A Capitalist Escape from Disaster? Agrarian Capitalism and coastal floods in the Low Countries (13th-18th centuries)

Tim Soens, University of Antwerp (B) – University of Utrecht (NL)
(tim.soens@uantwerpen.be; t.e.g.soens@uu.nl)

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1. Introduction: flood disasters and the rise of agrarian capitalism

Medieval authors were fascinated by floods, and left us with a huge number of flood reports which since have been compiled in gazetteers (Gottschalk 1971-77, Buisman 1995-2006 and digital indices like www.tambora.org). Their claims on damage and victims are largely unverifiable (Rheinheimer 2003), but seem supported by the huge number of deserted medieval villages and farms revealed by coastal archaeologists (Rippon 2000; Meier 2000). By the time more reliable data on damage, victims and economic output become available, flood disasters occurred less frequently and were less deadly. In the meanwhile most of the coastal marshlands had been transformed from 'peasant' societies of owner-occupied smallholders into regions of large-scale farming, mostly organized in capitalist social property relations, in which the access to labour, land and capital were market-dependent (Soens, Tys and Thoen 2014, for Southern England, see Dimmock 2014). Did flood disasters pave the road to agrarian capitalism in the North Sea Area? And did agrarian capitalism subsequently shape the social, economic and institutional conditions eventually leading towards an escape from disaster? In a recent article in *Continuity and Change*, Piet van Cruyningen (2014) argued that the history of flood disaster in pre-modern Zeeland (NL) might offer an example of the way agrarian capitalism could indeed produce a more resilient dealing with natural hazards, successfully avoiding most large-scale disasters and mitigating the impact of others. For the Christmas flood in Northern Germany and Groningen in 1717, Manfred Jakubowski-Tiessen (1992) also argued in a similar way that the damage of the Christmas Flood also laid the foundation for renewed economic growth and welfare in the coastal marshes, as the accumulation of land by wealthier landowners improved economic 'stability'.[1]

[1] Jakuboswki-Tiessen 1992: 200: *'Viele hoch verschuldete, nicht mehr existenzfähige Bauernhöfe wurden aufgegeben und von neuen, kapitalkräftigen Besitzern übernommen, wodurch wieder eine stabilere wirtschaftliche Grundlage dieser Landschaften geschaffen wurde*"

The argument that disasters not only brought misery and distress, but often also were a force of change, and sometimes even a 'force for good', is increasingly gaining importance in different fields of disasters studies (e.g. Deryugina et al. 2014 on Hurricane Katrina; Miao and Popp 2014 on technical innovations in the wake of disasters). Disasters would often have provided the shock needed to correct *suboptimal* institutional, economic and social development – a controversial idea violently attacked in Naomi Klein's 2007 *'the shock doctrine'*. In historical studies on disaster as well, such argument is sometimes echoed, for instance in recent reappraisals of the economic impact of the Lisbon 1755 Earthquake (Pereira 2009; Aguirre 2012). While Alvaro Pereira (2009) estimated the economic impact of the Lisbon Earthquake of 1755 at between 32 and 48% of the Portugese GDP, he also claimed that the earthquake increased wage levels (though only for skilled labour in the building industry), and reduced Portugal's economic dependency from Great Britain (notably reducing the import of textiles). In the end such analysis does not learn us a lot about the success of the Portugese society in overcoming the impact of the disaster, as it remains unclear whether different societies than Portugal would have done better or worse in a comparable situation and if the Portugese reaction was 'successful', which characteristics of Portugese society generated this success? (See Van Bavel and Curtis, forthcoming).

The history of coastal flood disaster in the North Sea Area between the 13th and the 18th century offers a perfect test-case to investigate such argument, as we have two different types of societies in the same region faced with the same kind of natural challenge: floods. In this paper the impact of major flood disasters in the Low Countries is reconsidered to question whether

(A) the flood disaster was indeed the shock leading to structural social and economic changes

(B) whether agrarian capitalism subsequently was better able to cope with the hazard of flooding in a coastal marshland environment (and if so, why?).

Our argument in this paper, is that both coastal peasant societies and capitalist societies could be quite successful in the mitigating the economic impact and the social disruption of flood protection. Both are characterized by a high degree of economic and geographic localization, mitigating the impact of floods. Most problems did occur when the institutional framework of flood protection, was conflicting with the social relations that prevailed in that particular society. At the same time we also argue that the 'measurement' of success is highly complicate, as the definition of what is 'success' remains to a large extent 'endogenous' to the type of society investigated. The success of peasant societies to cope with flooding cannot be judged by the same criteria as a capitalist society.

In this paper we will focus on major flood disasters which typically affected more than one Ancien Régime *province.* Such floods occurred in the 15th century (like the 1404 'Elizabeth' flood) as they occurred in the 18th century (the 1717 'Christmas' flood). Their death count is variable, depending on the circumstances – floods during nighttime are much more deadly,

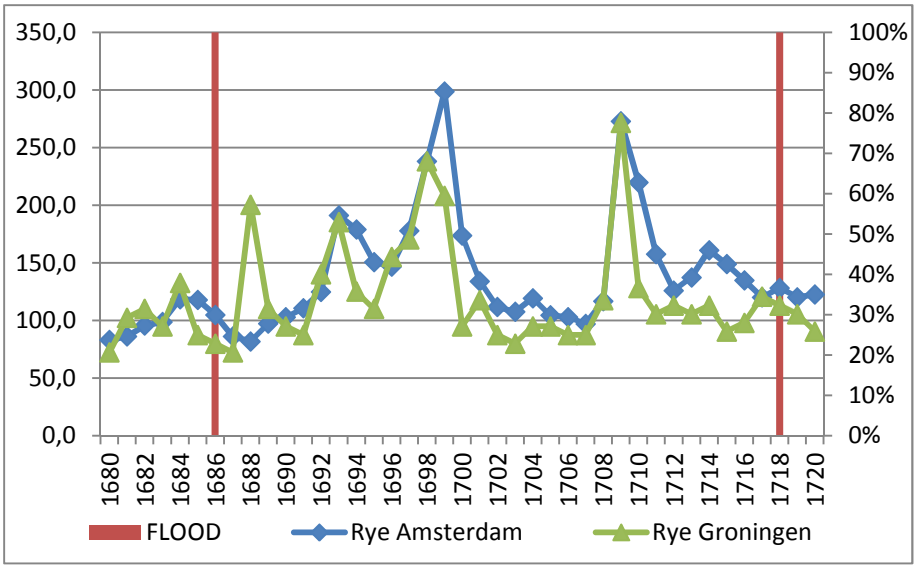
but they each caused the life of between 100 and 12 or 13000 death (the latter being the death count of the 1717 flood).

2. The limited macro-economic impact of flood disaster

Assessing the economic impact of flood disasters remains highly difficult. Coastal marshes often constitute only a small part of a broader economic region, the economy of which is not solely dependent on the events in the marshlands. Most data on economic output are only available on a more aggregate level (a state or a province), which are difficult to disintegrate in data on coastal and inland districts, and flooded and non-flooded regions**.** Fourthly, and perhaps most importantly, in the relationship between disasters and economic development indicating co-variation is much easier than proving causality. In one of the few articles on the economic impact of pre-modern flood disaster - Bailey (1991) argued that repeated coastal flooding certainly *contributed* to a stagnation and decline of agricultural output in Southern England between 1280 and 1350, hence *before* the Black Death. But 'contributing to' does not yet mean 'explain'. There are always other variables which at least co-produced the economic problems observed (Campbell 2010). Many flood disasters are for instance intimately related to periods of warfare or political turmoil. In such case, social and economic disturbances in the wake of the disaster might be caused by warfare rather than floods (see Gutman 1980 on war and natural hazards in the pre-modern Low Countries and Cavallo et al., 2013 for the same issue today).

