

Chapter 5

Revitalizing regulating services: the Netherlands floodplain policy

This chapter discusses the dynamics and interactions that govern AWIs in the river floodplains of the Netherlands, with specific reference to how these have been incorporated into the Netherlands floodplain policy. In addition, case material from other floodplains and river valleys in Europe is briefly discussed where relevant. The state (changes) of these agro-ecological systems in Europe, and in particular within the EU, are currently at a stage where rebalancing the ecosystem services is being sought, and increasingly explicit attention is being given to revitalizing the regulating, cultural and supporting services *vis-à-vis* the predominantly agricultural provisioning services. This is influenced strongly by the common policy and regulation context of the EU, which includes the Common Agricultural Policy (CAP), the Water Framework Directive (WFD), the Birds and Habitat Directives (BHD) (including its resulting Natura 2000 network). These are increasingly informed by the concepts and notions of environmental sustainability, ecosystems and biodiversity. Because these cases differ significantly in their economic contexts (as well as their ecological settings in some cases), it is necessary to discuss them separately in order to explore their context-specific DPSIR configurations.

FLOODPLAIN CASES FROM EUROPE

The database contains four cases dealing with river floodplains in Europe, each of which deals with issues of retaining or revamping the regulating services, in particular flood protection. Although they are all floodplains in Europe with EU policy influences and with many similar DPSIR elements, there are also some major differences. Therefore, the case of the Netherlands floodplain policy is chosen as the central case study of this chapter, while the other cases studies will serve to highlight similarities and differences where appropriate.

The cases of the Netherlands floodplain policy and the middle Sava River in Croatia (Box 5) are ecologically similar in that they have seasonal floodplains that have been historically attractive for agriculture but are increasingly valued for their flood protection functions. The cases of the Drentse Aa River (the Netherlands) and the Biebrza valley (Poland) have similar agro-ecological settings, with peat meadows in which the established ecological landscape and character is highly dependent on the continuation of active grazing and management of the meadows. Economically, the Netherlands cases represent a setting of high economic wealth wherein agriculture has been shaped by past EU policies and agricultural price regulations that have favoured highly intensive and consolidated agriculture. On the other hand, the cases of Poland and Croatia are in less affluent settings where agriculture has been shaped by the past policies of eastern European regimes and the continued use of common grazing

Lead author: Gerardo E. van Halsema (WUR)
Contributing author: Henk Zingstra (WUR)

BOX 5

Flood retention in the middle Sava River

The floodplains of the middle Sava River (Croatia) contrast sharply with the Netherlands context. The Sava floodplains have been characterized by less-intensive agricultural development based on extensive and seasonal grazing of livestock on the pasture commons of the floodplains (Zingstra, 2005). The low-intensity pasture use effectively maintained the agro-ecological landscape of seasonal meadows, shrubs and forests, and supported a specific floodplain flora and fauna, rich in biodiversity and with important bird habitats. With the transition of the Croatian economy to a market-based economy, this agro-ecological floodplain system was threatened. National land privatization policies jeopardized the traditional use of the Sava floodplains for grazing as the local small farm households could not afford to purchase the privatized lands. For the Sava floodplains, this was deemed undesirable as increasing national and international recognition was being given to their value in regulating services (flood protection) and supporting services (biodiversity and specific bird habitats). This prompted the Government of Croatia to designate the middle Sava River for flood retention. This has also been beneficial for the protection of biodiversity, with farmers able to continue their traditional grazing practices of the commons that are adapted to the seasonal flooding. With the upcoming accession of Croatia to the EU, this agro-ecological landscape for flood retention and biodiversity can be supported through the CAP and other EU agri-environmental programmes.

management, resulting especially in the second pillar (rural development) in the Agenda 2000 CAP reform. With the introduction of production limits and the first partial reform of the CAP from production-based to area-based subsidies, started in the early 1990s, the incentives for maximized intensive production have gradually diminished. Milk quotas, relevant for the predominant dairy farming in Netherlands river forelands, were introduced even earlier, namely in 1984. The introduction of obligatory agri-environmental programmes under the CAP in the MacSharry reform was also important. This promoted the nature and biodiversity values and services in rural landscapes. Finally, in the Netherlands situation, a government-supported programme of land acquisition for nature conservation purposes (partly cofunded from EU rural development funds) has also been influential in increasing biodiversity and nature values/services in the rural landscape.

