caused huge damage to and loss of palimpsest layering, leading to unrecognizable cultural-historical subsoils and/or man-made layers that as a consequence no longer contrast modern surface marks. (fig. 203) Therefore it is meaningful Renes also stated: 'In the Netherlands, during the last decade the use of heritage in planning has become very popular.' In other words: pre-existing layers are taken into account. This statement fortunately can be said to count for urban and rural areas.

413 https://nl.wikipedia.org/wiki/Digitaal_hoogtemodel ; https://en.wikipedia.org/wiki/Digital_elevation_model

414 http://geoplaza.vu.nl/data/dataset/actueel-hoogtebestand-nederland/resource/dead1fde-6978-4907-988d-329a4802c9a8

415 Renes 2015, 407 ff.; Antrop 2007, 101, 147. Antrop wrote: "Elements and structures from former land use patterns were sometimes partly re-used and fitted into the newly organized landscape." Antrop explicitely says: sometimes partly.

10.5.4 Extraction of raw materials

Raw material extraction was explicitly meant to be included in the 5% clause, as was urban expansion. (The extraction of drinking water from restricted areas can also be classified under this heading.) Particularly after WWII but starting even earlier, a desire for self-sufficiency with respect to the supply of raw materials for construction and earthworks on behalf of urban expansion and road infrastructure sparked off dredging and digging activities on an ever larger scale near river beds and other areas where suitable sand deposits could be extracted, sometimes from a depth of several dozen metres. Although sand, gravel and clay were the most important materials, turf production for fuel continued locally until after WWII. The resulting exhausted sand and gravel quarries were often adapted for recreational purposes; despite the obvious land loss they nonetheless contributed to the more recent cultural landscape. Aquatic sports in particular were booming business in some reconstruction-period sand or gravel mining areas. Raw material extraction is inherently linked to urban expansion or the establishment of entirely new developments. In situations covered by the 5% clause expensive individual expropriation procedures were not required. In others, of course, expropriation or purchase according to regular market prices remained standard. (fig. 204, 205)

10.5.4.1 Oil extraction in Drenthe Province

Although several other types of extraction of raw materials left (extensive) traces in the Dutch landscape, one of them is typical of the reconstruction erea. Not only because of its discovery in 1943 and its emergence from 1948 but also because the exploitation peaked in 1965. In this relative short period of time the surroundings of the Drenthe villages of Oud- and Nieuw-Schoonebeek (east of Coevorden, close to and along the German border) became occupied with hundreds of so-called *jaknikkers* (pumpjacks). The local farmers and land owners might be compensated for land loss from the 5 % clause, but most of them were sold out by the 1947 oil company *Nederlandse Aardolie Maatschappij (NAM)*. A most interesting aspect of the Schoonebeek area is its dual history of intense extraction of raw materials, both of which left traces to be noticed mainly by *connoisseurs*.[416] Peat extraction led to a landscape with a surface level at 1 to 4m below its 'natural' height (+10-15m asl; Du.: +10-15m NAP) and numerous parallel ditches.[417] Far below this surface level oil was found in 1943 and after its exploitation had started the landscape changed drastically. Topographical maps dating from that era show an abundance of pumpjack symbols and some photographs give an impression of a landscape heavily subjected to oil pumping.[418] (fig. 206, 207) Although several desolate remains are still visible today – some of them listed as national monuments – and modern technics brought further exploitation within reach as well, oil extraction here was a typical Drenthe feature of the 1950s, 60s and 70s whereas parcelling only changed from the 80s.[419]

10.6 Looking back and looking ahead

With hindsight, what the 1954 Land Consolidation Act accomplished did not constitute a radical reversal in thinking with regard to land management. Instead, the course set out already before WWII was maintained and regulations established during the war itself even formed the basis for spatial interventions which transcended purely agricultural interests. One of the pre-WWII tools was the option of a government-enforced land consolidation if this was in the public interest. Expropriation with compensation as well as (urgent) land purchase in the public interest both proceeded from the 1941 revision. The 1954 Act followed upon 'test runs' during the recovery of Walcheren and the land consolidation De Scheeken. A landscape plan was one of the Act's main ingredients; as such it codified then current practice. To lobbyists in the fields of cultural landscape management and nature conservation, some of whom had been active already before WWII, the 1954 Act represented a major step forward. Ultimately, a growing awareness among the parties directly involved in the process would be of crucial importance, even though the majority of applications for land consolidation were filed indirectly via the institutions representing those

[416] On the German side of the border still hundreds of pumpjacks are operational and there is an astonishing contrast between these adjoining landscapes.
[417] Peat extraction on a major scale and successive land reclamation started relatively late in this area; around 1900 most of the grounds were still wasteland moors. Nederlandsche Heidemaatschappij only started its activities here in the 1950s and 60s.
[418] See e.g. Westerman 2017.
[419] See: 0923 Bestuursarchief provincie Drenthe, nr. 7631 Ruilverkaveling Weijerswold, Padhuis, gebied Schoonebeek en gebied Nieuw-Schoonebeek; 1953-1958, 1968: There were plans for a land consolidation in the 1950s, but there is hardly evidence they were implemented in that period. Besides the Drenthe oil region there were some minor oil extraction areas in the Netherlands as well as mining places for other minerals.

204 Peat digging became mechanized in the course of the 20th century: this so called 'baggelmachine' is a scarce remainder.

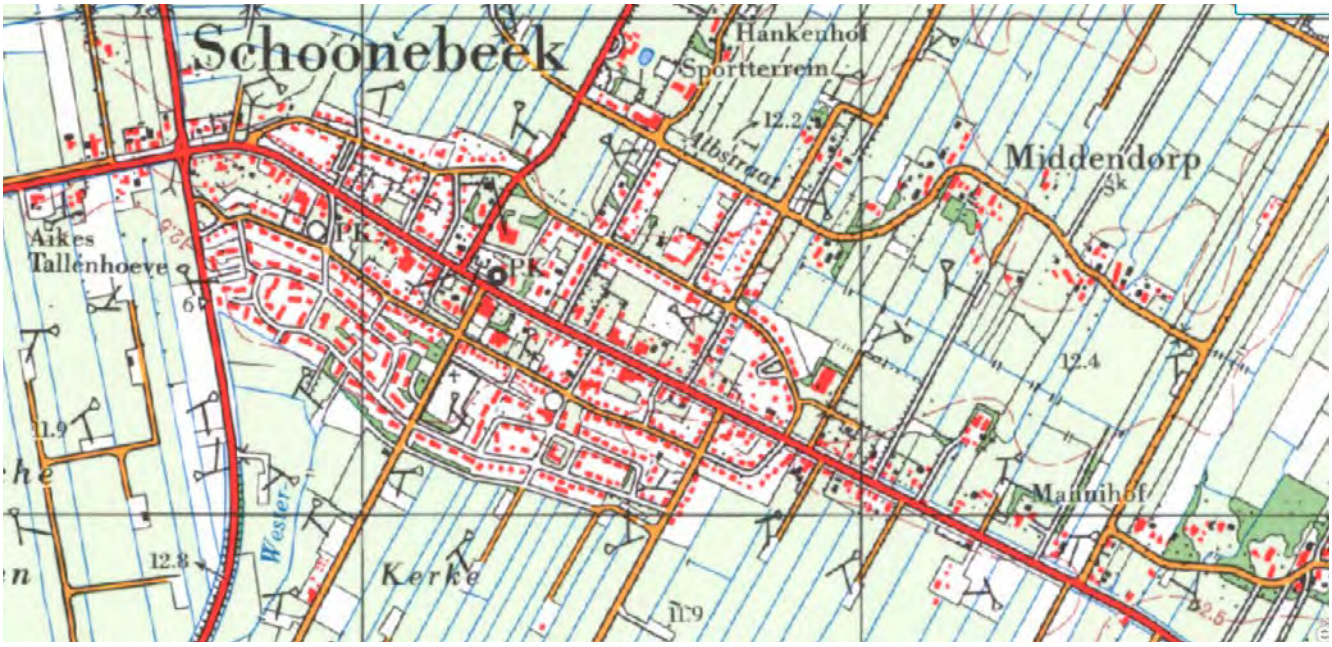
205 Today drilling machines for excavating natural gas stocks are common. Historical and modern fuel gaining claimed and still claim lots of space.

parties. Unlike the pre-1938 period, the post-WWII period saw a surge in the number of applications for land consolidation. This tendency accelerated once the 1954 Act had come into force. Meanwhile, the implementation of land consolidation continued unabated and the size of the involved blocks increased.
The experience with landscape plans, landscape preservation and landscaping accumulated in the late 1960s and 1970s resulted in the 1985 *Landinrichtingswet* (Land Management Act), which stated: '*The purpose of land management is to improve the management of a rural area in conformity with that area's functions as indicated in the context of spatial planning.*' This was a broader and less directive definition than what the various land consolidation acts had intended.[420] In 2007 the *Landinrichtingswet* was replaced by the *Wet inrichting landelijk gebied* (WILG; 'Management of Rural Areas Act'), the main focus of which is a further decentralization of the executive aspects of land management.[421]

420 See e.g.: De Visser 1997, 54 ff.; Hendrikx 1998, 142-148.
421 http://wetten.overheid.nl/BWBR0020748/2013-01-01.

Meanwhile preparations for yet another revision are under way. The WILG will be incorporated in the *Omgevingswet* ('Surroundings Act') which is expected to come into force in 2021 and will represent a thorough organizational and structural overhaul as well as a merger of all legislation pertaining to spatial planning.

In the next chapter we will focus on one typically Dutch development, the Land management as an extension of the Delta Works. The Delta Works were a direct answer on the 1953 North Sea flood.

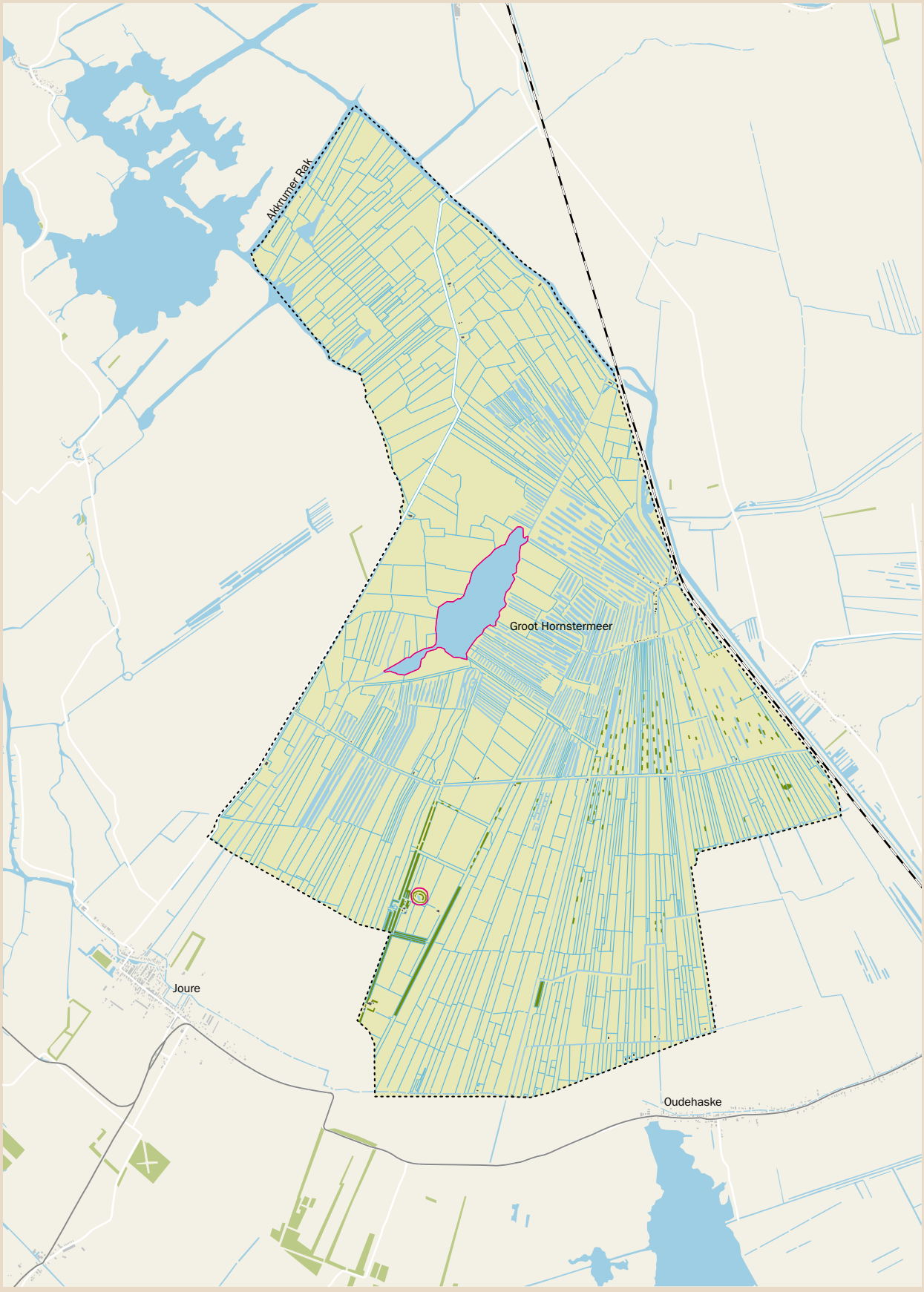


206 1975 map showing the location of dozens of pumpjacks near Schoonebeek, Drenthe Province. Oil extraction in the reconstruction-era severely changed the local landscape as well as the social circumstances.