Using prices of agricultural products, it can be demonstrated that the (macro-) economic impact of flood disasters in the Low Countries was minimal already by 1400. The 1404 'Elizabeth' flood was probably the largest flood disaster not related to war affecting the coastal plain surrounding Bruges in the 15th century. The impact on wheat prices in Bruges – wheat being the main staple cereal produced in the coastal plain – was nonexistent: grain prices in 1403, 1404 and 1405 were relatively low, and no significant change was recorded between 11/11/1404 (40 d. groten Vlaams per *hoet*) and 02/02/1405 (42 d. groten) – while the Elizabeth flood had taken place on the 18/19-11/1404.[2] The most deadly flood disaster in the history of the North Sea Area, probably was the 1717 'Christmas' Flood, causing between 11399 and 13352 victims mainly concentrated in Groningen and the adjacent marshland economies of East-Frisia, Oldenburg, Bremen and Schleswig (Jakubowski-Tiessen 270 versus Buisman: 453). Jakubowski-Tiessen (1992: 148ff) indicates an almost complete annihilation of agricultural production in 1718 followed by a serious reduction during the following years. The impact of both 1717 and a previous flood disaster – the Martinus flood of November 1686 which was almost equally destructive in Groningen – on the grain prices in Groningen was also non-existent, although the prices of (slaughter) cattle were higher in 1718.

[2] http://www.iisg.nl/hpw/data.php#belgium



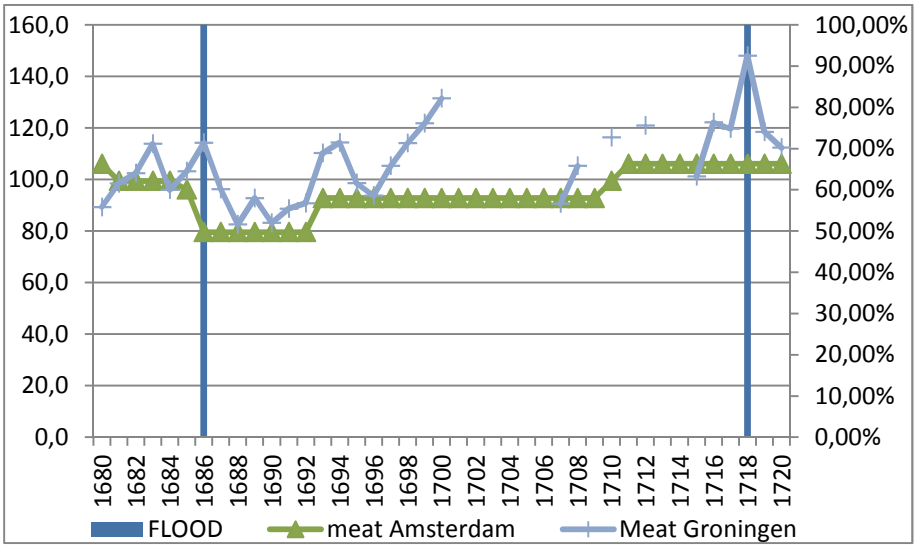


Figure 1A and 1B: Flooding and agricultural prices in Groningen (prices W. Tijms (2000) - http://www.rug.nl/research/nederlands-agronomisch-historisch-instituut/download compared to Amsterdam prices (prices J.L. Van Zanden - http://www.iisg.nl/hpw/data.php#belgium)

Most of all, this indicates that markets for agricultural products in the coastal economies of the Low Countries were integrated in such a way that even the worst flood disasters hardly affected prices. And this was already the case in the early 15th century.

But what about the agricultural output in the areas directly affected by the floods? Apart from accounts of direct exploitation (which are scarce in the Low Countries before the 18th centuries), tithes probably offer the best indication of agricultural output. Tithe data have been used mostly for the establishment of evolutions in the medium or long term (Zie , but can also provide valuable information on the impact and recovery from short-term shocks

like floods.[3] For Coastal Flanders, Kristof Dombrecht (2013) recently reconstructed a long-term series of cereal tithes for the coastal villages of Heist – one of the few long-term tithe series unambiguously focusing on a coastal area. In 74 cases - on 439 yearly observations – annuals profits fell below 75% of the average income in the 20 preceding years. In 27 years – including most dramatic and lasting collapses, like 1383-87; 1484-88/1491-92 and 1601-04 – (civil) war explains the decline of tithe profits. In 34 other years we do not know the reason. In some cases a legal conflict stops the proper collecting of the tithe (e.g. 1443-1445). In minimum 9 and maximum 13 years, flooding caused the drop in tithe receipts. 1391 was the first flood visible in the series, 1714-15 the last one. Three flood episodes - 1404, 1421/24 and 1509/11 – led to a significant reduction in tithe profits which lasted for more than one year (although this might be caused by consecutive flood events in these years). Based on the Heist data, one could conclude that disturbances through floods were not only less frequent but also less intensive than those caused by warfare: tithe profits on average fell to 46% of the average compared to 28% in the years of war. Most flood events seem concentrated to the late 14th to the early 16th centuries, although this is also true for the other sources of disturbance (warfare notably). Furthermore, the 18th century stands out as a more stable period. In comparison with the later Middle Ages however, cereal farming in this area has been reduced significantly (in the 14th century, the tithe yielded the equivalent of about 4000 litres of wheat per annum against only 2000 in the 18th century). It remains to be questioned to what extent such considerable reduction of arable farming – probably to the higher and better grounds - helped to decrease the vulnerability to flooding (and other types of disaster).

[3] On the use of tithe profits for the reconstruction of agricultural output, see Van Bavel and Thoen 1999; Dodds 2007. The Heist-series consists of leased-out tithes, often three-yearly, sometimes yearly. From 1706 the tithe is leased out on a yearly-base. External disturbances of the harvest resulted in reductions on the amount of money due, which have been systematically deducted.