The importance of environmental sustainability and ecological conservation and restoration has been increasingly reflected within EU policies and regulations at about the same time as agricultural policies have changed. Such concerns have culminated in directives, in particular the BHD – resulting in, inter alia, the ecological network Natura 2000 and the restoration of the environmental/ecological state of waterbodies under the WFD as well as the above-mentioned agri-environmental programmes, later supplemented

grounds¹¹, but is now subject to a new set of regulations, norms and values with their entry into the EU.

Figure 25 shows the nature of the AWIs in these wetlands.

The common EU policy context

The CAP of the EU has influenced and encouraged the expansion, intensification and extensification of agriculture. In particular, for the Netherlands cases, this has been characterized by a progressive intensification and consolidation of agriculture in an ever-diminishing number of farms of ever-higher levels of specialization and productivity. Since the period of EU-supported overproduction in the mid-1980s and the expansion of the EU into southern and eastern Europe thereafter, financial and political pressures have been mounting to reform the CAP. The thrust of this reform has been to move away from direct production incentives / price guarantees to income support, with a gradually increasing role for wider concerns of rural agro-ecological landscape

¹¹ In Poland and former Yugoslavia, about three-quarters of the farmland was never collectivized in state or cooperative farms.

by other environment-oriented rural development measures (including Natura 2000 payments). These have provided additional policy and financial incentives for nature conservation on farmland, and, to a lesser extent (but relevant in the river regions), measures to re-shape the agro-ecological landscape through active ecosystem restoration and management, thereby increasing regulating, cultural and support services.

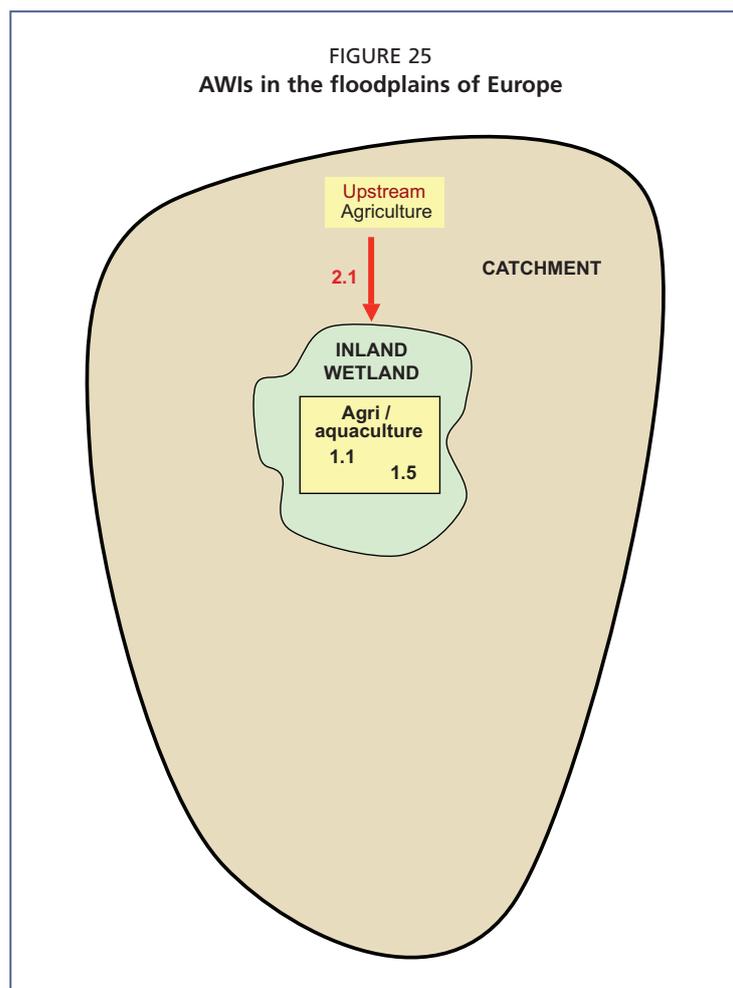
Apart from agricultural intensification, clay and sand extraction has also been a significant pressure on the floodplains in the past. These mineral extractions lead to significant state changes in the floodplain landscape, by leaving behind deep lakes or transforming mined pits to agricultural use, thus affecting the riverine flora considerably. However, there are examples of how the new “nature development” approach as supported by the EU reforms can, with some additional