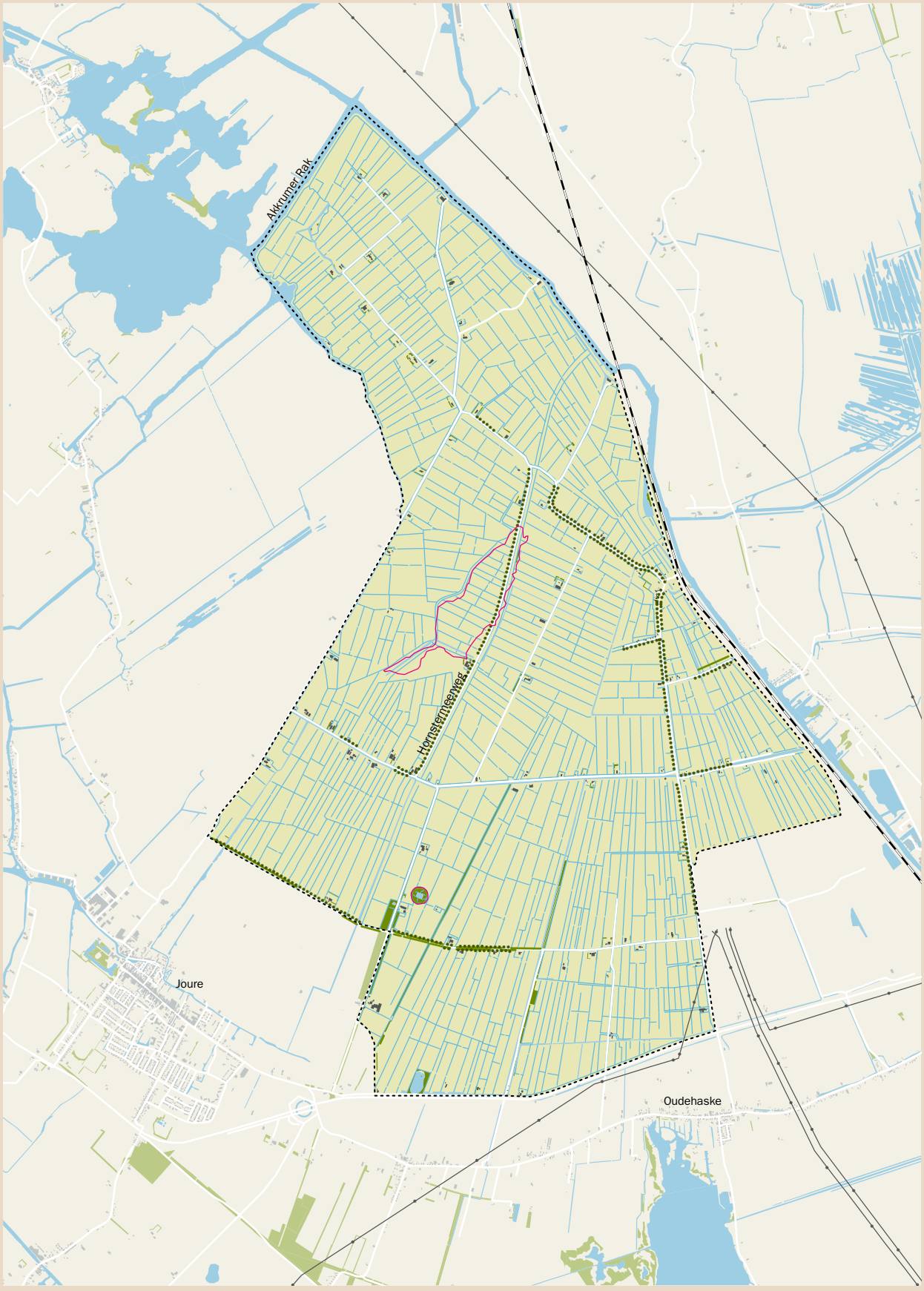
207 Shortly after the war the Schoonebeek area (Drenthe Province) became an oil extraction centre. Drilling-frames dominated the landscape for some time until pumpjacks took their place. (Unknown date)

Haskerveen Polder, 1957-1968

Land consolidation and rural improvement, De Fryske Marren Municipality



Haskerveen Polder
Left: Simplified map image ca. 1930. Scale: 1:50.000
Right: Simplified map image ca. 1970. Scale: 1:50.000
Land consolidation in the Haskerveen Polder went along with colonization and reclamation in its northern peat digging zone. The openness of the area remained intact. The red circle marks a duck decoy.



Identification

- Haskerveen Polder is a peat meadow area within the triangle Akkrum, Joure and Heerenveen, west of the railway line Heerenveen-Akkrum-Leeuwarden.
- The plan for land consolidation Haskerveen Polder (ca. 4,550ha) was drafted in 1957; its implementation was completed in 1968. Responsible bodies were *Technische Dienst Heidemij*, (Technical Service), *Ontginningsmaatschappij De Drie Provinciën* and *Cultuurtechnische Dienst.* The rural improvement programme for Haskerveen Polder ended in 1964, four years before the land consolidation was completed.

Problems

The application for land consolidation Haskerveen Polder was filed in 1953 but its implementation already conformed to the 1954 Land Consolidation Act. The existing field system was highly fragmented and the polder was dissected by a fan-shaped, dense network of narrow boundary ditches around small and narrow plots. Insufficient drainage posed another problem, and sections of the polder were regularly flooded. Some peat was being cut on a modest scale in part of the polder until after the Second World War, particularly in an area near a former lake, Groot Hornster Meer. The polder was considered poorly accessible; most meadows as well as the peat cutting area could only be approached by water (in Dutch: a '*vaarpolder*'; '*varen*' is 'to punt'), and transportation was time and energy consuming.
In addition to land consolidation the project also entailed a rural improvement programme; about half of the residents had no access to public utilities such as running water or electricity, and there were obvious social problems as well. Levels of education, forms of employment and available facilities were all inadequate and the quality of many houses left much to be desired.
Traditionally, the houses in the area clustered almost exclusively along the line Haskerhorne-Oudehaske, the road between Joure and Heerenveen. The marshy polder itself was very sparsely settled. The implemented land consolidation encompassed a larger area than the present National Interest area.[1]

Realization

More than ten years before Second World War, a workforce of unemployed people from the west of the country had already made a start with the improvement of the drainage situation and the further reclamation of the area. From the mid-1920s reclamation plans were published and several new farm-houses were realized. The lake Groot Hornster Meer was also drained and parcelled at this time.[2] These projects, executed by *N.V. De Drie Provinciën* and *Nederlandsche Heidemaatschappij*, represented the first significant spatial changes in the area.[3]
An important aspect of the post-war land consolidation was upscaling, mostly by merging adjoining parallel plots. Other plots, which had not yet been reclaimed and which together formed a typical peat extraction landscape, were now being drained. The (mainly) north-south oriented converging pattern in Haskerveen Polder of elongated narrow plots was largely preserved, but drained plots were also being repartitioned along an axis perpendicular to the original layout. In 1957, in the context of land consolidation and rural improvement, the 1917 steam-driven pumping station was replaced, which further improved the area's drainage situation. The road infrastructure was also extensively modernized whilst preserving the landscape's original completely open appearance. A new road was built which cut across the open landscape at a straight angle to the main field system (Meenscharweg, parallel to an existing ditch) and a few new traffic routes were added which followed the orientation of the fields. No roadside vegetation was added that might have interrupted the view, although trees were planted along a similar in those days newly constructed road called Lange Ekers.
At the same time, new farmsteads of various sizes were built at several locations along this road and some colonization of the polder occurred as well. Most of the farm buildings are marked out by relatively high, red-tiled hipped roofs, and separately placed houses are common as are solitary dwellings with some agricultural function. Windbreaks or clumps of fairly tall trees accompany most of the farms. Another characteristic feature are the concrete beam bridges which, like the buildings, are typical of their era.
Because the area was developed in conformity to the 1954 Land Consolidation Act, several elements and structures of cultural-historical value were preserved, a direct consequence of the landscape plan made obligatory by the Act. Among these preserved elements and structures are a duck decoy (1970 map, just below the centre), a number of dead straight, more or less north-south oriented, linear and occasionally densely vegetated structures (e.g. Wildehornstersingel) and several dykes. Here and there (e.g. along the Zwarteweg) the green appearance has been emphasized, creating incidental visual markers which interrupt the seemingly endless open space.
A remarkable aspect of the polder's development are the two motorways which were planned as early as 1950, the R34 between the interchange at Joure and Akkrum, and the R43 between Joure and Heerenveen. The first never materialized, but a strip of land that was cleared as part of the preparations in the 1970s is still clearly marked in the landscape by for instance parallel ditches, which do not align with the rest of the infrastructure. The R43, which appears on (digital) maps from ca. 1950 onwards, was completed in the late 1950s and later upgraded to the present A7 motorway. Its construction therefore coincided with the land consolidation.
As part of the rural improvement programme, dozens of houses were declared unfit for human habitation[4] and replaced. Infrastructures for water and electricity were built, telephone lines laid, and waste water disposal improved. Opportunities for participation in all aspects of social life were expanded through road improvements and better traffic and transport facilities. The focus was on providing in-depth information on farming practices but equally on housekeeping and social issues through e.g. employment counselling and education[5] as well as government assistance in establishing new business. (fig. 208, 209, 210)

208 Haskerveen Polder area with field-work used narrow-gauge railway. The photo was taken prior to the start of land consolidation, probably during the reclamation of 91ha peat lands by Ontginningsmaatschappij 'De Drie Provinciën' and 'Nederlandsche Heidemaatschappij',. (Photo May, 1952)

209 One of the newly built farms in the colonized centre of the Haskerveen Polder. Note its detached dwelling and the steep hipped roof covering accomodation for agrarian functions. (Photo May, 1960)

210 Newly metalled narrow country road in land consolidation Haskerveen Polder. (Exact location unknown; photo May, 1960)

211 Haskerveen Polder. Characteristical bridge in reconstruction period land consolidations etc. Most wooden and stone bridges were replaced by plate girder bridges with deck on concrete piers, as led lack of bridges in punting polders to the building of such specimens. (Photo 2008)

212 A Haskerveen Polder land consolidation farm along one of the reclamation or access roads. A semi-detached dwelling and a steep hipped roof covering accomodation for agrarian functions. Note the windbreak or girdle trees partly hiding the farmstead. (Photo 2008)

Key qualities

Land consolidation Haskerveen Polder managed to preserve the landscape's remarkably open character whilst simultaneously adding sparse agricultural structures along the new access routes and increasing overall plot size. Reconstruction-era farms and other buildings are instantly recognizable; they give a sober and rather conservative impression. With the exception of (small) water management features (e.g. bridges), the structures display little uniformity in size, layout or plan, although among the farm buildings dating from around 1960 hipped roofs dominate. (fig. 211, 212) An important reconstruction-period quality in Haskerveen Polder is the preservation or reinforcement of the area's original character via the integration of a number of cultural-historically significant elements and structures (e.g. a duck decoy, green ribbons, dykes, the remains of a national road that never materialized, and traces of earlier peat extraction still reflected in the field pattern). That is also true of the consequences, both tangible and intangible, of the construction and extension of public facilities, the improved housing and the social integration which typified rural improvement programmes. Later added spatial line structures include the canal Nieuwe Heerenveense Kanaal along the western flank of the railway line Heerenveen-Leeuwarden, and the expanded A7 motorway. The latter in fact separates the southern and northern sections of Haskerveen Polder and has itself become the southern boundary of the National Interest area. Recently, urban expansion has encroached upon two corners of the National Interest area (near Heerenveen and Joure), forming a minor threat to its open character in the zone between the modern A7 motorway and Lange Ekers, but otherwise the appearance of Haskerveen Polder is largely intact. (fig. 213)

213 Aerial impression of land consolidation and rural improvement program area Haskerveen Polder. On the right side the former lake, Groot Hornster Meer. The central axis is the curious course of the planned but never realized national road 38. The north is below. (Photo May, 2013)

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Notes

1 See also http://www.topotijdreis.nl/ and zoom in on the period after 1931.
2 Maps up to 1953 suggest that this happened twenty years later.
3 Brood 1978, 34, 41,182; Also see e.g. De Telegraaf, May 22, 1928; Nieuwe Rotterdamsche Courant, June 30, 1928.
4 The at the time applicable version of the1901 Housing Act authorized municipalities to declare a house unfit for human habitation.
5 See e.g. Leeuwarder Courant: hoofdblad van Friesland, April 2, 1988, supplement S&S; Friese Koerier: onafhankelijk dagblad voor Friesland en aangrenzende gebieden, January 24, 1961.

11 Land management as an extension of the Delta Works

Some of the most striking land management projects of the reconstruction period were those associated with the Delta Works. The Dutch government initially gave no priority to the reinforcement of the sea defences in the south-west of the Netherlands, despite extensive war damage to the region's islands and estuary. Although the risks of dyke breaches had been pointed out as early as the 1930s, little had been done to render the delta safe. Between the First and the Second World Wars, a few so-called 'Muralt walls' were built here and there and a few emergency reinforcements added to the dykes, but nothing structural was undertaken.[422] The urgency of the situation first became apparent however in the night between January 31 and February 1, 1953, when a severe north-westerly swept over the southern North Sea and in combination with a spring tide caused devastating floods in the south-western Netherlands.[423]
This chapter not in the first place focuses on the disaster itself, but it mainly comments on some later (spatial) developments. Apart from realisation of the Delta Works for instance the unlocking of the island area and some land acquisitions will be explained in short.

11.1 The Delta Works: legal and financial context

When the disaster struck, plans for the closure of the tidal inlets were already in preparation. In 1942, in the middle of WWII, civil engineer J. van Veen had presented detailed proposals for shoring up the vulnerable coastal defences in the south-western Netherlands by shortening the coastline.[424] However, during the war and for few years after, conditions were not right to tackle this – acknowledged but costly – problem. Moreover, the islands of Zeeland and Zuid-Holland had been largely inundated during the final war years so that priority was given to emergency repairs to make these areas at least habitable again.