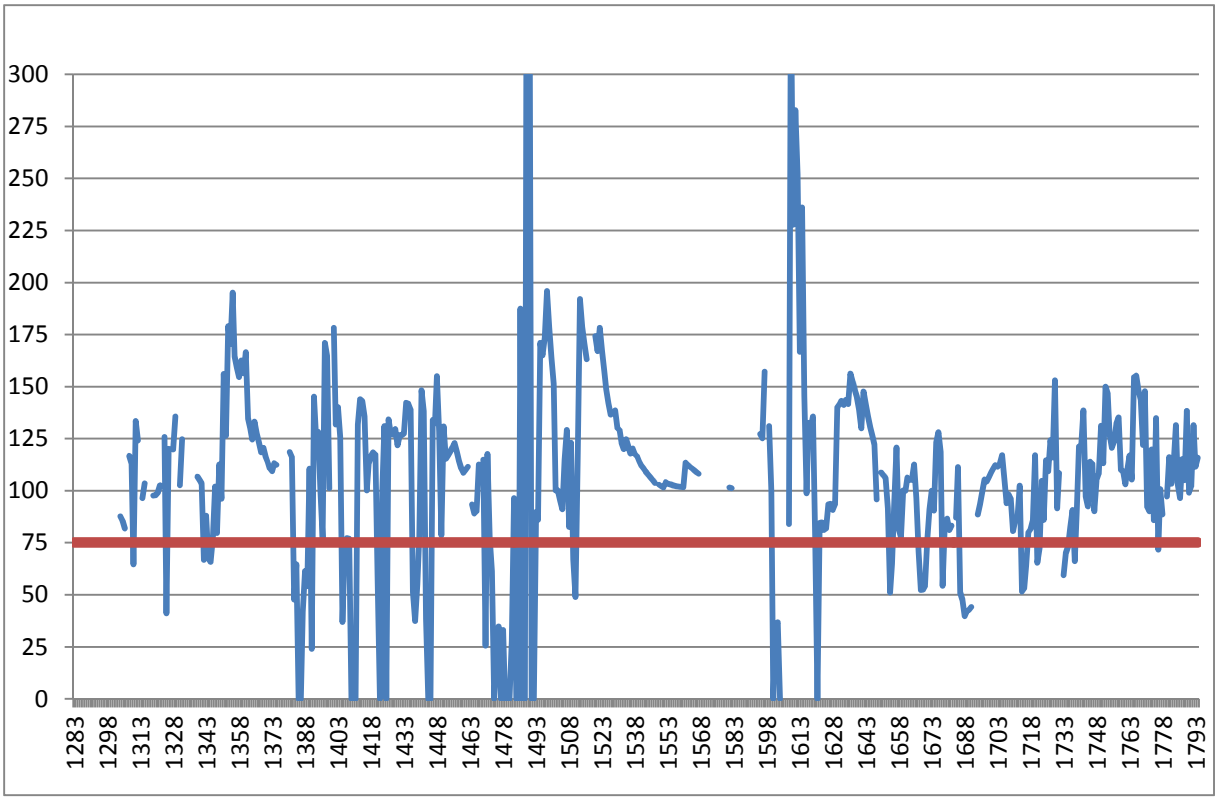


Figure 2: income from tithes in the parish of Heist (Flanders), 1293-1794: % variation to the 20-year average (Source: Dombrecht 2013)

The largest 15th and 16th century floods, clearly had an impact on agricultural output. They are, however, not the kind of apocalyptic events as sometimes suggested in literature. Floods were usually highly *localized* events. For the region of Oostburg (western Zeeland Flanders), detailed tithe records – leased out annually 'on the field' in early summer - from the Ghent abbey of St. Peter allow to reconstruct the impact of a major flood catastrophe like the 19/11/1404 Elizabeth flood, Table 1). Within the region of Oostburg, which, according to the work of M.K.E. Gottschalk as a whole was heavily affected by this flood (1955-58; I and II:7ff), a clear distinction can be made between districts directly affected by the flood (in the southern and eastern parts) and districts unaffected. The harvest after the flood was clearly below average in about half of the Oostburg-tithe districts, and had not yet fully recovered by 1407 (which in the unaffected tithe districts was a good year, combining good harvest with prices that were higher than in the preceding years). In some parts of the region of Oostburg, the 1404 flood hence disturbed economic production for several years. Yet, on a more aggregate level – and when looking from the point of view of a large landowner, with a diversified portfolio of land and tithes – the impact was limited. Vermaere (1978: 34) has reconstructed the long-term evolution of tithes in this district, from the 1395 to 1500. Furthermore, the 1404 flood disaster did not induce economic changes, for instance in the direction of intensification. From 1409 until the mid-1430s, tithe yields were clearly higher than in the decade before 1404, but this merely indicated a period of recovery, which did not reach the output levels of the pre-1370 period. Two further episodes of flooding in

1417 and 1424 would equally disturb output levels, but each time a swift recovery followed (Vermaere 1978).

Tithe District	**1402**	**1405**	**1407**	**1402**	**1405**	**1407**
Beyderwaan-Oostende & Westende	2448	1800	2088	7642	7117	6880
Noerdambacht-zuidende	1440	720	936	4495	2847	3084
Oost-Boesscuere	1584	720	1152	4945	2847	3796
Oostvrabersdijk	2400	1200	1584	7492	4745	5219
Oostmiddelloop	3120	1584	1728	9739	6263	5694
Oostpolder	1620	360	936	5057	1423	3084
Scuerloop-Noordende	1440	972	864	4495	3843	2847
West-Boesscuere	1368	528	864	4270	2088	2847
Westvrabersdijk	2088	1008	1584	6518	3986	5219
Total 1	**17508**	**8892**	**11736**	**54653**	**35159**	**38670**
Oostgroede	2484	3024	3168	7754	11957	10439
Proostpolder	1440	2160	2232	4495	8541	7354
Scuerloop-Zuidende	576	1008	1296	1798	3986	4270
Westgroede	2448	4320	4680	7642	17081	15421
Westmiddelloop	1872	2016	1944	5844	7971	6406
Westpolder	2088	2520	2880	6518	9964	9490
Zuudloop	1152	1008	1008	3596	3986	3321
Baarzande	2160	1728	2448	6743	6833	8066
Bardinghewech-noordende	648	1008	864	2023	3986	2847
Bardinghewech-zuudende	1440	1632	1296	4495	6453	4270
Total 2	**16308**	**20424**	**21816**	**50907**	**80757**	**71884**

Table 1: Tithe profits in various tithe districts in the region of Oostburg (Zeeland-Flanders), 1402-1407 , nominal and converted to wheat quantities[4] (Source: Ghent, State Archives, Sint-Pietersabdij, Rekeningen n° 1512)

3. Agrarian capitalism and the economic and geographic *localization* of flood disasters.

Localization seems the main reason why the macro-economic impact of floods was limited already by 1400 (in an agrarian economy which was still predominantly non-capitalist – although one heavily under pressure, see table 2). In disaster studies localization is both

[4] Conversion made using wheat prices in Bruges from the current year (50%) and the average of the preceding 5 years (50%), compare Thoen 1978. The conversion hence reflects – somehow - the harvest as estimated by the tithe farmer at the beginning of the summer, as he presumably based his bid on the quantity of the harvest + the grain price of the preceding years + the estimated grain price of the current year. One tithe district (Noordambacht-Noordende) was excluded as data were incomplete.

related to a geographic process – limiting the areas exposed to disaster – and an economic process – economic integration reducing the impact of disasters which only affect part of the economic system (Albala-Bertrand 2007) is both an economic – linked to the degree of interregional economic integration – and a geographic strategy. Agrarian capitalism as it developed in the coastal marshlands of North Sea Area, increased this localization, both through further economic integration, but above all by a spatial dynamics, which was aimed (A) at a distinction between flood-safe and flood-prone areas and (B) the social and economic marginalization of the latter.

In 1404, recovery of agricultural output was swift. However at the same moment, neighbouring areas were abandoned. This was the case for the entire district of IJzendijke, immediately adjacent to Oostburg. At first sight this contrast between swift recovery in one region, and complete abandon in a neighbouring one is surprising, but it is perfectly explained when looking at the huge difference in land value: 69 Flemish *d. groten* in IJzendijke compared to 101 in Oostburg. The accounts also inform us that finding suitable tenants in IJzendijke had become difficult in the years preceding the 1404 flood[5].

Farm Size 1402-03	**0-1 ha**	**1-3 ha**	**3-5 ha**	**5-10 ha**	**10-15 ha**	**15-25 ha**	**Total**
Ijzendijke							
N	36	11	3	0	0	0	50
tot ha	16	20	10	0	0	0	46
% ha	35	44	22	0	0	0	100
Lease (d. groten/ha)	67	74	69	0	0	0	69
Oostburg							
N	16	48	26	7	3	4	104
tot ha	9	87	103	46	36	85	365
% ha	3	24	28	12	10	23	100
Lease (d. groten /ha)	131	103	89	101	51	75	101

Table 2: size and value of land leased out by the Ghent abbey of St Peter in 1402-03 (Source: Ghent, State Archives, Sint-Pietersabdij, Rekeningen n° 1512)

Important in this story, is that coastal Flemish smallholders decided autonomously about the cultivation of their plots, but that the decision to repair dikes or abandon areas, was no more in their hands: by the early 15th century, landlords like the abbey of St Peter were in firm control of the water management organisation, and decided whether or not to invest money in dike repair (Soens 2009; 2013). After 1404, no effort was made to recover the IJzendijke-district, apart from the least affected (and/or highest valued?) part of it (near Gaternisse). Only in 1431, St. Peter Abbey would invest again in the area, as participant in

[5] Item I m LXXV r. ligghende Neffens Pieters Brunen lande enden den hoeftwaterganghe het leghet vaghe mids dat so smal es ende niet gheweghet ***ende inde selve contreye leghes vele te verpachtene***

the embankment of a new polder - 'Ijzendijke-polder' – hence recovering a small part of the previous district of IJzendijke.