interventions (creating new shallow wetlands and higher places), result in valuable nature areas, although of a different nature than the original river foreland.

These shifts in the policy and regulation framework of the EU have cleared the way for increased recognition of the value of the multifunctionality of these agro-ecological landscapes, and the natural resources therein, as well as the scope of these areas for multiple uses. A functional approach to highly intensive and productive agriculture is still present and applied to a core segment of the agriculture sector and landscape that is geared towards optimizing their specific provisioning services. However, this is being increasingly supplemented by a multiple-use approach to the management of the wider agro-ecological landscape in which the regulating, supporting and cultural services are explicitly valued and supported. Within the latter, agriculture is seen and presented as a potential custodian of the natural and cultural agro-ecological landscape that can secure and maintain biodiversity and specific habitats, as well as provide recreational and cultural services.

The rebalancing of ecosystem services is induced on two fronts:

- by regulating the negative impacts of high-production agriculture, in particular for basin-level interactions (e.g. the strict nitrate budgets in livestock rearing as regulated by the Nitrates Directive);
- by providing support and financial incentives for pre-defined restrictions/conditions on *in situ* agriculture in the floodplain so as to support the regulating and supporting service of the agro-ecological landscape (e.g. biodiversity and habitat payments as provided by the agri-environmental programmes, Natura 2000 and the rural development pillar of the CAP).



River floodplains and revitalization of flood retention capacity

River floodplains have long been attractive for agriculture owing to the seasonal deposition of rich clay soils. Along large tracts, dykes and dams have been built to improve the conditions for agriculture and to protect cities and towns from flooding. This has restricted the extent of the flooding during periods of high river discharge to an ever-narrowing strip along the river – especially in the case of the Netherlands floodplains.

The case of the Netherlands floodplain policy provides a valid example of rebalancing the ecosystem services around a specific and purposeful hydrological function, namely protection against flooding. This represents a marked turnaround in the floodplain land-use strategies of the Netherlands compared with previous decades. The basic principle underlying this change was the need to base land and resources use planning of the river floodplains on their regulating service for flood protection instead of their provisioning services for agriculture and urbanization. This was in the financial interest of the Government of the Netherlands as it averted investment costs. The extreme peak river flows of the spring of 1995, which led to a serious risk of flooding in the river polders in central and southern Netherlands, some of which were completely evacuated, brought to the fore the serious limitations of the river dykes. The first and immediate reaction to this crisis was that the river dyke system was in urgent need of a new complete overhaul (i.e. stronger and higher dykes), as had been implemented in previous decades. With strengthening works underway on the weakest sections and as the national plans to overhaul all dykes started to emerge, it quickly became apparent that the Government was facing major investment costs for decades to come – just as with the delta works against the sea that were nearing completion at that time.