11.1.1 The legal complexity

A few weeks after the 1953 disaster the then minister of *Waterstaat* (Water Management), J. Algera, established the so-called Delta Commission, chaired by *Waterstaat*'s director-general, A.G. Maris. In 1957 the Delta Commission presented a proposal for a *Delta Wet* (Delta Act), which in 1957-1958 was accepted by both houses of parliament. Among other things the ensuing Delta Plan entailed the closure of most of the tidal inlets, the realization of a number of additional constructions, and any dyke reinforcements that might be essential (Table 11.1).[425] Work commenced in 1957 with the construction of a flood barrier in the Hollandsche IJssel, east of Rotterdam.
Partly in response to the 1953 North Sea flood, four far-reaching laws were introduced which operated simultaneously, two of them being the 1953 *Noodwet Dijkherstel* (Emergency Act Dyke on Repair) and *Wet Herverkaveling Noodgebieden* (Act Re-consolidation Emergency Areas). The *Noodwet Dijkherstel* regulated the division of the costs associated with the repairs between the State and local water boards or polder-boards,[426] while the *Wet Herverkaveling Noodgebieden* copied the earlier Act which had guided the (post-war) recovery efforts on Walcheren a few years earlier. Its first article explicitly stated that in the case of several, specified disaster areas the *Herverkavelingswet Walcheren* would apply.[427]
In addition to these two Acts the 1954 *Ruilverkavelingswet* (Land Consolidation Act) and, a few years later, the 1958 *Delta Wet* also applied. Further the *Bijdragenwet Deltawerken* (Contribution Act) and a *Wet Oppertoezicht Deltawerken* (Act General Superintendence) came into force.[428]

11.1.2 The enormous financial impact of the flood

Due to the fact that several different Acts were involved, responsibilities and costs with regard to the recovery efforts in the disaster areas were split amongst a number of ministries and other parties. As was stated earlier, around 1960 the

422 'Muralt walls' are low concrete slabs placed vertically on top of lower dyke sections. They are named after their inventor, engineer R.R.L. de Muralt. In 1953 they proved to be almost completely ineffective. See https://en.wikipedia.org/wiki/Muralt_Wall

423 The same storm also caused extensive flooding in Belgium and England, resulting in a number of fatalities (ca. 25 in Belgium and ca. 300 in England).

424 http://resources.huygens.knaw.nl/bwn1880-2000/lemmata/bwn5/veen

425 An extended version in English can be found through: https://en.wikipedia.org/wiki/Delta_Works

426 With regard to dyke repairs the *Noodwet Dijkherstel* stipulated that repairs to the primary and secondary flood protection infrastructure along the sea coast and major rivers would not be financed by the water boards involved but by the State. This particular issue was hotly debated in parliament, for many M.P's saw local safety as a local responsibility.

427 Bouwman 1958, 16, 17. These comprised (parts of) the Zeeland islands of Schouwen-Duiveland, Tholen and Zuid-Beveland, or 36,800ha in total.

428 The Contribution Act had to do with Government subsidy for so-called *calamiteuze polders* (necessitious polders), that had insufficient income for dyke maintenance.

total damage was estimated at ca. 1,5 billion guilders (in today's terms [2016/2017] roughly 4,8 billion euros).[429] The total costs of dyke repairs alone – excluding other works – were ultimately estimated at ca. 380 million guilders (in 1954; in today's terms ca. 1.35 million euros). The largest budget item by far were the dyke repairs on the island of Schouwen-Duiveland (130 million guilders), followed by Goeree-Overflakkee (60 million) and Zuid-Beveland (46 million).[430]

At the time, agricultural recovery was budgeted at ca. 400 million guilders. The costs of the planned flood protection infrastructure were initially estimated at ca. 2,4 billion guilders but they soon began to soar as the Delta Works progressed. The semi-open Oosterschelde barrier in particular was a bottomless pit and in 1980 ultimately clocked 12 billion guilders (in today's terms this is ca. 12 billion euros).[431] By then many additional projects had not even started and the final figure is therefore higher still; it did not include the expenses of other ministries, provinces and the (semi-)public sector.

11.1.3 The North Sea flood is also a watershed

As in the case of the Zuiderzee Project, the Delta Works also functioned as a powerful catalyst. The awesome powers of the storm surge itself sparked off tremendous efforts put into the subsequent earthworks and building activities in order to undo what the destructive forces of sea and wind had done. In fact, a substantial section of the disaster area had to be recreated 'from scratch'. The involvement of so many different ministries and public bodies and the fact that a mosaic of partly overlapping social factors and processes all contributed to the costs collided to make the impact of the North Sea flood and the subsequent Delta Works no less profound than that of the Second World War. Although life losses, costs and repairs were far less than those of WWII the flood is still remembered as a watershed. And even today the 1953 North Sea flood continues to be a permanent factor in the management of the Dutch flood prevention infrastructure.

11.2 The closure of tidal inlets in the south-western Netherlands

The Delta Plan entailed the closure of all tidal inlets with the exception of the *Nieuwe Waterweg* (today also known by its complex name 'Europoort') and the *Westerschelde* (Western Scheldt), both busy shipping routes.[432] Although Rotterdam and surroundings, Vlissingen and also the Belgian port of Antwerp had all sustained damage, closing off the inlets to these

Table 11.1 Chronology of the main components of the Delta Works begun before 1965.

Realization period	Name	Location
1954-1958	Flood Barrier	Hollandsche IJssel, at Krimpen aan den IJssel
1957-1967	Volkerak Dam	Goeree-Overflakkee/Hoeksche Waard/Noord-Brabant
1958-1965	Grevelingen Dam	Between Goeree-Overflakkee andSchouwen-Duiveland
1958-1971	Haringvliet Dam and Flood Barrier	Between Voorne-Putten and Goeree-Overflakkee
1959-1960	Zandkreek Dam	Between Noord-Beveland and Zuid-Beveland
1960-1961	Veerse Gat Dam	Between Noord-Beveland and Walcheren
1960-1986	Oosterschelde Dam and Flood Barrier	Between Schouwen-Duiveland and Noord-Beveland
1964-1971	Brouwers Dam	Between Schouwen-Duiveland and Goeree-Overflakkee

Sources: https://nl.wikipedia.org/wiki/Deltawerken; *Driemaandelijks bericht Deltawerken*, No. 1 (August) 1957 to No. 60 (May) 1972.

[429] See: http://visualisatie.cbs.nl/nl-NL/Visualisation/PrijzenToenEnNu; http://www.iisg.nl/hpw/calculate.php; http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=81139ned&D1=a&D2=a&D3=0,2,12,22,32,46,66,86,90,94,98,102,106,110-118&VW=T. The two calculating tools produce slightly different results. Both are based on general purchasing power and inflation but are not directly linked to price developments in the construction sector. The sector's own price index only records relative numbers since 1979. Generally speaking, relative prices in civil engineering more or less tripled between 1980 and 2017. The sums in euros quoted here are therefore only a rough approximation.

[430] Report 1961, 365 ff. The original plan was that the State would cover all expenses until flood protection would have been restored to pre-disaster levels. Anything above and beyond that would be financed by the water boards or polder-boards. Although in response to critique this position was toned down it was never entirely abandoned.

[431] De Schipper 2008, *passim*; http://visualisatie.cbs.nl/nl-NL/Visualisation/PrijzenToenEnNu. See also earlier remarks on the issue.

[432] The 1958 closure of the above mentioned tidal inlets and other operations was followed by additional projects.

important harbours was clearly not feasible. That argument applied less to other ports: the docks near Dordrecht were in any case only accessible by a round-about route, and in Belgium the port of Gent was separated from the Westerschelde by a series of locks.
In addition to these closures the scope of the Delta Act also extended to the reinforcement of the primary and secondary flood protection infrastructure. This obviously meant raising and strengthening the dykes along the Nieuwe Waterweg towards Rotterdam and along the Westerschelde (which were both to remain open), as well as upgrading the coastal defences on the islands and the mainland.
The implementation of the complete Delta Works was projected to take about fifty years, but due to the ongoing sea level rise and other issues relating to climate change they will inevitably (have to) be succeeded by further measures in the 21st century. To the residents of the western Netherlands – many of whom live well below sea level or within tidal reach – there simply is no alternative. (fig. 214)

Projects associated with the closure of the tidal inlets and the reinforcement of the primary flood protection infrastructure ensuing from the Delta Act were the main elements of the Delta Works, and certainly the most spectacular ones. They encompass various types of barriers for which all the stops then available in the field of civil engineering were pulled out: dams, dykes, sluices, moveable barriers, etc. Experimental construction methods and techniques were frequently resorted to. All elements of the Delta Works are therefore monuments of national civil engineering. A few, however, stand out, particularly the Haringvliet sluices between the islands of Voorne-Putten and Goeree-Overflakkee (fig. 216), and the Algera barrier at Capelle aan den IJssel (both today national monuments).[433] (fig. 215) Another highlight is the Zeeland Bridge, the longest bridge in the Netherlands, (1963-1965; likewise a national monument) between Schouwen-Duiveland and Noord-Beveland.[434] (fig. 217) Another element worthy to be singled out is the system of supplementary canals, sluices, traffic bridges and tunnels established in the (south-western) part of the port of Rotterdam / Europoort, culminating in the moveable Maeslant barrier (1997) in the Nieuwe Waterweg.[435] The latter makes it possible to close off Rotterdam after all,

214 Soon after the 1953 disaster dyke repairs claimed the bringing into action of as much as possible of modern equipment. Not only sand, clay and basaltic blocks were used but asphalt-paving was also applied. This picture was taken autumn 1953 near Middelharnis, island of Goeree-Overflakkee.

433 Steenhuis *et al.* 2015, 10-15.
434 See e.g. *ibidem*; Monumenten 2013, 221-227, 295-301, 315-318.
435 Major works undertaken after 1965 are: the Markiezaats quay, the Oester dam, the Philips dam, the Bathse outlet, the Maeslant barrier and the Hartel barrier. Further interventions involving sluices, canals and dykes completed the Delta Works. The entire project was finished in 1997, but there were follow ups until 2010 and still works must be updated.

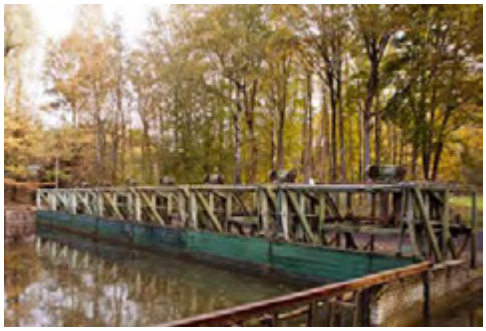
215 An impression of the first big construction of the Delta Works: the 1957 Algera flood barrier at Capelle aan den IJssel, Zuid-Holland Province.

216 The interior of the Haringvliet flood barrier between the islands of Voorne-Putten and Goeree-Overflakkee (Zuid-Holland Province) during its construction. (July, 1963)

217 Aerial photo of the Zeeland Bridge. Top is north. (Unknown date)

218 Aerial impression of the 1997 Maeslant barrier in the Nieuwe Waterweg - waterway to Rotterdam. Both swinging barrier arms are about 240m. (Photo July, 2007)

a feat made possible by the western relocation of the port's main docks. The new docks which line the artificially raised areas along the foreshore, called Eerste Maasvlakte (and the future Tweede Maasvlakte, now under construction; Maasvlakte 1 & 2), can accommodate even the largest modern vessels, but also the city of Rotterdam itself is still accessible for the behemoths of the sea.[436] (fig. 218)



219 This Waterloopbos (Watercourse Forest) model is part of a socalled wave machine used for embankments stability tests.

11.2.1 Tests

Many of the experiments conducted in preparation of the Delta Works took place in the Noordoost Polder, where in the early 1950s a branch of Delft University's *Waterloopkundig Laboratorium* (hydraulics lab) was established. Sections of the laboratory were in the open air and the site was sheltered by trees to limit wind impact. Its test installations – dozens were built – made it possible to study the dynamics of water currents but also to test moveable barriers and technical equipment for building rock foundations on the sea bed. The experiments conducted at the Delft *Waterloopkundig Laboratorium* and in the Noordoost Polder (at the site Voorsterbos or Waterloopbos) were essential to the realization of the Delta Works, not least because they reduced its costs substantially. In 2016 the open air relics and various other components of the Noordoost Polder testing site (the lab as such was closed down) were listed as an 'out of the box' national monument, their connection to the Delta Works being an important argument.[437] (fig 219)

436 https://en.wikipedia.org/wiki/Maasvlakte; De Volkskrant, May 20, 2017. In that year some of the largest bulk carriers in the world moored at Rotterdam, each carrying over 20,000 standard containers of 1 TEU each (= almost 40m³; TEU stands for Twenty Foot Equivalent Unit.)

437 https://nl.wikipedia.org/wiki/Waterloopkundig_Laboratorium; Monumenten 2013, 263-271.

11.2.2 Pilot projects: the closure of Walcheren, Braakman and Brielsche Maas

The Delta Works were preceded by three projects which (unintentionally) served as useful pilots for the enormous enterprise. The first comprised dyke repairs and associated reconstruction of the cultural landscape on the island of Walcheren. At Walcheren a series of six so-called Phoenix caissons were used for the first time, in a rather precarious procedure: they were lowered into three of the four dyke breaches on the island and filled with gravel. The enforced-concrete Phoenix caissons had originally been intended for the temporary ports along the Channel coast of Normandy after the Allied invasion of June 1944, but by 1945 not all of them had yet been used (see also the Box Text on Walcheren).[438] The second and technically more innovative project was the closure of the Brielsche Maas tidal inlet, north-west of the town of Brielle on the island of Voorne-Putten (Zuid-Holland Province). For this closure, completed in 1950, one Phoenix caisson and 75 smaller concrete caissons were used. After the 1953 North Sea flood the experience gained at the Brielsche Maas led to the production of many more (smaller) caissons as well as connecting 'collars' (nearly 700 in total) to serve as dyke cores, and thus in a sense as 'keystones'.[439] The third pilot involved the closure and partial drainage of the Braakman tidal inlet, west of Terneuzen in the region of Zeeuws-Vlaanderen. The closure and drainage of the Braakman was not part of the Delta Works, for the undertaking was completed in 1952. However, as in the case of the Brielsche Maas there was an important link in that the project became a showcase for innovation: after the final closure of the Braakman by lowering two concrete caissons into the last dyke gap had become a fact, the resulting newly acquired land was assigned two different functions. (fig. 220) Of its ca. 1,500ha a large section became agricultural land while the rest was set aside for recreational functions such as aquatic sports and as a nature area with woodland. The organization of both Walcheren and Braakman highly conformed to *landscape plans* that were copied in other reconstruction plans for the flooded areas and – in accordance with the 1954 Land Consolidation Act – elsewhere.