In 15th and 16th century Flanders, capital investment was increasingly concentrated in areas which were considered flood safe, and areas which were considered flood prone were increasingly isolated and marginalized. This is perfectly illustrated by the differential evolution of land prices: whereas in 1450 lease prices where 40% higher in the flood-prone Oude Yevene district compared to the flood-safe Blankenbergse region, by 1570 lease prices in the latter area exceeded the former by 60% (Soens 2011: 347). Based on the studies by Dekker and Baetens (for 16th century Zuid-Beveland), Van Cruyningen (2005/06; 2013 and 2014) for Zeeland-Flanders; Soens and De Graef (2015) for the 17th century Waasland polders in Flanders, it seems safe to argue that investors avoided risk and uncertainty as much as possible. They avoided periods of war, ongoing legal fights about the status of land, diffuse property rights, and they avoided flood-prone regions. As a result urban landownership and capitalist social property relations expanded most rapidly in low-risk regions: the polders of Furnes, for instance (with 90% leasehold already in the 16th century: Vandewalle 1986), or the village of Oostkerke near Damme (Soens 2009), where by 1570 smallholding had been completely erased. Since the Zwin was dammed near Damme around 1180, Oostkerke was one of the most flood-safe areas in the Flemish coastal plain.

hectare	N farms	% farms	Land (ha)	% land
min 1	3	4,0	2,0	0,2
1 tot 2	5	6,7	7,5	0,6
2 tot 3	5	6,7	11,1	0,9
3 tot 4	4	5,3	14,5	1,2
4 tot 5	1	1,3	4,4	0,4
5 tot 10	20	26,7	145,3	12,4
10 tot 20	11	14,7	140,1	11,9
20+	26	34,7	850,4	72,4
Total	75	100,0	1175,2	100,0

Table 3: landholding in the village of Oostkerke 1570 (Soens 2009).

Apart from marginalizing flood-prone areas (and through this process reinforcing their flood-prone character), the increasing localization of flood risk was also fostered by the extraordinary dynamics in drainage between the 15th and the 17th century. Such drainage projects, either aimed at the embankment of tidal flats (marine and estuarine *polders*), or the windmill drainage of interior lakes and flooded peat districts (*windmill polders* or *droogmakerijen)*, created 'islands' of 'modern capitalist farming', materialized as 'polders' or windmill-drainage projects ('droogmakerijen'). These islands of modern – and capitalist – farming protected relatively small areas from flooding through their own system of flood protection. The creation of 'polders' precedes the rise of agrarian capitalism. Nevertheless, a striking difference exists between pre-capitalist projects – initiated by village communities or

groups of farmers - and capitalist ones, initiated by outside-investors. Whereas village communities usually left a certain amount of saltmarsh in front of the sea-wall for reasons of economic profit (pasture, fowling, fishing, reed cutting), capitalist projects maximized the cost-efficiency of the embankment: the larger the area reclaimed, the lower the cost per hectare (Jongepier 2015 for 17th century polders in the Waasland area (B); Ehrhardt 2007: 123ff for an interesting case-study in 17th century Würsten along the Weser). Maximal reclamation of foreland usually increased flood risk. However, as the process was endlessly repeated, only the most recent 'polder' was subject to flooding, whereas the older ones were no longer exposed directly to the sea or the estuary. And indeed, there are plenty of examples of new polders (and new windmill drainage projects) initiated by consortia of urban (or noble) investors and organized for capitalist agriculture, which flooded either during construction or in the first decades after the construction. Dike breaches and floods in newly constructed 'state-of-the-art' polders can be found from the Beierlanden in South-Holland (Baars, 1973: 30-66) over the 1682 and the 1714/15 floods in Zeeland and Flanders, to the Holland district of Lincolnshire (along the Wash in Eastern England) in 1811 (where coastal flooding returned again after centuries of limited coastal flood problems, not by coincidence a few decades after reclamation had been restarted - Grigg 1966: 23). The flood risk was hence localized in the most recent polder. If the reclamation process came to an end (for instance because the economic context no longer allowed further investment), this polder was permanently endangered, and typically had to be 'rescued' by the state, as Piet van Cruyningen (2014) recently demonstrated for the so-called *'Calamiteuze polders'* in Zeeland.

Another illustration of the geographic localization of flood risk through the capitalist early modern reclamation dynamics, is offered by lake drainage in North-Holland during the Republic: drainage of interior lakes on the one hand increased fresh water problems in neighbouring regions, but on the other hand relied on the outer sea-walls of these neighbouring regions to protect them from outside floods. Flood safety in the drained lakes hence was realized at the expense of the older – neighbouring – lands (see for instance De Bruin and Aten (2004) for the 1675/76 floods in West-Frisia; Van Zwet 2009).

4. The economic recovery from flood disasters: capitalist and non-capitalist polders compared.

From what precedes it is clear that dike breaches and storm floods occurred in capitalist polders as well. They were localized, and did not disrupt regional economic output. In Zeeland-Flanders for instance, the impact of the 1714 and 1715 floods on the export of cereals was minimal. In fact, in 1714, the export recovered from a low point in 1713, and from 1715 onwards boomed as never before (Van Cruyningen, 2000: 412-414). However, as we have seen above, this limited macro-economic impact was not different after pre-capitalist floods. How different was the recovery of agricultural output in those *localities* which had been flooded? A unique chance to compare the impact of floods in both 'new'

capitalist polders and 'old' medieval marshlands, which at least partly were still occupied by peasant smallholders, is offered by the Land van Putten in Southern Holland in the aftermath of the 1570 'All Saints Flood'. In the administration of the count of Holland, tithe data for 116 individual districts ('blokken') in this region have been preserved. In 1570, the Land of Putten consisted partly of old medieval embankments (Ring of Putten and Poortugaal in the table above) and new polders, created in the 15th and 16th century (Uitslag, Nieuwe Uitslag, Charlois, Dirk Smeekensland etc.). In these new polders urban and noble landownership and leasehold-farming dominated from the very beginning (see Pons 2003: 106-107 for nearby Riederwaard). In the old land of Putten and Poortugaal as well, urban landownership land was on the rise. According to Van Der Gouw (1967: 80-81), absentee landowners headed by the Bronchorst family greatly expanded both their landownership and their grip on the water board in the mid-16th century (the Bronchorst family even became perpetual *hoogheemraad)*. As we will see below, however, smallholding still persisted in parts of the old lands in 1570. The impact of the 1570 flood in the Land van Putten was heavy, as witnessed by two detailed reports, the one by the local *rentmeester* Andries Van Der Goes and the other by commissioner Ernst, to the infamous governor of the Low Countries Fernando Alvarez de Toledo, duke of Alba (Gottschalk 658 ff). Both of the reports agree that most of the region was flooded. Victims are only mentioned in Simonshaven, where the breaching of an outlet sluice killed 25 people. Based on their experience of the 1530, 1532 and 1552 floods, the landowners argued that the land would be useless for arable farming for ten years.