Within the agriculture sector, the revision of the EU–CAP system initiated in 1991/92 (with the aim of limiting overproduction) started to be felt around this time. Where the EU production policies had earlier stimulated pressures for agricultural colonization, building of polders and intensification, the reduction in overproduction was being translated into drivers and pressures to reduce and consolidate the sector. For non-intensified agriculture, attention shifted more towards the multifunctionality of agriculture, with farmers becoming managers of the landscape and keepers of the rural and environmental patrimony.

The emergence of the new Netherlands floodplain policy, with the need to provide for increased flood protection by means of restoring the river floodplains and increasing the peak flow capacity within the outer (or winter) dykes, coincided with the turnaround in agricultural and environmental policies. Increasing the peak flow capacity could be achieved relatively easily and cheaply (when compared with revamping the dyke infrastructure) by actively restoring the floodplains through hydrological landscaping, and limiting and relocating agriculture and urbanization to non-flood intrusive conditions (i.e. low-flow summer agriculture). In addition, the reshaping of floodplains (and sometimes creating new ones) was ideal for restoring wetlands, with which the increasing demands for nature and recreation in Netherlands society could be met, while also meeting the requirements of EU environmental directives.

Thus, from both a broad agricultural interest (not necessarily at the individual farm level) and flood protection perspective, the reshaping of the floodplains could be initiated, and affected farmers compensated or bought out through funds made available from agricultural policy reforms, environmental policies, and averted flood protection investment costs. The result was to encourage them to change their practices towards flood-friendly agriculture or cease their activities in the floodplains. In addition, stricter restrictions were put in place and enforced in order to curb the encroachment of urbanization into the floodplains. For example, in designated flood areas, houses (and farms) are being relocated to higher ground or, as in innovative showcases, floating houses are permitted as “urban waterfronts”.

DRIVERS

The national and EU policies with regard to agricultural and flood protection helped to shape the intensive use of the river floodplains and their adjacent polders in the river landscape of central Netherlands. By the late twentieth century, this had culminated in a situation where the floodplains and polders were: (i) intensively shaped and used by high-production agriculture; (ii) an elaborate network of flood protection works of inner and outer dykes and polders; and (iii) facing continued pressure from urban expansion to further encroach upon the floodplains. The near flood crisis of 1995 brought to public attention the fact that the river peak discharges were being enhanced by urbanization in the Netherlands as well as by land-use practices in upstream riparian countries. In addition, it was recognized that flood crises would increase in the future as a consequence of higher intensity rainfall induced by climate change.

PRESSURES

For several decades before the 1990s, the principle pressures on the floodplains were those associated with the progressive restrictions of the flood retention capacity owing to hydrological management. The flood protection works were aimed at training the rivers into restricted summer (low-flow) and winter (peak-flow) beds. The prime drivers for these actions were: (i) protecting and enabling agricultural expansion and intensification; (ii) securing navigation (not considered further in this chapter); and (iii) protecting urban dwellings and centres. The high peak flows of 1995, which mainly originated from the upstream riparian countries, led to serious flood risks with extreme high water levels within the outer dykes. With this, flood risks became an eminent pressure.

STATE CHANGES

The state changes in the floodplains were characterized by a skewed exploitation of the provisioning services, in particular with regard to facilitating a highly intensive agriculture. The flood protection approach was based on an engineered water control concept that had been developed to enable agriculture, urbanization and navigation. Rather than assimilating the regulating services of flood retention, the flood protection works had gradually but increasingly sought to replace these services and functions by engineered works. The flood crisis of 1995 made it clear that the available flood retention capacity of these engineered works was no longer adequate to cope with the changing and increasing river peak discharge regimes. As a nuance: the floodplains situated between the inner and outer dykes always were part of the flood protection network. However, these became characterized by summer uses as meadows, nature and recreation areas, and increasingly subject to pressures from urbanization and further contraction. As became apparent in the spring of 1995, these pressures were not sufficiently restricted and regulated in terms of enhancing their flood retention capacity. River forelands were dominated by species-rich semi-natural grasslands until about the 1970s. These were often of great botanical importance, also because of the location in a special flora district, connected with Central Europe. Owing to the location in the river foreland, grassland farming was still less intensive than beyond the dykes. By progressive intensification of farming, almost all semi-natural grassland outside nature reserves (including those created in the 1970s and 1980s) disappeared from private farmland. By 1990, 1.5–2 percent of the floodplain system (about 500 ha) was still covered by such grasslands (Dijk, 1991), the main cause of the decline being fertilization. Since the 1990s, new projects to enhance nature values have had several purposes, including the restoration of grasslands, wetlands and riverine forest. Broader than the traditional conservation of semi-natural landscapes, this approach was the result of a new thinking on “nature development”, which became an important pillar of the new Netherlands Nature Policy Plan (1990).