220 The closing of the Braakman tidal inlet by using Phoenix caissons. This pre-1953 operation was one of the hasardous pilot-projects before the North Sea flood struck the south-west. (Photo 1952)

11.3 A diversity of interventions in the spatial structure

The Delta Plan and the Delta Works coalesced into an integral approach to the south-west of the nation in which water management, accessibility, social and economic improvement and ongoing modernization went hand in hand. Several 'entrances' are congruent and more or less seem to coincide but others collide at this point, and therefore we focus them in short.

11.3.1 Emergency repairs and the start of operations

In most instances, emergency repairs to dykes were carried out within days or at most weeks after the February disaster. To close the breaches and carry out (initial) repairs, virtually the entire Dutch dredging fleet and stock of earthworks machinery were drafted, even what was then still engaged in the construction of the new IJsselmeer Polders. This massive deployment of materiel made it possible to at least temporarily

438 https://www.oorlogzeeland.nl/index.php/zeeland-dijkherstel?showall=1&limitstart=; Phoenix caissons were produced in six different sizes, the largest measuring ca. 62 x 12 x 12m.

439 Report 1961, 384 ff., esp. 390, 396 ff.: 493 caissons and 203 collars.

close dozens of breaches already before the winter of 1953-1954.
The six final major breaches to be repaired were all on the island of Schouwen-Duiveland. Of these the very last, near Ouwerkerk, was closed on November 6, 1953, over nine months after the flood. Today the four caissons of the final closure (also originally produced for the 1944 Channel coast invasion in Normandy) are listed as national monuments.[440] Rendering the Dutch coast storm-proof required reinforcing the dykes and other barriers, streamlining the dyke system, covering dyke surfaces with basalt or other custom-made concrete blocks, and above all raising the dykes to what was called 'Delta level', by which was meant that coastal defences should be able to cope with surges up to +5m asl (Du.: *+5m NAP; Normaal Amsterdams Peil*), measured near Hoek van Holland.

11.3.2 Re-consolidation

All ongoing and requested land consolidations in areas not inundated during the 1953 disaster were suspended or postponed to make way for the recovery and/or re-consolidation of the affected areas.[441] Also ongoing land consolidations were increasingly put on hold.
The re-consolidation of the disaster areas was taken in hand with an eye to the future and ideas on future land management were applied. The 1938 Land Consolidation Act had not anticipated massive undertakings on this scale, nor was an emergency scenario included in the 1954 Act. From a legislative perspective, re-consolidation was a more radical version of land consolidation. Among other things it involved a more efficient distribution of farms over the land available. The (spatial) impact could be considerable.[442]
In many of the affected areas the damage was so extensive that any return to pre-disaster conditions was judged to be irresponsible or at least inadvisable. Moreover, already before the disaster farming practices in some of the affected areas were observed to be very much behind the times. Field systems, drainage, accessibility and social-economic conditions no longer conformed to modern demands and the disaster had caused some areas to fall even further behind. All these issues together induced the government to take matters into its own hands. Walcheren served as an example; it became the scene of re-consolidation accompanied by farm relocations (especially of the larger farms) to the newly created IJsselmeer Polders.[443] The new spatial structure of the Zuid-Holland and Zeeland islands was on a much larger scale and much more efficient than it had been before the 1953 flood. The worst affected areas, mainly in Zeeland, were developed to conform to a more coarsely structured layout than with hindsight might be considered desirable. The impact of waves and salt water had largely obliterated the original *craquelure*, the fine-meshed field patterns and the long lines of trees which had existed in some sections of the islands. As part of the redevelopment a number of smaller (inland) dykes were topped off or completely levelled and a few other characteristic features also diminished in number, e.g. duck decoys, traces of earlier breaches ('kolks'), remains of mottes (*vliedbergen*) and dozens of artificial waterholes for cattle (*veedrinkputten* or *hollestellen*). The flood and the subsequent redevelopment undoubtedly left the island landscape more monotonous, yet the reconstruction efforts included the (re)placement of vegetation elements, and various tree ribbons were planted along roads and dykes to break the spatial monotony. The large but visually diverse fields on (much of) Schouwen-Duiveland, Tholen and Zuid-Beveland are particularly conspicuous when seen from above or on maps.
Interventions were less drastic on the Zuid-Holland islands. In the mid-19th century or before, these islands had been compartmentalized into regularly shaped blocks of fields transected by straight roads and dykes. The new layout of the badly affected eastern section of the island of Goeree-Overflakkee, for example, was not much different, both overall and in detail, from the pre-1953 situation although some farm upscaling took place.
The (re-)consolidations evidently made the landscape of the Zuid-Holland and Zeeland islands more uniform; the latter in particular now resemble the Zuid-Holland islands as they looked before the flood.

[440] An unusual feature with regard to these listings is the fact that they were formalized on July 28, 1968 (Case No. 014174), i.e. long before meeting the legal requirement that any site or feature must be at least fifty years old before it can qualify as a national monument. The description states: 'Four caissons, from the dyke closures after the 1953 flood. Although the age of the caissons is less than 50 years, in accordance with Art. 1, Section 3 they nonetheless qualify for inclusion in the register.' The 'fifty-year' criterion was recently dropped.
[441] Markusse 1998, 9. Significant in this context is the virtual absence of the period 1953-1956 in the list of starting dates of land consolidations, land management projects and similar operations.
[442] Bogaarts 1989, B, 1556 ff.
[443] Bouwman 1958, 16, 17.

11.3.3 Rural improvement programmes

After the 1953 floods, one would expect the most seriously affected areas to be the first to be targeted by rural improvement programmes. Remarkably, however, these programmes by no means encompassed all afflicted areas. The island of Schouwen-Duiveland for instance was not. An 1966 application was then turned down because the Dutch government deemed the island's agricultural potential to have sufficiently recovered so that its condition was no longer urgent. A large proportion of the island population traditionally resented outside interference and modern ways, which extended also to modern means of communication and medical care. Only one modest programme was carried out on the island of Goeree-Overflakkee, in the form of the medium-sized (re-) consolidation Grijsoord near Oude Tonge (1965-1968). There, approximately 90 farmers together farmed 1180ha. Attempts were made to induce them to switch to (greenhouse-based) horticulture, and also an information programme on housekeeping practices was set up.[444] Other rural improvement programmes ran on Voorne-Putten (1961-1970) and sections of Zuid-Beveland (1957-1962) and Tholen (1958-1964).[445] Occasionally the local population received them with little enthusiasm or even with downright opposition. This was the case in Zuid-Beveland, where the start of a programme in 1957 coincided with re-consolidation. Both were initially sharply criticized and suffered from a lack of cooperation. Later, however, traditional forms of production began to change and agriculture (arable and livestock) and horticulture were successfully modernized. Upscaling some farms whilst terminating others also produced some results, and in the end efforts to modernize social and economic life, housing, housekeeping and gardening met with success. In several areas where rural improvement programmes and re-consolidation were carried out, spatial renewal was manifest on a modest scale in new dwellings and field layouts but particularly in the use of modern forms of traction and transport, and indirectly also in modern housekeeping practices.

11.3.4 The landscape plan in the disaster areas

The (re-)consolidation plans were also an opportunity to draft landscape plans and to integrate non-agricultural functions or natural, cultural(-historical) and other elements and assets into the new landscape. For instance, in several places dyke breaches had left behind characteristic landscape features such as the above mentioned kolks. Some of these were embanked but ultimately not drained because they were too deep. Obviously, these *wielen*, *welen* or *walen* (all Dutch words indicating such features) have a significance as memorials, and today they have additional significance as valuable nature areas. Examples of such combined cultural relics and natural assets are the two former breaches, both closed off with caissons, near Schelphoek and Ouwerkerk on Schouwen-Duiveland, and also a section of the Oost-Inkelse Polder near Kruiningen on Zuid-Beveland.

Other examples of existing structures embedded in landscape plans are dyke remnants and road embankments. Over the years the sea dykes were completed and raised to Delta level, with many inland dykes now being superfluous as a result. Some have been levelled but a few still exist, either up to their original height or in truncated form and with or without visible damage from the 1953 flood. The material that became available when dykes were removed or topped was reused, for example to level the land surface. In Schouwen-Duiveland, the suspension of its land re-consolidation, requested in 1949 and in 1954 still ongoing, was one of the consequences of the 1953 *Wet Herverkaveling Noodgebieden*. A comparison of *Staatsbosbeheer*'s earlier landscape plan (pre-1954) and the recovery plan drafted after the disaster reveals that both envision a similar scale but in some other ways nonetheless differ substantially. In both the old and the new plans – and also in the final outcome – the original fine-meshed field system would be obliterated. In the end, a significant proportion of the dykes and dyke sections were preserved, relics of a landscape otherwise largely wiped out by the sea.[446] The landscape plan also introduced more roadside

444 Eilanden-nieuws [...] November 6, 1964, 1.
445 Karel 2005, 348, 349. The data on Grijsoord presented in the two sources do not tally.
446 http://library.wur.nl/WebQuery/tuin?q=ruilverkaveling+schouwen.

and dyke vegetation on this traditionally 'treeless island'.[447] (for Schouwen-Duiveland also see the relevant Box Text) A slightly different situation prevailed on Tholen. There, the landscape plan led to the replacement of the island's characteristic elm trees by other species, particularly poplar. Nonetheless, also the plan for Tholen incorporated a few geomorphological and landscape assets, such as a dammed former tidal creek, Pluimpot, and a number of *wielen*.[448] On the other hand, Tholen stood apart in that recreational facilities arrived later and were on a relatively limited scale.[449] (fig. 221)

221 Like most islands in the Zeeland and Zuid-Holland delta erea Tholen also takes its profit of the watery surroundings. This picture shows recreational dwellings in the village of St. Annaland. (Unknown date)

11.3.4.1 Recreational functions in the 1953 disaster area landscape plans

Miscellaneous recreational facilities were a new element in the landscape plans for the disaster areas of Noord-Brabant, Zeeland and Zuid-Holland: they deliberately set aside certain areas for recreational functions. Incorporated were green zones as well as facilities for shoreline recreation and aquatic sports whilst retaining 'enclaves' of characteristic cultural-historical value. Maybe the most conspicuous of these enclaves is an almost pristine, authentic small-scale landscape fragment near Sinoutskerke (south of Goes on Zuid-Beveland) that was part of land consolidation De Poel, but was deliberately left out.[450] Further (fossil) creeks, *vliedbergen* (artificial refuge mounds from the old days), minor dykes, infrastructural relics (canals, sluices, railway tracks) and numerous historical farms retained their original place in many places in the water-damaged reconstruction-period landscape. Today, the popularity of aquatic-sports centres, seaside resorts and holiday villages (e.g. on Walcheren, Noord-

222 The Zeeland bridge is a bottle neck for traffic between the islands of Schouwen-Duiveland and Noord-Beveland (respectively Zuid-Holland and Zeeland Provinces) because it was designed as a single lane road. (Photo 2016)

447 Contrary to what is sometimes claimed Schouwen-Duiveland was a mostly bare, but fruitful island. See: Van de Aa, 1839-1851 / 1979, X, 293.

448 *Het Vrije Volk: democratisch-socialistisch dagblad*, February 9, 1953, 1; *De Waarheid*, August 1, 1953, 3; *Algemeen Handelsblad*, April 23, 1960, 3; *Eendrachtsbode*, December 31, 1964, 2; *Archief van het Lid J. Markusse van de Subcommissie Tholen van de Herverkavelingscommissie*, 1953-1963, Introduction; Zuurdeeg, 1992, 34, 35.

449 Its comparative isolation may be both cause and consequence of the deeply Orthodox-Protestant religious convictions of the island population, which are reflected in its local politics and administration.

450 http://library.wur.nl/WebQuery/tuin/31941.

223 The Brouwers Dam between the islands of Goeree-Overflakkee and Schouwen-Duiveland (respectively Zuid-Holland and Zeeland Provinces). (Photo 2014)

Beveland, Schouwen-Duiveland and Voorne-Putten) has stretched the reconstruction-period traffic infrastructure to the limit of its capacity.

11.3.5 Road infrastructure

The opportunity to place traffic roads on top of dykes and other sea barriers was eagerly embraced as it finally ended the isolation of most of the islands in the Dutch south-western delta.[451] The impact of road construction and, in a parallel development, that of the gradual phasing out of ferry services and (steam-)tram lines was huge. Since some ferry harbours and (tram) stops lost their sometimes centuries-old status as traffic nodes, circumstances in the hinterland were likewise radically altered. Hamlets which until then had been far from any access route now found themselves situated along a thoroughfare, while some of the larger towns were passed by. The process of opening up the islands was not without its glitches. Until the late 1980s, for example, Tholen still lacked a permanent land-based connection to any of the other islands. Traditionally, Tholen looked towards western Noord-Brabant, and that did not materially change after the Delta Works. Moreover, the traffic capacity of some of the new roads and bridges throughout the south-western delta was rather limited, apparently because it was based on traffic prognoses from the 1960s and 70s. Not nearly all highways were dual carriageways, with the result that for instance the roads on and near Goeree-Overflakkee and Schouwen-Duiveland (including the Zeeland Bridge) became notorious traffic-jam hotspots. (fig. 222) Nonetheless the Delta Works ended the isolation of virtually the entire south-west of the country, making the Delta Works themselves and the road system they implemented a crucial factor for change in the daily lives of the region's residents. More than ever before the delta region is now territorially integrated with the rest of Netherlands, and likewise more than ever before many island residents are seeking jobs and earning an income in parts of the country which previously were well beyond the reach of most commuters. (fig. 223)

[451] Until then, only Zuid-Beveland and Walcheren were accessible by land, and only since the 3rd quarter of 19th century. Otherwise, all connections were by ferry.