Tithe receipts however refute this argument. Notwithstanding a political context which was uttermost troubled – in 1571 much of Holland no longer obeyed Alba's government – arable production in many districts was resumed as quickly as possible: only 14 of the 116 tithe districts generated no profit in 1571. Even in Simonshaven, the five tithe districts still generated 90 fl. in 1571 (compared to 129 fl. in 1570). In total, tithes in the Land van Putten generated 3103 fl. in 1571 against 3506 fl. in 1570 (and 2971 fl. in 1572). In the end, part of these sums could never be collected, but this had little to do with the impact of floods, but rather with the political turmoil and the reduction of the tithes (25 to 50%) granted by of the Duke of Alba to the farmers.[6]

	Ring of Putten	Putten 'Uitslag'	Putten 'Nieuwe Uitslag'	Piershil	Poortugaal	Charlois	Dirk Smeekensland
Year	**Tithes (guilders)**						
1570	1216	151	359	355	357	535	52
1571	1403	145	422	404	236	248	0
1572	967	109	323	298	277	672	120
	Acreage sown (ha)						
1570				193	220	245	26
1571				188	140	105	0
1572				133	134	234	59

[6] In 1571 and 1572 1143 fl. and 1218 fl. respectively was remitted.

Table 4: Tithe Receipts in the Land van Putten (1570-72): total receipts in guilders and arable acreage sown (Source: NA Den Haag, Grafelijkheidsrekenkamer, Rekeningen, n°2530-32).

The new polders seem equally vulnerable to flooding as the old ones: whereas the Uitslag and Nieuwe Uitslag did well, in Charlois and Dirk Smeekensland the harvest of 1571 was particularly limited. In the new polders, the divergences between individual tithe districts were significant. For instance, in the polder of Charloi, drained in 1462 in 9 out of 15 districts the area cultivated with cereals fell below 35% in 1571, compared to 1570. In five districts the decline was less pronounced, and in one district, the area sown with cereals was larger in 1571 compared to 1570. As data for other recent polders point in the same direction, this might indicate that the larger tenant farms of the new polders, were more prepared than their smallholding colleagues on the old land to cut back arable production after floods (only to restore it when conditions were better).

District	Acreage sown 1570 (ha)	1571 (as % of 1570)	1572 (as % of 1570)
Charlois_01	16	*74*	*131*
Charlois_02	23	*57*	*96*
Charlois_03	12	*89*	*137*
Charlois_04	19	*32*	*159*
Charlois_05	26	*11*	*49*
Charlois_06	16	*63*	*67*
Charlois_07	19	*103*	*140*
Charlois_08	18	*56*	*87*
Charlois_09	21	*29*	*67*
Charlois_10	5	*0*	*230*
Charlois_11	18	*34*	*50*
Charlois_12	23	*31*	*22*
Charlois_13	11	*15*	*27*
Charlois_14	12	*0*	*120*
Charlois_15	7	*0*	*307*

Table 5: area sown with cereals in the tithe districts of Charloi (Land van Putte, 1570-72) (Source: ibidem).

5. The social impact of flood disaster: the return of survival strategies.

The impact economic production is only one aspect in the resilience to flooding. We also have to take into account the amount of social disturbance and dislocation caused by the disaster, and the changes in the social structure induced by flood disasters. Studying the amount of dislocation and social disruption for pre-modern flood disasters, is far from evident. The first reliable data on victims only date back to the sixteenth century, and even

for the more recent floods, social profiling of victims is seldom possible. For the district or *Ambt* Esens in East-Frisia (Niedersachsen, D), Homeier (1970) could link the victims of the 1570 Flood to the cattle they owned.

Cattle Units	Households affected (%)	households with fatal casualties (%)	% killed	% destroyed houses	% dead cattle units
0-2 cattle units	24,4	54,4	37,8	81,6	73,2
3-11 cattle units	26,1	40,6	34,8	61,7	76,9
12-33 cattle units	24,4	28,8	22,7	33,6	59,3
34-119 cattle units	25,1	4,7	4,8	7	49,3
Total	100	32,1	100	46	54,2

Table 6: casualties (people and cattle) in Esens (East-Frisia) after the 1570 Flood (Based on Homeier 1970: 69; Rheinheimer 2003: 17).

In 1570 Esen, already was a society of large farms, with 84% of the land concentrated in farms over 20 hectares. Their occupiers were not tenant farmers, but rather landowning yeomen, with a voice in representative organizations (Knottnerus: 7-8). Half of the district's households lost cattle, and one in three households lost one or more of its members. The data present a clear social bias: the larger farmers were seldom killed, probably largely because their houses were stronger and located on safer locations. They also lost substantial amounts of cattle, but relatively less than the poorer villagers.

Lacking comparable data for other floods it's difficult to conclude whether the differential social impact of the 1570 flood in Esens was typical for a polarized society dominated by large farmers. The number of dead was particularly high when a flood struck by surprise, usually at night. At that moment, the location and quality of the house were probably decisive for the chance of survival. The cottages of agricultural labourers often proved very vulnerable. In contrast to many farms they were not build on a higher location, but instead they were often grouped on marginal, low-lying spots, close to dikes. Even during the 1953 flood in Zeeland, the death count among agricultural labourers was disproportionally high for this reason (Slager 2003).

Nevertheless, we have to distinguish between the direct casualties caused by a flood disaster and the highly differential impact of the flood on different types of victims. flood. For three major flood disasters - Oostburg in 1404; Putten in 1570 and the Hunsingo district in Groningen 1717 - we analyzed the mobility and continuity of different categories of tenants and the – possible - reorganization of holdings following the disaster. In Oostburg, the tenants of S. Peter Abbey took leases for six years. Normally 1405-06 would have been the last year of six, but many leases were renegotiated after the flood, mostly linked to a deal about the partial recovery of leases for 1404 and 1405. In 1408 about 40% of the plots were leased by a different tenant compared to 1402. But, in those parts of the district which

had actually been flooded, up to 75% of the land had changed hands. As Lies Vervaet (2015: 289) recently showed for the tenants of the hospital of St. John in Bruges, a high mobility of tenants - less than 50% staying more than ten years - was usual in the early 15th century, and floods merely accelerated this process.

	CONT	CHANGE	CHANGE (FAM)	Total	% CHANGE
1402-03	**227**				
1405-06	185	37	5	227	18,50
1408-09	169	55	5	229	26,20

Table 7: (dis)continuity of several types of farmers after the 1404 flood in Oostburg (Source: see table 2)

The 1404 Elizabeth flood did not introduce a concentration of landholding in this region. On the contrary: the share of the larger tenants (holding more than 15 hectares of land) declined, predominantly to the advantage of a 'middling' group of tenants holding between 5 and 10 hectares of land (who saw their share in the land increasing from about 12% to 27%). After the 1404 flood some larger holdings – like the one by Pieter f. Boudin f. Arnoud who had leased 9 different plots, totaling 23,5 hectares – fragmented again, and were held by different tenants. The position of the small farmers (below 5 hectares), in contrast remained virtually unchanged. By 1443 the importance of the larger tenants had further diminished, but then the distribution of land started to change, and larger tenants rapidly expanded at the expense of both middling groups and smallholders. The figure below shows the massive changes in the social distribution of land in coastal Flanders during the late 15th and the 16th century (see Soens and Thoen 2008; Soens 2009). Whereas the long-term evolution was one towards engrossment of holdings, the direct effect of major crises – the 1404 flood and the civil war of 1482-85 - apparently was a reduction of their grip on land.

In contrast, the less devastating floods of 1446 and 1509/11 did seem to accelerate engrossment.

Figure 3: Oostburg estate of the Ghent abbey of St. Peter: % of land held by larger tenants (each holding more than 15 hectares of land) (Source: Ghent, State Archives, Sint-Pietersabdij, rekeningen, 1512-1523).