IMPACTS

Two major impacts have informed the different multiple-response strategies that have enabled the turnaround in the Netherlands floodplain policy. Agricultural intensification as fostered by EU agricultural policies culminated in a highly intensive and productive agriculture sector, which by the mid-1980s had led to an EU-wide overproduction. The handling of this overproduction was becoming an economic burden on the CAP that was based on providing price guarantees to farmers. Moreover, the associated state changes from intensified agriculture, in terms of the loss of biodiversity (as a consequence of past colonization and intensification of grassland exploitation) and the pollution burdens of nitrate and water pollution, became regarded as problematic and undesirable. At the same time, the new nature development philosophy, soon followed by corresponding policy (above), became an important driver for new developments that jointly served water management and nature values. The second impact is firmly associated with the restricted flood retention capacity of the floodplains. Increasing the flood retention capacity and securing flood protection by means of revamping the dykes presented government and society of the Netherlands with huge investment costs for years to come.

RESPONSES

The responses to these diverse drivers, pressures, state changes and impacts have been multiple, and they have been embedded in two separate response strategies that have converged over time. The first response strategy has been that of reforming the CAP and associated policies relating to rural development and nature/environment. Responding to the issue of structural overproduction, pollution and the poor state of biodiversity (and possible other factors), reforms of the CAP and EU environmental directives started in 1984 (with milk) and have been ongoing since 1991/92 (other sectors). These reforms target three aspects of the pressure–state–impact interface: (i) limitation of overproduction through the introduction of strict production quotas and conversion of the CAP from production-based to area-based payments; (ii) stricter regulations of the indirect impacts of agriculture on wetlands and the environment in general (e.g. by the Nitrates Directive); and (iii) enhancement and stimulation of cultural and supporting services (specifically, biodiversity) within agriculture and rural development. These helped to pave the way for national nature management and development policies and, later, an enhanced implementation of the EU nature directives and programmes (e.g. the BHD and Natura 2000) that target conserving (and to some extent enriching) the values of the rural landscape with increased cultural and supporting services. The impacts of these policies on the agriculture sector have been, among others, an accelerated consolidation and contraction of highly-intensive, highly-productive agriculture and a revitalization of low-input (or lower-input), diversified management practices (partly by site managing NGOs and the National Forest Service) with enhanced biodiversity and recreational services (Box 6).

The floodplain restoration response strategy initiated after the flood crisis of 1995 has been based primarily on the principle of averting the huge investment costs of an additional “traditional” overhaul of the dykes and flood protection network, opting instead for a revitalization, and in some case re-creation/enhancement of the floodplains and their regulating service of flood retention. The core of the new Netherlands floodplain policy, “room for the rivers”, consists of restoring and enhancing the flood retention capacity/service of the floodplains by means of hydrological landscaping that serves this primary function. This entails: (i) restricting *in situ* agriculture in the floodplains and in a few designated “flood retention polders”¹² to non-flood obtrusive practices; (ii) buying out of agricultural land (for water management and nature conservation purposes); and (iii) the active creation of wetlands (often by means of dredging). In

¹² Basically, polders that are returned to the floodplain.