11.4 Further land acquisition plans in the delta area

1870 saw an agreement between (mainly, but not exclusively) the Province of Zeeland and the Dutch government on subsidy for the so-called *calamiteuze polders* (necessitious polders)[452], that is coastal polders that were (financially) incapable to maintain its sea-dikes and other sea-defense.[453] In fact the continued existence of such accidental polders was one of the main – but not often explicitely mentioned – causes behind the 1953 disaster: there was hardly a centralized and uniform dyke control.[454] Besides these *calamiteuze polders* there were lots of other polders and grounds outside the dykes within reach of high tides. Mainly this last type of grounds, saltings and mud-flats, might be relatively easily reclaimed before or after the closing of the tidal inlets. And so this is what actually happened in several cases. In 1958 Bouwman wrote between 10,000 and 15,000ha of newly reclaimed land might result from the Delta Works. Compared to the smallest of the IJsselmeer Polders – the Wieringermeerpolder (20,000ha) – this was not very much. He mentions saltings and grounds along the south-coast of Goeree-Overflakkee and along the north- and south-coasts of Zuid-Beveland and the north-coast of Zeeuws-Vlaanderen.[455] These plans ultimately only slowly or partly materialized however and Goeree-Overflakkee only 'grew' from the 1980s. The tidal marshy gap between Walcheren and Zuid-Beveland (called Sloe) was for the greater part reclaimed from the early 1960s, but the Zeeuws-Vlaanderen coast – except for Braakman (1952) – hardly changed since 1953. One of the main reasons for slowing down the tempo was growing significance and concern with natural assets in the delta region. This coincided with the struggle for half open exhaust sluices in the Oosterschelde outlet and the so-called *kierbesluit* (chink decision) concerning the Haringvliet sluices. The Oosterschelde now has a limited tidal effect again, which is an important contribution for acquatic and zoologic assets. The Haringvliet sluices were narrowly opened for migratory fish for the first time on January 16, 2019. The damming and sluices in the delta area were the beginning of new accretion of grounds in places where formerly erosion prevailed, such as in the former Hellegat, now the complex traffic junction Hellegatsplein: the accretions along the dam are an important fauna eldorado today. Thanks to concern for natural assets and through the additional measures, which were not welcomed by everybody – the now safe Dutch delta region is still a dynamic area.
A dynamic area with the Port of Rotterdam and the above mentioned Maasvlakte as its focal point. (fig. 224)

224 Aereal view of Rotterdam Europoort. The new docks are in artificially raised areas along the foreshore, called Eerste and Tweede Maasvlakte (or Maasvlakte 1 & 2).

452 'Calamiteuze' of course has to do with 'calamity' or disaster; Descriptions of the works on the sea defense in many calamiteuze polders can be found in the hardly consulted annual series: Verslag aan de(n) Koning(in) over de openbare werken (1853 →).

453 https://nl.wikipedia.org/wiki/Calamiteus_waterschap ; Provinciale Zeeuwse Courant, 30-04-1958, 9: It was a result of the above mentioned *Bijdragenwet Deltawerken* (Contribution Act).

454 Beekman, 1932, 258, 259; Dibbits 1950, 259, 157-159, 260.

455 Bouwman 1958, 10-12.

225 Aerial impression of the northern half of the Oosterschelde flood barrier between the islands of Schouwen-Duiveland (top) and Noord-Beveland. The former base of operations Neeltje Jans is just visible at the bottom. The top is north. (Photo February, 2008)

11.5 The iconic status of the Delta Works

In terms of the number of victims and the financial losses the 1953 North Sea flood was a catastrophic event. At the same time, however, the storm surge can be considered a turning point in Dutch history, because it gave a fresh zeal to the nation's perpetual war against the water, its traditional arch-enemy. After the start of the Zuiderzee Works in the 1920s and following the completion of the Afsluitdijk, Wieringermeer Polder and Noordoost Polder, the Delta Works quickly became the new civil-engineering icon.[456] To the modern Dutch nation, the Delta Works are synonymous with the post-WWII reconstruction, probably to a greater extent than the Zuiderzee Works, which – although largely realized after the war – were the product of pre-war plans. Furthermore, the Zuiderzee Works elaborated on an ancient Dutch tradition while the Delta Works were the manifestation of something completely new after the disruptions of the 1953 North Sea flood. The New was reflected not only in constant technical advancements but equally in a growing awareness of both the vulnerability and the manipulability of biotopes and aquatic communities. A number of later modifications to the Delta Works were made possible thanks to a greater flexibility and a growing environmental and nature consciousness which resulted in movable and semi-open sea barriers. The Delta Works also belong to our own era. Exhibitions such as those on the artificial island and former base of operations Neeltje Jans, at the Oosterschelde Barrier between Schouwen-Duiveland and Noord-Beveland, still draw large crowds while new books and films on the Delta Works as Dutch icons are produced at regular intervals.[457] (fig. 225)

This chapter on land management as an extension of the Delta Works was the last of a series of treatises on the implementation of Dutch mainly post-war reconstruction plans. In the next and final chapter we will draw some conclusions and we will also introduce and motivate the choice of our eight National Interest areas and the six Type areas.

456 Steenhuis *et al.* 2015, 104.
457 Steenhuis *et al.* 2015, 46-59; https://en.wikipedia.org/wiki/Neeltje_Jans

Walcheren, 1947-1958

Re-consolidation and reconstruction, Veere Municipality

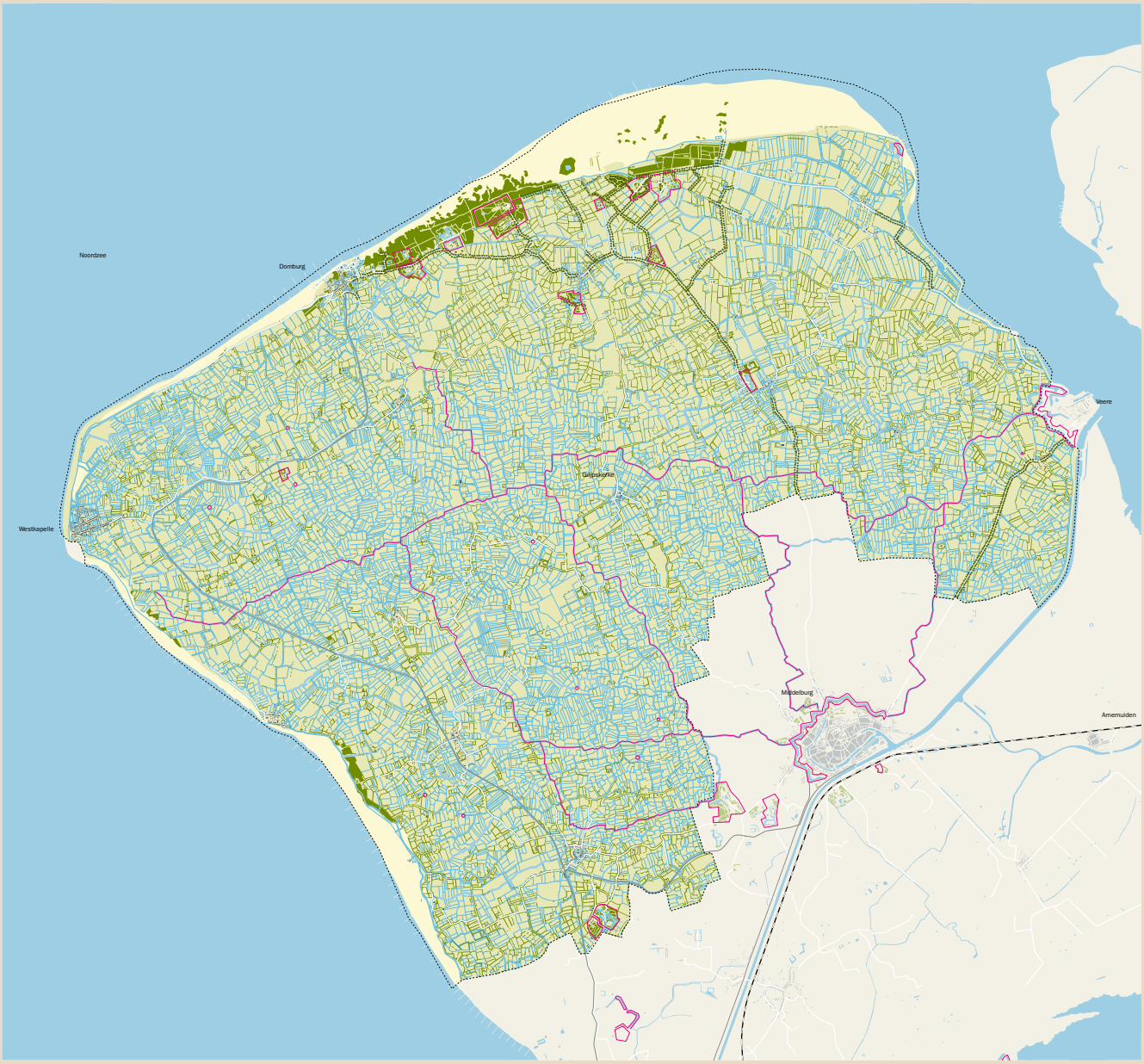
226 Allied forces in amphibian vehicles crossing a village street at the island of Walcheren after having inundated this German stronghold in 1944. (Photo spring, 1945)

Identification

- This rural area, the object of the re-consolidation, is situated on the western half of the island of Walcheren that was inundated and/or damaged in 1944-1945. During the 1953 North Sea flood, this section of the island remained dry.
- The repairs and redevelopment of Walcheren began after the Second World War, in the context of the 1947 *Herverkavelingswet Walcheren* ('Walcheren Re-consolidation Act'). N.M. de Jonge and R.J. Benthem, both working for *Staatsbosbeheer*, were responsible for the *landscape plan* and many planting schemes were designed by garden architect C.P. Broerse. The realization (1947-1955/1958) was a collaborative effort by *Nederlandsche Heidemaatschappij*, *Cultuurtechnische Dienst* (CTD) and *Dienst Wederopbouw Zeeland* (Zeeland Reconstruction Agency), among others.

Problems

From the start, the Second World War had a tremendous impact on Walcheren. In the first days of the war, Middelburg suffered a devastating air raid. Later, the island itself and the harbour of Vlissingen (German: *Festung Vlissingen*) were heavily fortified as part of the construction of the *Atlantikwall* (Atlantic Wall) the German coastal defence system which extended from the North Cape (Norway) in the north to the Pyrenees between France and Spain. Early in October, 1944, the Allied forces bombed the Walcheren sea defences in four places, as a result of which the island was largely flooded with salt water. The air raids also did serious damage to the village of Westkappelle. For months the tides rushed freely in and out, destroying the existing landscape and its field systems including the vegetation and many buildings. When the breaches in the dykes of Walcheren were closed so-called phoenix caissons were used for the first time, a type developed to serve as a landing stage for Allied ships after the Normandy landings in 1944.[1] Once the floods had subsided the centre of the island was revealed to have been completely destroyed. Any return to the situation before the 1944 disaster was impossible. So as to be able start work immediately, the government issued an emergency law, the 1947 *Herverkavelingswet Walcheren* (Re-consolidation Act Walcheren). Its contents did not


Noordzee
Domburg
Veere
Westkapelle
Middelburg
Arnemuiden

Walcheren
Left: Simplified map image ca. 1930. Scale: ca. 1:100.000
Right: Simplified map image ca. 1970. Scale: ca. 1:100.000
Similar to the above mentioned land consolidation in Beltrum the re-consolidation and reconstruction of Walcheren in the late forties and fifties led to upsizing of parcellation.

227 Soon after the war the bombed dykes of Walcheren had to be repaired. This picture shows transport of building-materials and a dredger and pipework near Rammekens. Notice the German tetrahedrons that have not yet been removed. (Photo 1946)

come as a total surprise, for the regional plan, by J. de Ranitz and D. Roosenburg, had already offered suggestions as to how the fragmented island and its problematic drainage situation could be redeveloped. One of the most pressing problems was that the island's dish-shaped land surface made it very difficult to drain off excess water away from its centre towards the foreshore beyond the dykes and the dunes in the north-west and south-west.
A re-consolidation without improved drainage would therefore be only a partial solution. (fig. 226, 227)
In 1946, the island's original meandering dykes, levees, hedges, lines of trees and especially its thousands of tiny fields with their typical craquelure pattern were in ruins after their prolonged wartime exposure to sea water. The damage to farms and (traffic) infrastructure was equally extensive. Among other things, the emergency law allowed for decisions as to what needed to be done to rest not with the land owners but with the national government in The Hague. This considerably shortened the trajectory for repairs but it also provoked much resentment, although in fact the emergency law to some extent followed the 1941, German-instigated revisions of the 1938 Consolidation Act.