In the other cases as well we observe that large tenants were equally, and probably more vulnerable to disaster than smallholders. Data from the Land van Putten during the 1570 'All Saints' flood confirm this picture. In Poortugaal and Oude Vliet the count of Holland leased out 41 hectares of land, which were heavily affected by the flood. After the 1570 flood, only 5 of the 15 tenants were able to continue their lease, four of which hired tine pieces of land.

	0-1 ha	1-5 ha	5-10 ha	10ha+	Total
1570					
N	**7**	**5**	**2**	**1**	**15**
Tot ha	**5,0**	**11,3**	**14,0**	**10,9**	**41,2**
1571					
N	**7**	**7**	**1**	**1**	**16**
Tot ha	**5,6**	**14,6**	**5,3**	**15,7**	**41,2**
Continuity	**4**	**1**	**0**	**0**	**5**

Table 8: Land van Putten (South-Holland): land leased out by the count of Holland in 1570 and 1571 (source: NA Den Haag, Grafelijkheidsrekenkamer, Rekeningen, n°2530-32)

The two most deadly floods of the 17th and 18th century occurred in November 1686 (*Martinus*-flood) and December 1717 (*Christmas*-flood). On both occasions, the highest number of death were recorded in the Hunsingo-district of Groningen: 640 death in 1686 and 1942 in 1717. As such Hunsingo was probably the district most severely affected by flooding in the Early Modern Low Countries. Much of the land in Hunsingo was owned by

institutions (41,4 % in 1755, including the province of Groningen who had inherited most of the landed property once belonging to ecclesiastical institutions dissolved during the reformation), local nobility ('jonkers', 16,7%) and citizens from Groningen (15,2%) (Paping 1995: 184). Tenant farmers had however developed a hereditary claim on their farms, the so-called 'beklemrecht'. Through the payment of an entrance fee - since 1711 worth two times the annual lease - new tenants or *'beklemde meiers'* - entered their tenancy on the same conditions as their predecessors). Already in 1630 large farms predominated agriculture, with 70% of the land used by farmers with holdings over 20 hectares. Through the administration of the provincial land, we get a glimpse of the social impact of both floods, which caused so many victims in this region. In the years following the flood, many leases were renewed, and the considerable debt owed by the tenants was negotiated. Of the 111 holdings investigated 38 changed hands between 1717 and 1721. About half of the new tenants enters – exceptionally – without paying an entrance fee. Some lands were used temporarily by another tenant after the flood. Only seven of the new tenants are identified as sun of daughter of the previous tenant.

Who were the old tenants which left their tenancy after 1717? Were they killed during the flood? Most probably not. The accounts mention only one tenant – Duirt Willems, hiring 12,5 hectares near Kloosterburen – who was dead, and whose debt of fl. 48 could not be recovered because he had 'lost everything'. And the farm of Jacob and Aaltie Luitien in Leens (22 hectares) was let to Nanne Jurjens who reimbursed the former tenant for the stones of his house which apparently had been destroyed during the flood.[7] In contrast, most of the former tenants continued to be mentioned in the accounts for payment of arrears, indicating that they were still alive. Quite remarkably, mobility was as high or even higher among the larger tenants, with holdings of more than 20 hectares. It's highly unlikely that these larger farmers were disproportionally killed during the flood. Apparently quite some larger farmers were compelled to abandon their holding in the aftermath of the 1717 flood. There was however no rush on the land of former tenants and neither a sign of any significate redistribution of land in the aftermath of the disaster. Only one clear case of engrossment can be found: in 1719 Rinje and Frauke Halsema, tenants of the Freddema-house in Kloosterburen, enlarged their considerable holding of 75 hectares with the land of Jacob Jurjens (27 hectares). In 1722 a further extension followed, with the land of Clais Hindric (42 hectares). Halsema hence became by far the largest farmer in our sample, but overall his acquisitions remain exceptional, and the fate of the many other large farmers who were on the verge of economic destruction, was probably much more representative. Following the 1717 flood, the price of land reached a secular low, and in the Groningen system of hereditary lease, this meant a serious blow to the financial assets of the large farmers (Priester 1991). As Jakubowski-Tiessen (1992: 198-200) observed for neighbouring parts of Germany, farmers saw their debts increase significantly, and in some regions – although not everywhere – debts related to the Christmas flood would only be repaid in the

[7] Account 1719: "*de behuysinghe overgenomen als een stienbult bij taxatie"*.

late 18th century. We hence cannot blame – or praise – the Christmas flood of 1717 – for the further engrossment of holdings in this part of Groningen. Only after 1750 – when farming conditions improved considerably – a significant enlargement of scale would take place.

	0-5 ha	5-10 ha	10-20 ha	20-30 ha	30-40 ha	40-50 ha	50+ ha	total
Hunsingo 1630								
N landholders	714	270	284	183	143	107	127	1828
% landholders	39	15	16	10	8	6	7	100
hectares	1561	1896	4187	4505	4939	4786	9554	31428
% of land	*5*	*6*	*13*	*14*	*16*	*15*	*30*	*100*
Hunsingo Provincielanden 1717								
N tenants	7	24	14	17	18	14	17	111
% landholders	6,3	21,6	12,6	15,3	16,2	12,6	15,3	100,0
hectares	28	187	203	413	631	616	1.016	3.095
% land	*1*	*6*	*7*	*13*	*20*	*20*	*33*	*100*
fl. per ha	5,8	4,4	3,1	3,7	3,6	3,8	3,9	3,9
New Tenant (total)	3	3	4	10	3	4	4	31
New Tenant (sun/daughter)				*5*	*1*		*1*	*7*
Gronigen Clay: 24 village sample 1755								
N landholders	774	427	584	495	393	194	150	3017
% landholders	25,7	14,2	19,4	16,4	13,0	6,4	5,0	100,0
Gronigen Clay: 24 village sample 1862								
N landholders	1060	426	475	442	372	238	311	3324
% landholders	31,9	12,8	14,3	13,3	11,2	7,2	9,4	100,0

Table 9: changes in landholding following the 1717 'Christmas' Flood in Hunsingo, Groningen) (Provincielanden: RHC Groninger Archieven, Staten van Stad en Lande, XXX; 1630 data: Curtis, forthcoming; 1755 data: Paping, 1995: 318-320).[8]

In regions of capitalist social property relations – like most of the Flemish, Zeeland and Holland, *polder* regions in the 17th century, flood disasters did not directly induce social changes either, although individual livelihoods could still be greatly disturbed by flooding, as the story below illustrates.

Box 1: Three Tenants, a Landlord and a Dike Breach in 1682

On the 26th of January 1682 a storm-surge hit the coasts of Flanders, Zeeland and South-Holland. Among many other *polders*, many of them newly drained since 1609 (Gottschalk , vol. 3; Buisman, p. 90ff; de Kraker and Bauwens, p. 106). The death-count is unknown, but it probably was not that high (a few hundred?). We only know for sure of 30 death in the surroundings of Veere in Zeeland. One of the recent polders which flooded, was the polder of Konings-Kieldrecht (finished in 1653) and situated on the left bank of the river Scheldt in Flanders. The storm surge caused two giant dike breaches, both still visible in the landscape. This polder was the product of a typical 17th century embankment project, realized shortly after the Peace of Westphalia (1648) by a consortium of urban and noble investors. It was

[8] The provincielanden 1717 sample includes a sample of about 60% of the total amount of land owned by 'Stad en Lande', notably in the villages of Zuidwolda, Noordwolda, Bedum, Menkeweer, Maarhuizen, Maarslag, Onderwierum, Westerwytweert, Stitswert, Nijenklooster, Vierhuizen, Zuurdijk, Warffhuizen, Warffum, Uithuizen, Kloosterburen, Leens and Uithuizermeden. Sampled villages include both villages heavily and less heavily affected by the 1717 flood.