addition, infrastructural obstacles and urbanization are tackled. This turnaround in national policy has been enabled by, and converged with, the EU reforms of the agricultural, rural development and nature policies. Rather than being a priority growth sector, agriculture is now subject to diversification and regulation, with specific attention given to the enhancement of the cultural and supporting services. (However, owing to rising food prices and biofuel demand, the drivers and pressures to increase agriculture production have mounted rapidly in 2007–08.) The new flood policy brings a fresh impetus to further restore and enhance the regulating services and, as far as the floodplains are concerned, restrict the exploitation of provisioning services to what is feasible within the dominance of flood regulation services.

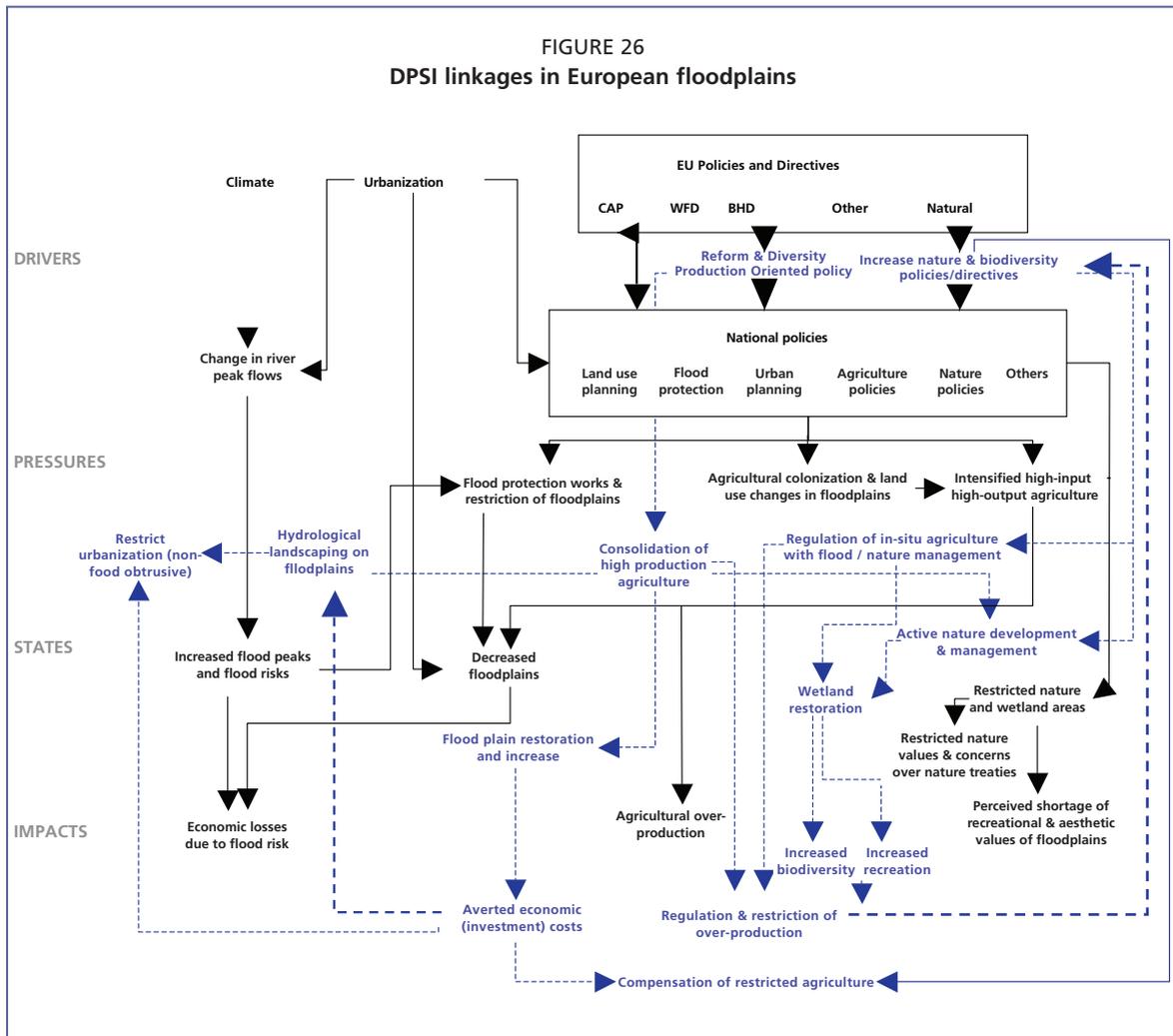
CONCLUSIONS

The rebalancing of the ecosystems services in the Netherlands floodplains, and in general in the EU agriculture sector, is a concerted and multiple initiative being undertaken at different levels and developed/refined over a series of stages (Figure 26). The reform of the CAP has been primarily a response to the economic impacts of structural overproduction and increasing concerns about the ever-decreasing and diminished cultural and supporting services in the rural landscape, in particular with regard to biodiversity and water quality. This initiated the process of rebalancing the ecosystem services in which the provisioning services of agriculture could be curbed and restricted through the imposition of regulations – both in terms of *in situ* interactions in relation with agro-ecological landscapes, as well as by indirect interactions at the basin level – complemented by provisions and facilities to actively foster and stimulate the revitalization of nature and biodiversity. This paved the way for the subsequent Netherlands floodplain policy, which took the rebalancing of ecosystem services one step further by making the revitalization of the regulating services of the floodplains its central objective. The primary impacts and drivers that this policy responded to were: (i) the averted economic investment costs that the revamping of the flood retention capacity represented compared with overhauling the dyke infrastructure; and (ii) the impact of climate change in requiring a higher flood retention capacity in the future. The valuing of regulating services as flood retention has now become a mainstream element of Netherlands flood and water management policy. In the new Netherlands water law (under preparation), flood retention has