Realization

Some upscaling had already been initiated shortly before the war, but the results were completely wiped out by the floods. From 1947 onwards, the intricate mosaic which until 1944 had characterized the landscape of Walcheren was completely overhauled, making the island a model for comprehensive innovation. The various administrations used the recovery process as an opportunity to turn Walcheren into a test case and an example.
The redevelopment also allowed for the restoration of the island's original green – but by far not everywhere wooded – appearance. Especially its slightly higher sections were traditionally characterized by hedges, hedgerows and farmyard vegetation. These were included in the repairs, resulting in the restoration of the original appearance of those parts of the landscape, albeit on a larger scale. This was the case to a lesser extent in the lower, central section. There, the old 'craquelure' field pattern had disappeared beneath a slip deposit but its somewhat disorganized appearance had survived – or rather, was restored. The substantially larger plots now form an untidy mosaic of block shapes which still reflects the underlying fossil creeks and levees. Shrubbery is less prominent, however, and the immense space is even less compartmentalized than before, again as a result of upscaling; parts of west Walcheren's centre even give a decidedly open impression. In a carefully considered planting scheme, vegetation clustered in certain places, for instance along (former) creeks. So-called '*overhoeken*', 'leftover corners' (patches of unused land) were planted and the dunes were forested. As the plan initially focused on economic recovery, farming received ample attention although *Staatsbosbeheer* also considered recreational functions. After its experiences on Walcheren – one of the most important test cases for the 1954 Land Consolidation Act – *Staatsbosbeheer* became the driving force behind most of the *Landscape Plans* in (re)development and/or land (re)consolidation projects.
One noteworthy aspect of the *reconstructieplan* was the dismantlement of an airfield which for years had existed near the village of West-Souburg (between Middelburg and Vlissingen), while a new airfield was envisioned north-east of Vlissingen[2] (see 1947 map, lower-right). In 1948, both were cancelled, leaving Walcheren without any airfield of significance.
The rebuilding of Westkappelle, which had been virtually obliterated and counted over 150 deadly victims, was supervised by the *Dienst Wederopbouw Zeeland*. Between 1945 and 1957, the rebuilding operation proceeded according to a plan by architect D. Roosenberg that used the village's original layout as a blueprint. In its scale and buildings the new village perfectly reflected its original qualities. A significant memorial in its own right is the large kolk lake south of the village, formed in 1944 when the nearby dyke was deliberately bombed to cause a breach (see 1970 map, far left).
Walcheren's recovery resulted in a varied landscape. In the north and south, pre-war and post-war farms and houses stand side by side. In the centre, reconstruction-period farms and houses prevail, usually quite far apart but occasionally clustering into hamlets. The difference stems from the fact that that the lower central section of the island had suffered most from the tidal forces while the upscaling process also had the greatest impact there. The upscaling led to greater lots than before the war,

228 Reconstruction period farm at Walcheren island. Dwelling and agrarian premises are under seperate roofing. (2007, exact location unknown)

229 Reconstruction period farm at Walcheren island. Late 1950's dwelling joined with a traditional wooden barn that seems to have survived the inundation. (2007, exact location unknown)

but it must be said: comparing pre- and post-war topographic maps and photos shows they differ less than is often stated. A comparison with the Vriezenveen case arises: supposed vegetational richness or compartmentation of space is predominantly an illusion in both areas. Lot forms and parcellation types changed radically into much more rational shapes (but hardly ever in rectangular pattern), separated by an equivalent system of ditches. Land use and especially landownership changed al lot however. Maps show rise in arable (thanks to better drainage), while less owners worked the same gross area. And farming had become more rationalized and mechanized.
Some farms built when the reconstruction efforts began (ca. 1946-1948) show signs of rushed work: thin façades and visibly recycled materials; a number of them share a certain uniform style. About 350 of these small farms were built shortly after the war, but most have since been demolished or given another function. The later farms were more varied and built by modern standards. Overall, redevelopment and upscaling were behind the relocation of a number of farms to the Noordoost Polder. The island's traffic infrastructure, which earlier had been marked by many cul-de-sacs, was clearly improved whereby existing connections were preserved, and the process was to an extent integrated in the later *Deltawerken*. Again, high-rising vegetation was extensively used. In addition, the water management situation on the island with its many levees and depressions was improved.[3] (fig. 228, 229)
New land development in the 1990s resulted in further upscaling and the partial obliteration of direct traces of the 'modernization' of the late 1940s and 1950s. Today Walcheren is much more upscaled than it was after ca. 1958. The traffic infrastructure was once more upgraded, retaining existing roads, and again in part in the context of the Deltawerken. During the 1953 North Sea flood Walcheren was mostly spared; only a polder near Arnemuiden (in the island's east) was drowned. Yet, this was the very place where the first results of the *Deltawerken* materialized in the form of the damming up of Veerse Gat, the inlet between Walcheren and the island of Noord-Beveland. Besides Walcheren became much better connected to the rest of the country thanks the series of dykes and bridges between the other islands. Today there is a tunnel underneath the Scheldt estuary connecting Walcheren and Zeeuws-Vlaanderen.

Key qualities

On Walcheren, a ruined small-scale pre-war landscape was (twice) reconstructed on a larger scale. The modernized landscape mostly regained its original features but with a more functional field pattern and better access and drainage. Some elements of the Deltawerken were implemented simultaneously, albeit at first on a limited scale. The implementation of the vegetation scheme was such that higher parts of the island regained their original green bocage appearance. Scattered over the landscape were numerous new farms, creating a blend of the old and the new. Some of the reconstruction-period buildings are in a restrained style which lends additional grace to the rebuilt village of Westkappelle.
Walcheren became a type case for future land developments, in particular for those areas that were hard-hit by the 1953 North Sea flood. The Walcheren *Herverkavelingswet* was also applied to several of the other islands, such as Noord-Beveland and Schouwen-Duiveland. The experience gained during the repair efforts on Walcheren was also one of the cornerstones of the 1954 Land Consolidation Act. In particular the inclusion of the Landscape Plan in the Act owed much to expertise acquired on Walcheren. (fig. 230, 231) Today, Walcheren is part of the National Landscape *Zuidwest Zeeland*.

230 Reconstruction plan for Walcheren, 1947. This map has unjustly often been used to show Walcheren's (supposed) complete metamorphosis after its re-consolidation. In fact it was only a rough sketch of a future lay-out. The air field (bottom right), for example, never materialized.

231 Aerial impression of re-consolidation area Walcheren island. The north is left. (Photo May, 2013)

Notes

1 Van der Ven 1993, 276.
2 The planned airfield was toreceive a set of runways laid out in an A-shape, just like Deelen Air base.
3 For a detailed impression of the spatial developments, visit http://www.topotijdreis.nl/ and zoom in on the maps for the period 1941 to 1965.

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Epilogue

12 Conclusions

This book set out to discuss the spatial development of the Dutch countryside (i.e. the rural areas) in the 20th century, and more specifically between 1940 and 1965, the period labelled as the 'reconstruction era'. Its beginnings followed immediately upon the German occupation of the Netherlands in May, 1940, and it formally ended a quarter of a century later. The period lasted much longer than anticipated. This was in part due to a second catastrophe, the February, 1953 North Sea flood.
In rural areas, the reconstruction efforts were fuelled by specific motives and goals which can be summarized as capacity increase and modernization of production. A number of factors made capacity increase and improvements in the agricultural sector necessary and desirable. They related not only to production increase but also to the various ways in which this might be achieved: more efficient utilization of
(as yet) non-profitable land, raising production efficiency, and cutting costs. Production costs were a major issue, particularly due to upscaling abroad and the international market situation.

12.1 Continuity of land management processes

Virtually every spatial or historical process is part of a continuum. This makes it impossible to pinpoint it exactly in time. This was a main reason for sometimes mentioning 1930 instead of 1940 as a starting point: the autumn of 1929 not only marks the commence of the Great Depression, but the early 1930s also constitute the beginning of international stress leading to the Second World War. Besides this: many spatial, technical and social developments in post-war Netherlands started or already first peaked in the 30s, such as locking off the Zuiderzee, electrification of the railnet and the laying out of garden suburbs with sanitary provisions and sewerage. 1930 brought the dawn of modern life. And in several rural regions the erection of modern farms, the provision with electricity and the opening up of hardly accessible local communities had also begun. From this point of view it is not a surprise continuity of developments was emphasized in this book.

It must be restated here the three main types of reconstruction-period land management, as discussed in the previous pages, were no new inventions. To the contrary, *land reclamation* in wastelands and development have been indispensable elements of a sedentary lifestyle for thousands of years, and the embankment and *drainage of surface waters* (land acquisition) to create new agricultural soil has been a Dutch speciality for centuries. However, the reclamation of the last few ten thousand hectare of 'wasteland' within a period of about two decades after 1940 was a special case.
It signalled the conclusion of a tradition dating back thousands of years.
An opposite tendency was observable in the drainage of surface waters. This process peaked in the period 1940-1968. During those years, the total drained area encompassed 1500km² or 150,000ha, of which the three IJsselmeer polders made up by far the largest share. As with land reclamation, the completion of these polders again marked the end of the major land acquisition enterprises. Social resistance against these radical interventions in Dutch space was intensifying and some ongoing projects were even cancelled.
In the case of *land consolidation* or re-allication the situation was different. Land exchanges were hardly a novelty during the reconstruction period. The manner of it, however, was constantly evolving, both in legislation and in its spatial impact. Mutual exchanges and divisions or mergers of plots of land are universal phenomena. Occasionally, they can be traced back to the feudal period, (long) before 1800. The introduction of the 1924 Land Consolidation Act in the Netherlands enabled a – from a legal perspective – 'modern' approach. Its start was slow. On the eve of WWII, the total area subjected to land consolidation still amounted to no more than 20,000ha. The end of the economic depression of the 1930s, together with the introduction of the 1938 revision of the Land Consolidation Act, initiated a surge in the number of applications for consolidation. However, their actual implementation was slowed down considerably by the outbreak of WWII. The land consolidation process only gathered speed after the war. Today, the process still continues, although its substance, terminology and ultimately also its goals and intentions have changed. In 1954, the 1938 Act in

its turn was succeeded by a new Land Consolidation Act. This contained provisions which placed *landscape plans* on a legal footing. Before, landscape plans were important in that they providing the 'furnishing', in the form of planting schemes and zoning. However, thanks to the 1954 Act, a wide range of other functions now also qualified for inclusion in the landscape plan, such as roads, nature, recreation, and cultural history. The Act inaugurated the arrival of the so-called *land consolidation 'new style'*, which had a much wider scope. At the same time, land consolidations became the prime focus of government policies to economically strengthen the agricultural sector through upscaling, farm relocation and, in the case of many small farms, termination.
These changes in the land consolidation process to some extent paralleled developments in reclamation and land acquisition. Starting in the early 1950s, the role of natural and landscape assets as well as cultural-historical values in land consolidation increased. In 1975, the 1954 Land Consolidation Act was replaced by the Land Management Act. In 2006, this in its turn was succeeded by the *Wet inrichting landelijk gebied* (WILG; 'Management of Rural Areas Act'), which is scheduled to merge with the *Omgevingswet* ('Surroundings Act') in 2021.[458] In the future, land management will focus more on land consolidation processes, much less on the reclamation of surface waters, and hardly at all on new reclamations.

12.2 Five issues relating to spatial developments in rural areas

Section 1.4 of this book listed five general questions to obtain a balanced view of spatial developments in rural areas in the Netherlands between 1940 and 1965. By answering them, we hoped to achieve a more detailed understanding of those developments. This would be helpful in the selection of type cases. These five questions will now be answered individually. After that, we will briefly explain the criteria which led to the selection of the eight National Interest areas and the six Type areas.

12.2.1 Question 1: Impact of the Second World War

The first question was: *What was the nature of the war damage inflicted on Dutch rural areas during the Second World War, which factors caused it, and which areas were hit hardest?*

Rural areas were the main stage for war-time action. Defensive and offensive structures were also built in these areas, for they offered ample room, and they were also suitable for instance for deliberate inundation and the laying out of airfields, besides providing cover and camouflage. The impact on the relatively thinly population countryside was huge. Many of its buildings were damaged or destroyed, and vast areas throughout most of the Netherlands were flooded.
Factors specifically harmful to rural areas were the destruction of or damage to farms, houses and fields, bomb damage to infrastructure (including hundreds of railroad and other traffic bridges) and the destruction of woodland and other vegetation. In several areas these forms of damage intensified pre-existing material and social and economic problems. This was particularly the case in much of the south-eastern Netherlands, in the central river plains, on the eastern Dutch sandy soils, and on a number of islands in the south-western delta. All these areas were already struggling with issues relating to field systems, water management, access, or a combination of these. The damage to property and livestock led to a loss of income, poverty and (worsening) social deprivation. After the Second World War, social life in rural areas was resumed, but not in the same way as in urban areas, where residents were much quicker to pick up new lifestyles. The psychological horizon of rural residents had always been more limited, and the war had not changed that.[459] Occasionally, rural residents had to wait years for 'revitalization', in some areas until the second half of the 1950s, when the regional improvement programmes started. Interventions in damaged landscapes during the Second World War to some extent proceeded from the need to bring them in line with what the times demanded. In some areas,

[458] Both acts re-introduced the concept of re-consolidation, alongside reorganization and land consolidation.
[459] Schuyt & Taverne 2000, 48-56.