designed for large-scale commercial arable farming, with farms of typically about 30 hectares each, held in short term leasehold by the farmers. As lord of the area, the duke of Arenberg had patronized the project, and in turn had received about 113 hectares of land, which he had divided in three farms. On that 26th of January, Joost van Goethem (53,7 hectares), Joost van Landeghem (37,9 hectare) and Anthoon De Bock (22 hectares) were facing the brutal force of the water. The farm of the Bock was situated right next to the dike breach, and the farmer and his wife could barely saving their lives when the water took away their house, two barns and a stable, with all the lifestock inside, the harvest of grain of 1681 and even the cash money, to be used for the payment of the lease.[9] While the landowners of the Konings-Kieldrecht-polder gathered money to construct a new dike – a difficult enterprise given the two giant breaches - the Duke of Arenberg's administrators negotiated with Joost van Goethem and Joost van Landeghem about a reduction of their lease for 1681 (1/3) and 1682 (full). Both tenant farmers at the same time got a renewal of their lease for nine years (against six in the previous contract), at the old price (26 to 28 fl./ per hectare). This however proved too optimistic, because in 1683 both tenants again received a reduction on their lease (1/4th and 1/3th of the lease), indicating that their farms were still not fully operational two years after the storm surge. Anthoon De Bock fared worse, and the administrators tried in vain to recover part of the lease due for 1681, which did not succeed given the 'extreme poverty' of the former tenant. In 1684 the administrator only hoped to recover some money from the sale of the wood and stone ruins of the farm – farm buildings which had been constructed and owned by the former tenant farmer.

This small story of the 1682 flood in Kieldrecht illustrates on the one hand the vulnerability of new and modern 'capitalist' polders for flooding, but also the successful localization of the economic and social impact of disaster. But it also shows the importance of the 'private' leasehold arrangement between landlord and tenant farmer in allocating the impact of the flood.

6. Institutional Qualities, Capitalism and Flood Disasters.

In the end whether or not a society was successful in coping with a natural hazard like flooding, depends to a large extent of what can be labelled '*institutional qualities*' : is a society capable of organizing a system of flood protection which meets the needs of its members without compromising the needs of the following generations to meet their own needs (to paraphrase the well-known Brundlandt-definition of sustainable development)? As the goals of a capitalist farming economy (production for the market, growth of labour productivity, cost efficiency, maximum profit) are fundamentally different from the goals of a peasant society (direct access to the means of subsistence, growth of physical output, survival of the family, risk avoidance), the institutional framework of coping with flood risk should be different as well. It hence makes no sense of comparing and judging the qualities

[9] Brussels, State Archives, Arenberg, Beveren, Account 1683: *'het ghelt tgone ghereet lach omme op minderinghe van sijnen pacht te connen betaelen selfs niet en heeft connen mede nemen'*

of sets of institutions without taking into account the social context in which they operate (Van Bavel and Thoen 2013).

In peasant coastal societies, both normal dike maintenance and dike repairs were primarily organized through the *Kabeldeichung*-system (*verhoefslaging)*. In this system a dike (sea-wall or river-wall) was allotted to individual landowners, who each were responsible for the maintenance of one part of the dike. Local officials were responsible for controlling the quality of the maintenance, urging defaulting landowners to perform their maintenance duties and punishing trespassers. This system is found from southern England to Scandinavia, and was based on a society of owner-occupied small to medium-sized 'peasant' farms. These peasants also had use-rights on their part of the dike (which they could use as pasture land) and were (usually) entitled to the land in front of the dike, once again a valuable asset (Fischer 2010: 127; Knottnerus 1997). As both ordinary maintenance and most repair works after storms occurred in winter, dike labour could perfectly be integrated in a seasonal, non-specialised, agricultural labor-cycle (see Van Dam 2001:223 based on the model proposed by Lucassen 1985). In times of flood disaster, Kabeldeichung relied on the local presence of large amounts of labourers (being owner-occupiers), each responsible for part of the dike.

In a capitalist model, such system no longer makes sense, as property and use of the land had been dissociated, landowners no longer lived in the area and their tenant farmers no longer disposed of the kind of excess labour time needed for dike maintenance. The shift to a system where dike maintenance is centralized by a local organisation (a water, dike or levee board), which hired external labourers to maintain and repair dikes, and funded its activities through a land tax, is only logic. For large commercial farmers and urban or noble landowners, cash payments seem more efficient than individual labour services. In such system *(centralized maintenance* or *Kommuniondeichung)*, dike labour was no longer supplied locally, but could be recruited from further away, sometimes by full-time (agricultural) wage labourers, but most often by peasants from the sandy inland regions, who still integrated seasonal dike labour in their agricultural (and proto-industrial) labour schedule. In case of a flood disaster, success relied on the capability of the organization to raise enough money and to attract enough labourers. A solidarity between landowner and landuser was needed, to cover the extra cost of the flood disaster, both by paying part of the extra taxes and by granting a reduction of the lease. Leasehold, in this way served as the private insurance mechanism which allowed tenant farmers to survive a flood disaster (Sonderegger 2012 for the role of leasehold as insurance mechanism).

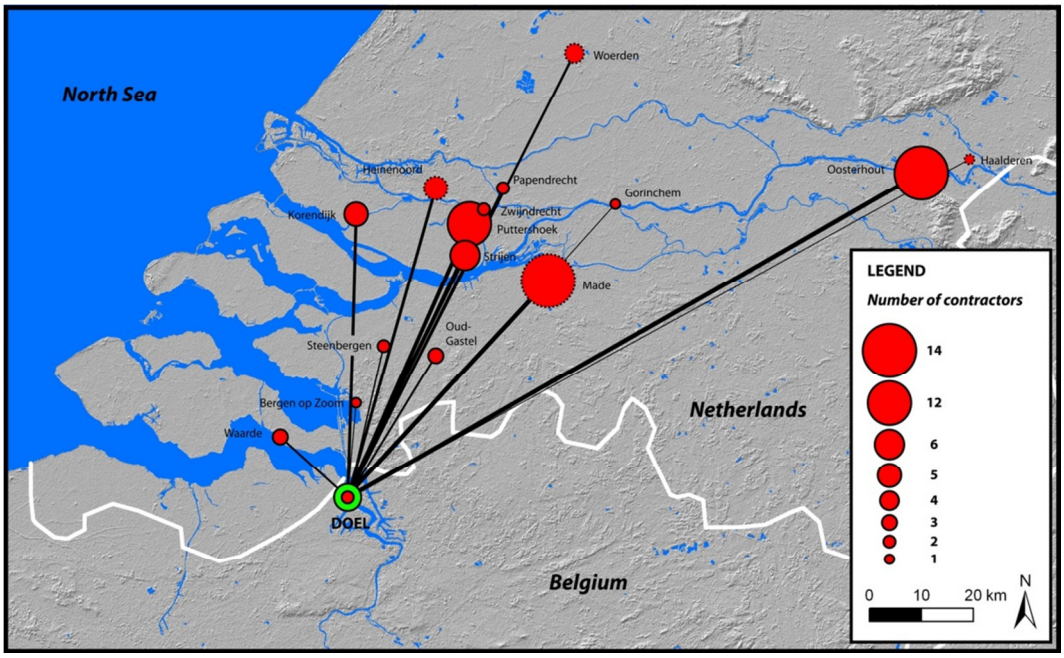


Figure 4: contractors of dike-work in the Flemish village of Doel, 1613-15 (Soens and Jongepier, 2013)

What the history of flood disaster in the pre-modern area shows, is that in many cases, the institutional framework was not adapted to the social context. Whereas in coastal Flanders, the centralization of water management – starting in the 13th century - largely *preceded* scale enlargement in coastal farming (Soens 2009), in many parts of the Dutch Republic centralization of water management lagged behind commercialization of agriculture. Many regions of large scale commercial farming and capitalist social property relations still clung to *Kabeldeichung* (Van Tielhof 2014).