BOX 6

Small river valleys with peat meadows

A different trend emerges from the cases in the small river valleys and floodplains where peat is the dominant soil type. The retreat of agricultural activities as a response to changed market conditions and EU policies has disturbed the fragile balance between agriculture, as a provisioning service, and the specific attribute in terms of biodiversity that had been developed as a response to the long-lasting and stable use of these river valleys for haymaking and grazing. Owing to the specific biodiversity that had developed in these hay meadows, large areas of these river valleys have been designated “sites of community interest” under the BHD. However, with the increasing cessation of agriculture in these areas, e.g. for reasons of economic viability, this specific biodiversity is also threatened. Member states are facing problems in meeting their obligations to the EU nature conservation legislation. The Biebrza valley in Poland and the Drentse Aa River valley in the Netherlands are two examples of this. In both, the cessation of active use of peat meadows threatens to transform the vegetation and affect their specific biodiversity. The continuation of agricultural activities in such cases, specifically the active use and maintenance of the meadow system, can be supported by provisions and payments made available under the EU CAP and nature directives. These are seen as being activities relating to cultural patrimony and the delivery of biodiversity services – either to individual farmers or landscape management organizations.



become a formal criterion for land-use planning and governance; one with which land can be dedicated (or codedicated) to the primary function of flood retention. This further enhances the opportunities for the revitalization and creation of wetlands (including cultural and supporting services) that foster the flood retention capacity of the floodplains. The extent to which this turnaround in thinking has penetrated Netherlands society and politics is illustrated by the fact that the notion of revitalizing the flood protection capacity of the coastal deltas through brackish agro-ecological systems is already being contemplated in some quarters.¹³

¹³ Similarly, in the United Kingdom, allowing the sea to reclaim areas previously protected and allowing flooding of agricultural land that was previously kept dry by pumping is becoming increasingly acceptable, primarily because the economic costs of defences and pumping are now considered too high. This is part of a general trend throughout Europe.