232 Military dump and left-overs were gratefully welcomed after the war and were used for many agricultural and civil purposes. (Noordoost Polder, date unknown)

applications for land consolidations pre-dated the war or had been filed at its start. Examples are the island of Walcheren, severely affected in 1944, and Maas en Waal-West.[460] Destruction, prolonged flooding and (damage resulting from) military use or operations were additional reasons for landscape interventions. For many war-damaged areas, particularly in the central river plains, the south-eastern Netherlands and Zeeuws-Vlaanderen, applications for (re-)consolidation were filed or work started before 1955. In these instances, the war served as a catalyst. In several areas army dump became part of the modernizationprocess. (fig. 232)

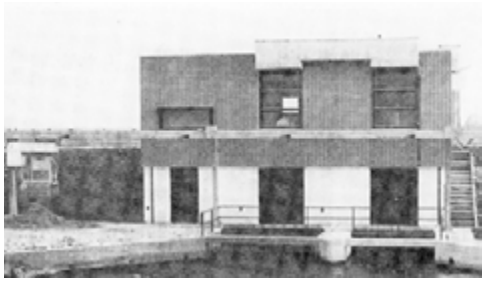
12.2.2 Impact of the 1953 North Sea flood

The second question was: *What was the nature of the damage sustained by Dutch rural areas during the 1953 North Sea flood, which factors caused it, and which areas were most affected?*

The answer to that question is more or less similar to the previous one.
The storm surge of February 1, 1953 washed over much of (mainly) the south-western Netherlands. It caused the loss of over 1800 lives, the drowning of numerous livestock, unfathomable personal suffering, and colossal material damage.
The disaster also affected several areas where applications for land consolidation were still pending, or where work was ongoing or had been completed. Two applications, for example, concerned Schouwen-Duiveland (one of which was in the initial stages of implementation); others concerned the island of Goeree-Overflakkee and the Voorne area.[461] After the disaster, plans were updated (for example with regard to roads and dykes) and implemented (again). In the south-western delta, the 1953 North Sea flood therefore served as a catalyst and, to a lesser extent, as a push factor for land consolidation and (the juridically more intervening) re-consolidation. That was also true of the Delta Works. The earliest plans for the closure of the sea inlets / tidal river outlets date to shortly before and during the Second World War.

460 Compare Roosenburg & De Ranitz 1938; Van den Bergh 2004, 138.
461 Van den Bergh 2004, 209-211; Andela 2000, 178.

Only a few days before the disaster, the Delta Committee had published its preliminary findings on the subject.[462] On the eve of the 1953 North Sea flood, concern was rapidly growing but there was certainly also negligence and carelessness. In the delta region, the employment schemes of the depression period had not led to an adequate deployment of personnel and materiel. If they had, things would not have gone so horribly wrong in so many places. In the years after the flood not only rebuilding of dykes and land reconstructions took place, but as an integrated also feature drastic drainage improvements were realized. (fig. 233)
We may therefore conclude that neither the Second World War nor the 1953 North Sea flood were starting points for land management projects. Both catastrophes, however, certainly speeded up procedures and sparked off an active response to existing initiatives. Just like WWII, the 1953 North Sea flood was again a powerful catalyst.



233 Pumping station Witte Brug near Goedereede (island of Goeree-Overfakkee), an example of many more of these, built as an indispensable consequence for improvement of drainage in the delta region. (Photo ca. 1959)

12.2.3 Other physical and social factors

The third research question was: *What (other) physical and social factors led to and/or contributed to the large-scale modification of the existing landscape?*

Part of the answer to this question was the observation that deficiencies and deprivation in many fields long pre-dated the war. They were not merely the result of the economic crisis of the 1930s. Their roots went much further back, to the 19th century. Some problems were material, others proceeded from the technical limitations of the period, or they were social, proceeding from disturbed or problematic relations of ownership and power, a lack of education, poverty, or inadequate housing (e.g. no running water or electricity). From an agro-engineering point of view, serious problems with regard to field systems, water management and access pre-dated WWII. Some of these issues persisted until the 1960s. Many farms were (too) small, properties were scattered, and parcel shapes inefficient. One of the physical factors was a need for additional fertilizers.

Paradoxically, however, soil improvement sometimes made existing problems worse, for instance when increased (artificial) soil fertility and higher yields caused even more fragmentation. In itself, each of these factors might not have led to interventions on a scale such as prevailed after the war, but in combination they often did.
Improved access and drainage and the merger of scattered plots became key concepts. In addition, the State encouraged upscaling, colonization by means of farm relocation, and a reorganization of the agricultural sector. Smallholdings judged to be no longer viable had to make way for larger farms that could compete with other market players. In particular the EU and its predecessors as well as the 'global market' now set prices, and thereby (indirectly) determined the bottom line for individual farm productivity. From the 50s and 60s upscaling and modernization of the means of production became absolute conditions for profiable agrarian survival. (fig. 234)
From a social-economic perspective, state-sponsored regional improvement programmes were a response to the rapidly widening gap between rural areas and urban or urbanizing ones. With their emphasis on modern practices, education and the improvement of rural living conditions through the introduction of modern facilities, regional improvement programmes also ensured a higher return for spatial interventions. They were complementary to many land (re-)consolidations and, until the early 1960s, to reclamations as well.

462 See e.g. De Schipper 2008; http://www.haaksezeedijk.nl/04.pdf, 40-44.

234 Antique and modern agricultural production factors in juxtaposition: a worn out 19th century horse and carriage vehicle opposite a brand new farm, still under construction. Photo taken in land consolidation Spier-Wijster, Drenthe Province, May, 1957.

12.2.4 Continuous and discontinuous actors and factors

The fourth research question stated: *Which continuous and discontinuous actors and factors were predominantly involved in the reconstruction of Dutch rural areas in the period 1940-1965?*

The answer to this question deviated somewhat from our other conclusions. In the course of our research for this publication, the author's initial assumption of discontinuity in rural spatial developments and in the contributions of fundamental actors and factors to this process proved to have been wrong. Many of the post-war institutions which shaped the Dutch countryside in fact pre-dated the Second World War.
Returning to tradition and picking up where the 1930s had left off were important goals. Comparisons with the situation during the last 'normal' year before the war, 1938, confirm this. Perhaps this explains the somewhat stuffy image of the 1950s in the Netherlands: the 1930s had simply jumped over the hurdle of WWII and seamlessly turned into the 1950s. Indeed, in rural areas, continuous actors and factors dominated the scene, although some of them originated at the very start of the reconstruction period.
The most constant acting force was the State, in all its manifestations and roles of law maker, commissioning body, executive organization, financier, policy maker, planner, researcher, and so on. A number of government agencies and institutions took the lead, such as the *Cultuurtechnische Dienst* (CTD or CD – 1935; later *Dienst Landelijk Gebied*), the *Bureau Wederopbouw Boerderijen* (BWB – 1940) and the *Rijksdienst voor Landbouwherstel* (1944). These last two were active for only a few years.
For decades, important players such as the Wieringermeer *Directie* (1930) and the *Dienst der Zuiderzeewerken* (1919) were responsible for profound changes in the appearance of the Netherlands, in the form of the drainage and organization of the IJsselmeer Polders. Until 1962 and 1971, respectively, these institutions, under the same names, continued to play the same role, carrying out massive plans which essentially originated in the late 19th century.
Another important State organisation should be mentioned here: the *Rijksdienst voor het Nationale Plan*, established in 1941, was presented several

years before the German occupation. This RNP, later the Rijks Planologische Dienst, can therefore also be considered an organisation distinctive of continuity. One last pre-war institution that influenced thinking about rural land development and land (re)construction in the post-war period was the *Contact-Commissie voor Natuur- en Landschapsbescherming* (CC – 1932), together with the *Werkgroep voor de Cultuurlandschappen* (WCL – 1943).

Wasteland reclamation continued under the aegis of institutions such as *Nederlandsche Heidemaatschappij* (1888), *Grontmij* (1913) and *Staatsbosbeheer* (SBB – 1899), resulting in the creation of ca. 400,000ha of farmland in the period 1900-1960. Waste land reclamations went hand in hand with modern farm construction and from the 1920s and 30s all over the country dozens or even hundreds of rationalized farms arose. It is clear agrarian transition already took off in the pre-war years. (fig. 235)
These same parties were also involved in land consolidation. Since 1924 the State had set the rules, albeit with some changes along the way.[463] Most legal revisions related to methods and procedures, not to the substance. In 1954, the landscape plan was introduced, a formaly novel element. By then, even the history of that concept, however, went back more than fifteen years – or even to the mid-1930s. Finally continuity shows in and consolidations of course: they counted up to ca. 500,000ha in the period 1900-1965, of which 80% realized in the period 1955-1965.
Even the Delta Plan, born of the upheaval following the 1953 storm surge and flood, may have been hatched at that time, but the egg was laid before the war. A study of the potential closure of the sea inlets appeared only days before the disaster.[464]

Although it is clear that many actors and factors in the reconstruction period had their origins (long) before 1940 or 1945, there were discontinuous factors and actors as well. During the reconstruction period, the context of farming changed radically. Continuity was offset by other, discontinuous factors and by changes in the operational conditions in all forms of land management, such as reclamation, drainage and land consolidation. The associated civil-engineering and agronomic works, from farm construction to drainage infrastructure, resulted in a lack of capital, probably most urgent problem. This was partly remedied by the Marshall Plan, and later by agreements, trade, and European cooperation, in a radical breach with a past of clashing nation states. Another discontinous point to be mentioned here was the end of the drying up of colonial revenues; for several years the Dutch Indies even cost lots of money because of its Independency War (1945-1949).[465] What finally can be considered a new phenomenon was the relatively fast acception and adaptation of the American way of life, with its characteristic modern spatial planning, its domestic utensils, its cars and its music and cinema, etc.

235 Sometimes pre-war farms show aspects that might mistake us and identify them as reconstruction-era constructions. Such possible mistakes do emphasize the pre- and post-war continuity in several agrarian developments. This 1930 farm in Appelscha, Friesland Province, still exists.

12.2.5 Type cases of spatial development

The fifth and final research question was: *Which rural areas can be considered type cases for the (spatial) developments of the reconstruction period 1940-1965?*

This question underlay our presentation of the National Interest areas and Type areas in the Box texts. It was also the question the RCE formulated in 2011 in relation to its policy document *Visie Erfgoed en Ruimte.*

[463] Regarding voluntary or private land exchanges, the Cadastre was the only significant party.
[464] Ten Horn-van Nispen 2002.
[465] https://en.wikipedia.org/wiki/Indonesian_National_Revolution

It is easy to identify dozens if not hundreds of areas in the Netherlands that display one or more qualities or assets typical of the reconstruction period. Together, the type cases presented here form a representative sample[466] of reconstruction-period landscapes which in some ways illustrate certain developments, elements or structures. In our selection, we have tried to ensure an even representation of all periods, regions and landscape types.

12.2.5.1 The selection of National Interest areas and Type areas

As said before the selection of eight rural National Interest areas was an outcome of the so-called *Visie erfgoed en ruimte* (VER). In sum 30 areas including these eight – were selected. In the context of the *Visie erfgoed en ruimte* arose a national priority theme: *Wederopbouw: tonen van een tijdperk* ('Reconstruction: the Visualization of an Era'). With regard to the selection of these National Interest areas, the main goals were (translated quote): '*legal responsibility for area-oriented protection of heritage of national significance. Support of partner governing bodies: expertise development and dissemination.*' And also: '*The special properties of these areas deserve greater public attention and the most exceptional areas deserve public protection.*'[467] The aspect of protection falls outside the scope of this publication, which focuses rather on the special characteristics and properties of these areas and the public attention they generate. The present publication also presents six other Type areas in addition to the eight National Interest areas listed in the VER. It does so with an eye to this public attention, to emphasize the significance of other areas besides the National Interest areas. Other younger landscapes may contain equally valuable elements and structures worthy of general notice.

A fairly small team was responsible for the selection of the eight rural areas defined by the Cultural Heritage Agency of the Netherlands, in the context of the *Visie erfgoed en ruimte* (VER). The selection – the National Interest areas – mainly reflects the information available in 2010. Other, or perhaps more appropriate type cases of rural reconstruction might possibly have been selected. The six additional areas – the Type areas – emerged later, as a result of more detailed information and insight. They emphasize the fact that valuable cultural landscapes from this period may be encountered in many other places.

12.2.5.2 The eight National Interest areas

Together, the eight reconstruction-era National Interest areas from the reconstruction period cover the entire period of 1940 to 1965, De Groep being the earliest and Haskerveenpolder the most recent. They are also distributed throughout the country, from Friesland (Haskerveenpolder) to Noord-Brabant (De Scheeken) and from the Achterhoek region (Beltrum I) to Zeeland (Walcheren). These eight areas contain a wide range of different geological landscapes, from peat reclamations (Haskerveenpolder, Vriezenveen) to sand and loam soils (De Groep, De Scheeken), and from river clays and sandy clays (Maas en Waal-West) to marine clays (Walcheren, Noordoost Polder). Finally, whenever possible, the selection took into account anticipated future developments. Sometimes, the originally planned boundaries of a selected area had to be reduced, as for instance in the cases of Haskerveen Polder and Vriezenveen, and on Walcheren. Another implicit criterion was typological. Together, the various selected landscape types had to form a representative sample of reconstruction-period forms and developments. (fig. 237)

12.2.5.3 The six Type areas

The selection of these six areas proceeded along similar lines. In this case, however, the author, not an entire team, was (largely) responsible, basing his choice in part on the existing preliminary selection. In the end, two contiguous, early, contrasting land consolidations were added (Dalfser Hooislagen and Nieuwleusen), as was a late dune-reclamation landscape (Oosterduinen). Yet another land consolidation concerned an area where land loss was an issue (Maasplassen), while a second involved two adjoining but contrasting consolidations on sandy soils within one Type area (Rijtsche Heide and Peelsche Heide). Furthermore, the selection contains an example of war damage in the form of a terrain modified to accommodate a German air base (Deelen). The last area to be added was an important example of re-consolidation

[466] Sample: 'a small segment or quantity taken as evidence of the quality or character of the entire group or lot' (From: Merriam Webster Unabridged, online edition, March 30, 2018)

[467] VER 2011, 53.

following the 1953 North Sea flood (Schouwen-Duiveland). The six Type areas have one common trait: they were reltively strongly altered.