The flood disasters of 1404 in Flanders and 1717 in Groningen offer two interesting case-studies of institutional arrangements which were not adapted to the prevailing social relations. In coastal Flanders, flood protection had gradually been transformed into *Kommuniondeichung* in the late 13th century, first concentrated on drainage, but increasingly also on flood protection (Soens 2009). In the two decades preceding 1404 landowners in the district of Oostburg (the 'Oude Yevene') water board paid on average 41.6 Flemish d. Groten per hectare *per annum* for flood protection and water control. With this money, the water board could employ 9.2 days of unskilled labour *per annum*. However, in 1404, the average landowner (presumably a peasant smallholder) owned 2.4 hectares of land (figures derived from Soens 2011). If this average smallholder had to pay 100.5 Flemish d. groten *cash*, this was a huge additional cost, by far exceeding other types of taxes. Farms below 2.5 hectares will not have produced much surplus that could be sold at the market, so the money needed to pay these taxes had probably to be earned through some form of wage labour. In 1404 and 1405 an even higher tax of 55 and 48 Flemish d. groten per hectare were levied at a moment when the flood had destroyed at least some part of the agricultural production. As such the centralized organization of flood protection was indeed a major threat to peasant

landowners. However, the 1404 evidence shows that it was mostly a problem for the largest peasants, with farms of more than 10 hectares, and much less for the smaller ones. Many of the peasant smallholders were probably able to recover at least part of the taxes they had to pay by working for the water board, but this was much less the case for the larger owner-occupied farmers (and the larger tenants, who often also owned considerable plots of land). The accounts of the water board for 1404 have been lost, but the account from 1407-08 indicates that dike repair was outsourced to contractors in relatively small lots of 12 *roeden* (about 45 metres) of dike each.[10] Probably local peasants either contracted for some of these works directly or were engaged by a larger contractor. Furthermore, the solidarity between landowner and tenant farmer was deficient: the abbey of St Peter did sue its tenants in court, and tried to recover as much of the lease as possible, even for the year of the flood.

As long as labour was recruited locally, peasant smallholders could somehow survive a flood protection system which was not adapted to their way of life. The last explicit evidence of a strictly local recruitment of dike labour dates back to 1442-1443, when the water board of Eiesluis hired 109 labourers without horse and 90 labourers with one or two horses (presumably local peasants). By 1500 however, the recruitment of dike labour had changed profoundly, and not only in Flanders. Both for dike works in Kadzand in 1500 (see Soens 2005/06), and for the repair of a dike burst in Spaarndam in Holland in 1510 (Van Dam 2001), dike workers were recruited in a much wider area, and this would be the rule in most regions throughout the Early Modern period. In such conditions, floods increasingly became problematic for owner-occupied smallholdings.

In Groningen we find the inverse situation. The maintenance and repair of dikes in Hunsingo and Fivelingo had not yet been centralized, and individual villages each were responsible for the repair of their dikes. Within each village the dike was traditionally partitioned and allotted to individual farms. As average farms were already big in the 17th century, many farms were responsible for ten or more parts of a dike. A dike reeve (*dijkrechter*) was responsible for the annual inspection. Originally the office of dike reeved rotated among farms, but in the 17th and 18th century it had been monopolized by the rural nobility (the *jonkers)* who considered these functions as a source of both status and income (Hempenius 1991: 331-332; Feenstra 1981: 73-75). The system had not been adapted to the concentration of landholding which had already taken place. Furthermore, with the hereditary character of leases in this region (*beklemrecht)*, also came the sole responsibility for dike repair: the owner of the bare property rights (*blooteigenaar)* was not obliged to intervene, and the administration of the provincial lands does not mention any direct help. After the 1717 'Christmas' flood, the mass of dike labourers also had to come from the much more densely populated inland sandy (*Geest*) or peat regions (Ufkes 72ff and Jakubowski-Tiessen 1992: 241). The large tenant farmers hence faced the worst combination of two

[10] Ghent State Archives, Fonds Sint-Pietersabdij, I, Rekeningen 1512, f°142-151.

systems, as they were faced with a flood protection system designed for small owner-occupied farms, and a system of tenure which did not provide for any financial assistance by the landowner. Furthermore, the Hunsingo farmers lacked any grip on the organization of dike repairs: besides the dike reeves, the regional state authorities also increasingly intervened in the organisation of dike repairs. In the 18th century, state authorities increasingly saw flood disasters as a challenge testing their qualities as administrators (compare Mukerji 2007 on 17th century France). In the person of special commissioner Thomas Van Seeratt, the state of Groningen urged the tenant farmers to fasten dike repairs and to build stronger and higher dikes. Repeatedly Van Seeratt threatened to outsource dike repairs to professional contractors – which poured in from Northern Germany - at the expense of the 'negligent' coastal communities.

Both in Flanders in 1404 and in Groningen in 1717, conflicts between social relations and the institutional arrangements of flood protection, help to understand why the 'normal' localization of flood disaster did not work, and why better-off groups also saw their livelihoods seriously disrupted.

7. Concluding remarks.

Did agrarian capitalism lead to an escape from flood disaster in the early modern period? Not at all. No one needed to be rescued and the rescue team was waiting on the sidelines until all danger had gone. When they finally came in, they proved equally vulnerable - or equally resilient - to flood disaster, but in their own way.

The history of flood disaster in the North Sea Area, is a story of economic success, in the sense that flood disaster had been 'localized' economically and geographically at an early stage. The high degree of economic integration and the division of the landscape in several compartments – part of an 'amphibious culture' according to Petra Van Dam (2012) -, all preceded the rise of agrarian capitalism. The precise way of realizing this localization was different in peasant and capitalist societies. In the latter societies, safety one part of the land, was realized by exposing another part. In periods of economic growth and land reclamation, the risk of flood disaster could permanently be transferred to new frontiers. When expansion no longer was possible, the last frontier risked to marginalize. Capitalist farming provided no answer for this problem, except for calling in the State, which is what happened in many coastal regions of the Low Countries in the early 18th century.

Major flood disasters, like probably most other types of pre-modern rural disaster, did not provide fertile ground for engrossment of farms and major outside investment. The examples studied here, seem to indicate that small landholders – although probably more exposed to direct physical risk – did rather well, as they were less dependent on marketing (arable) products, but combined different sources of income, most of which could be continued immediately after the flood. New investors – mostly from urban origins in our region – were seldom attracted by regions prone to disaster. In periods of economic

expansion, they were highly interested in coastal marshlands, but only if a *'tabula rasa'* of old property rights and landscape forms could be made, and an '*ex novo'* landscape could be created.

Perhaps most difference is to be found in the way the middle- and upper-layers of a society were affected by a flood disaster. In Flanders in 1404 and in Groningen in 1717 these were highly affected in their economic and social capabilities, mainly, as we argued, because the institutional arrangements of flood protection were not aligned to the social relations which prevailed in society. In Flanders, the early transition to 'centralized' flood protection was not in line with the predominance of owner-occupied farming (although it served the interest of a minority of large landowners and contributed to the decline of the traditional local coastal farmer), and in Groningen, the *Kabeldeichung* system was no longer in line with the size of farms.

Centralized flood protection failed to protect the larger Flemish farmers in 1404 and traditional 'Kabeldeichung' was problematic for the big farmers of Groningen in 1717. As such our story clearly shows that institutional arrangements cannot be judged on their failure of success independent of their social context. And that institutions which worked perfect in one context, failed in another.

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