12.3 Managing reconstruction areas of national interest

The national policy with regard to reconstruction-period areas involves entering into '*bestuurlijke prestatieafspraken*' ('administrative performance agreements') with the relevant authorities regarding zoning regulation-based legal protection of the core qualities of the thirty areas (including the eight rural areas) of national interest. These relevant authorities include municipalities as well as provinces and others.
To work out the details, a research and planning budget was made available for all thirty reconstruction-period areas for the period 2012-2016.[468] Preliminary research for the eight national areas has been completed and could sometimes be used for this book.
In the case of municipalities, legal protection proceeds from municipal zoning regulations. In provinces, available instruments include the so-called *structuurvisie* ('planning strategy document'), but this is not legally binding. Yet another instrument is the *provinciaal landschapsgezicht* ('provincial protected landscape view').

12.3.1 Reconstruction in zoning regulations

Selected national reconstruction areas frequently resort under several zoning regulations and occasionally also several municipalities. This makes them vulnerable. Theoretically, a situation in which an area resorts under one zoning regulation and one municipality creates optimal conditions for a coherent and consistent area policy. In such cases, rules and regulations pertaining to these areas are largely in agreement, and acknowledgement of the areas' character and qualities is enough to ensure they are handled properly. When drafting zoning regulations or spatial plans which transcend policy or territorial boundaries, it is particularly important to follow up on *Visie erfgoed en ruimte*'s goal to keep the period 1940-1965 visible at a local level.
An area classified in one or more municipal zoning regulations as exceptionally valuable may be designated as '*gemeentelijk beschermd gezicht*' ('municipal protected view'). Few areas currently enjoy this form of protection,[469] but current legislation does allow it. A municipal protected view can also encompass rural areas. As such, it has the potential to contribute to a more long-term protection of assets than would be possible through a zoning regulation (the legally established lifecycle of a zoning regulation is approximately ten years).

12.3.2 Area protection by means of the 'provincial protected landscape view'.

In addition to agreements between State, province and municipality based the provincial strategy document (*structuurplan*), landscape assets in rural reconstruction-period areas may also be safeguarded by means of instruments associated with the status of a so-called 'landscape view'. The 1998 *Natuur-beschermingswet* (Nature Conservation Act) authorizes provincial administrations who choose to do so to assign 'protected landscape views' (*beschermde landschapsgezichten*). The *Natuurbeschermingswet* defined a landscape view as '*a composite of vacant plots, or of both built-up and vacant plots, which on the basis of its structures, patterns, elements or other physical appearance is of general significance from a historical-landscape perspective.*'[470] This definition provides ample opportunities for extending a protected status to reconstruction-period landscapes. Better integration of land-management related measures into provincial environmental policies may also include specific care for landscapes from the period 1940-1965. This may help to preserve their specific appearance at a regional level. So far, however, no provincial administrations have chosen to designate protected landscape views.

468 VER 2011, 53.
469 Municipalities which have designated municipal protected views include Amersfoort, Apeldoorn, Krimpenerwaard and Wassenaar.
470 *Natuurbeschermingswet* 1998, Art. 1.e, http://wetten.overheid.nl/BWBR0009641/2016-04-14#HoofdstukI.

12.3.3 How about opponents against (and proponents of) large-scale interventions

In the first chapter of this book (paragraph 1.1.3) we wondered one more interesting problem. We posed one the questions which led to the present publication is whether the arguments of past and present opponents against large-scale interventions like land consolidations, reclamations of wastelands, agronomic engineering etc. are still valid in view of current perspectives, and if not, why. It is not easy to answer this question in short, but one statement seems safe: it depends which interests and issues are at stake. There is lots of literature and pamphlets pro and con interventions and all writers and organisations are usually right from their point of view and in that specific epoch.
On the one hand probably no one will deny cultural-historical and natural assets got lost or were destroyed or injured. In sofar opponents are winners as yet. But on the other agronomic and and a wide range of social gains will not be denied. So proponents won too.
Yet we must decide simple evolution and linear progress to a better future as proclaimed up to mid-20th-century proved at least questionable. Recently a most interesting paper showed some insight in this matter. Van den Wittenboer published her master thesis which contains results of an inquiry into digitally published historical newspapers (1955-1985) on the subject of experiencing landscape change, including land consolidation and reclamation of wastelands. She chose a series of stakeholder types and labelled their aggregated opinions into positive, indifferent and negative scores (+//±//-). Amongst other things she found appreciation of different groupings sharply contrasted and that appreciation sometimes changed in time. In most cases farmers' appreciation increased, just as outsiders' opinions. In contrast local citizen's appreciation more than often dropped.[471] It might be concluded – as stated above – it depends which interests and issues are at stake.
Today it must be remembered since 1955 to 1985 35 to 65 years passed – an equivalent to at least two or three generations. For many people former situations are no more than hand down tradition, framed in stories, (motion-)pictures and photo's. This might explain depreciation of change: many do 'regret the loss' of an inconvenient past they hardly ever experienced and maybe is even imaginary. In other words: they might be called abstracts or even 'unjust sentimentality'. An example is a 2007 'general public pamphlet '*Nederland weer mooi*' ('the Netherlands beautiful again').[472] The pamphlet sometimes was professionally criticized because it too much emphasized 'relics' and/or assets of rural landscapes and rural life that may not even have existed as described.[473] A mood of nostalgic or romantic '*sehnsucht*' lies in wait when (re-invented) historic landscapes and rural life are focus of discussion.[474] (fig. 236) Another example can be found in '*Atlas van de Schie*' when describing and warning against the 'marketing of a landscape' and 'building new nature.[475] '
A final example was already mentioned: the general public responding to some landscapes in Drenthe as if they were authentic, although they were the products of landscaping.
Loss of cultural-historical assets, information and authenticity nevertheless must be regretted, but remember especially hundreds of Landscape plans (*Landschapsplannen*) and (mostly parallel) Rural Improvement programs (*Streekverbeteringen*) were well-considered ingenious inventions and interventions with far-reaching positive results at furnishing our post-war (sometimes heavily damaged) cultural landscapes and at increasing their inhabitants' prosperity.
In this context it might be called a parallel phenomenon that land hunger and agrarian land use seem to diverge. Although more (or at least an equal area of) land became in use for agrarian purposes, the amount of cattle out to grass (relatively) shrank and still shrinks and ever more crops are grown roofed over too.[476] Many meadows are permanently used for harvesting hay and greenhouses and today plastic covered cultivation as well are still gaining importance.
It is a paradoxical development: intensive agriculture at peak level and yet not all available grounds in use. Moral and some political opposition against these developments are growing but a radical change is not yet to be expected. Maybe further noticing cultural-historical assets in landscapes comes into view thanks to intensification and local or regional

471 Van den Wittenboer 2017, I, 108 ff., 154 ff., 180 ff., II, 27-153, 158-167. The main subjects of study were the agrarian villages of Losser and Vriezenveen.
472 Also known as: Deltaplan voor het landschap 2007.
473 https://nl.wikipedia.org/wiki/Vereniging_Nederlands_Cultuurlandschap
474 See Antrop 2007, *passim*, e.g. 66 ff.
475 Van der Zee, Abrahamse & Des Bouvrie 2016, 182 ff.
476 Van der Schans & Keuper, 2013.

236 Cover of the 2007 pamphlet 'Nederland weer mooi' ('the Netherlands beautiful again').

concentration. In this context it is important too to emphasize that not one cultural landscape will ever be 'finished' – nowhere, and especially not in the Netherlands with its tradition of changing and raking up its territory. The Netherlands are a mosaic unfinished landcapes. This fits the well known phrase questionably attributed to the Greek philosopher Heraclitus of Ephesus (c. 535 – c. 475 BC) that says: "The only thing that is constant is change."[477]

12.4 Postscript

The purpose of this book was to raise the readers' interest in, and to inform them about, the 20th-century landscapes, and specifically the post-WWII reconstruction-era landscapes, of the Netherlands. They are some of the nation's lesser known but highly typical aspects. The landscapes created during this turbulent period, which besides the Second World War and its effects also encompassed the 1953 North Sea flood, display some highly varied and occasionally minutely prepared examples of land management. Of course there was not enough room in this book to explain all problems and solutions and several times we could only lift a tip of the veil or only touch lightly on solving spatial (and/or their connected social-economic) perplexes. Of course the author is fully aware of rising problems resulting from climate change. Climate change caused by man and not the least by man in relation to agriculture, such as carbon dioxide and nitrogen oxides imbalances. But – despite their (present) importance these problems were no topics in this book.

Some Dutch landscapes contain historical elements and structures, as components of completely re-consolidated and organized areas. Others were fully created 'ex nihilo', with some newly created stretches of land encompassing tens of thousands of hectares. There are also reclaimed areas that were transformed from wasteland into fertile farmland or productive forest – as well as the other way round! Finally, there are the water management projects collectively known as the Delta Works. Although being largely built in concrete, these also constitute landscape elements, and as such they are crucial to Dutch safety from the sea. Without its dykes, sea barriers and dunes, its exceptionally low elevation will always continue to render much of the Netherlands vulnerably to flooding. Attempts to cope with water are a recurring theme throughout Dutch history. The cultural landscape of the 20th century elaborated on that tradition, but thanks to modern technology, it did so in entirely new ways. This book has achieved its purpose if its readers have become more aware and better understand the interruptions as well as the continuities of this turbulent period, and if they also understand that the more recent Dutch landscapes equally express the spirit of their age, and as such are valuable.

[477] https://en.wikipedia.org/wiki/Heraclitus

237 Eight National Interest areas and Six Type areas in the Netherlands. Together these areas should represent the Post War Reconstruction Period rural land use developments.

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(Mainly using original Dutch names)

A. Peters	129
Archief Dienst Landelijk Gebied (DLG)	130, 195
Aviodrome, Lelystad	116, 183, 191
B. Lamberts	228, 229
Beeldarchief Rijkswaterstaat	83
Beeldbank Amsterdam	20
Beeldbank NIMH	74
Beeldbank RCE	16, 21, 24, 55, 61, 62, 75, 100, 102, 104, 112, 128, 132, 148, 237
Beeldbank RCE - Collectie Stichting Historisch Boerderijonderzoek (SHBO)	125
Beeldbank RCE (K. Roderburg)	231
Beeldbank RCE (W. van der Sar)	219
Beeldbank RCE, Siebe Swart	58, 94, 120, 145, 164, 187, 188, 213, Cover
Beeldbank Rijkswaterstaat (RWS)	1, 6, 69, 167, 168, 171, 173, 175, 186, 200, 215, 216, 218, 220, 223, 225, 233
Beeldbank WOII - NIOD	41, 177
Beeldbank Zeeland	202
brilliantmaps.com	166
Collectie Vereniging Oud Vriezenveen	92
Creative Commons	156
Dienst Kadaster en Openbare Registers	8, 9, 10, 11, 79 A + B, 81, 82, 174, 180 l + r, 181 l + r, 206, 245
Dienst Kadaster en Openbare Registers (Page numbers)	24, 25, 48, 49, 54, 55, 88, 89, 100, 101, 222, 223
ESRI	12, 13, 63, 93, 121, 139, 165
F. Niemeijer	31, 32, 36, 37, 39, 56 A + B, 57, 85, 155, 163, 211, 212, 222
Feddes/Olthof	53
Flickr - Kees Torn	50
Flickr - Overijssel Province	84
Flickr - Public domain	146
Fotodienst Dienst Landelijk Gebied (DLG)	109, 131
G. van Gompel	34
G. Vogels	15
Gelders Archief	197
Google Earth	33, 88, 126, 144, 172, 224
H+N+S Landschapsarchitecten	162
Heidemij (Gelders Archief; Public domain)	64
Iha Holiday Ads	221
Koninklijke Bibliotheek (KB)	49
L. Prins	142, 143, 190
MUST (Page numbers)	82 t + b, 122, 123, 146, 147, 170, 171, 196, 197, 216, 217, 246, 247, 266, 267
N. Aartsen (Brabant Collectie)	141
NA - Anefo	99
NA - Archief Rijksdienst voor het Nationale Plan (RNP)	135
NA - Collectie Elsevier	22. 65, 160
NA - Collectie Nederlandse Heidemaatschappij	5, 23 t + b, 27, 28, 29, 30, 103, 107, 108, 117, 118, 134, 149 t + b, 176, 179, 193, 204
NA - Directie van de Wieringermeer - RVD-eigen	113, 185
NA - Fotocollectie Nederlandse Heidemaatschappij	89, 90 l + r
NA - Nederlandse Heidemaatschappij	97
NA - RVD-eigen	184
NA - RVD-eigen, Slagboom en Peeters	201

—

NA - Spaarnestad Fotoarchief	80, 96, 122, 169, 226, 232
Nationaal Archief (NA)	14, 152, 153
Provinciale Planologische Dienst van Zeeland	230
Provincie Zuid-Holland	214
RCE	51
RCE - Collectie Stichting Historisch Boerderijonderzoek (SHBO)	54
RCE, B. Broex	46, 47
Regionaal Historisch Centrum Eindhoven (RHCE)	40
Rotterdams Archief (Copyright Unknown)	151
Staatsbosbeheer (SBB)	203
Tegels op Locatie in Nederland (3831SB_00010_F2)	127
Universiteitsbibliotheek Utrecht	19
Unknown	52, 77, 86, 101, 119, 137, 150, 161, 182, 227
Unknown (25-vers-hoogte-kaart-nederland)	78
Unknown (After Eshuis 1963)	138
Unknown (After Rinsema & Van Houten 1959)	91 l + r
Unknown (After YouTube)	158 l + r
Unknown (Public domain?)	66
Vereniging Nederlands Cultuurlandschap	236
Wageningen University & Research (WUR)	140 t + b, 154, 198, 199
Wageningen University & Research (WUR) - Pudoc (G.A. Oosterbaan)	196
Wikimedia Commons	2, 3, 4, 7, 17, 18, 25, 26, 35, 38, 42, 43, 44, 45, 48, 59, 60
Wikimedia Commons, B. de Vries	157
Wikimedia Commons, Watersnoodmuseum	76
Zeeuwse Bibliotheek, Beeldbank Zeeland	68