Land policy tools in flood risk governance: The differentiated experiences arising from the basins of the Rivers Evros (Greece) and Scheldt (Belgium)

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Abstract: Land policy as an all-encompassing practice has been providing a wide variety of instruments to proactively and reactively deal with disasters and promote resilient territories. Historical experiences related to periods of post disaster recovery (the rebuilding of cities after World War II, earthquakes, fires, floods) have revealed the importance of the land policy system as well as the institutional structures that in combination to planning policy determine the efficacy of the safety environment of the affected areas. The operation of expropriation and compensation mechanisms, land re-allocation provisions, land amalgamation and readjustment and the re-distribution of land development rights have proved to be highly critical in disaster management cycle, and principally, during the recovery-reconstruction and the prevention-mitigation phases. What has to be underlined in this respect is the way the aforementioned tools and mechanisms have developed historically under accentuated demands posed by crisis or disaster conditions and are implemented in different institutional vis a vis spatial planning contexts aiming to fostering resilient communities. Set in this context, the aim of this presentation is to examine the effectiveness of land policy in two distinct settings of flood risk management: the Evros River Basin in Greece and the Scheldt River in Belgium. This comparative approach allows to identifying the different obstacles and potentials that could contribute to the formation of an integrated land and safety-resilience strategy.

Keywords: land policy; flood risk management; property rights; risk governance

Introduction

The recent series of catastrophic events in Europe define exceptional situations that have partly overturned advanced civil protection systems and at the same time have forcefully brought back in the agenda the catalyzing importance of the social political and planning milieu in determining a safe environment. From an evolutionary perspective, this situation is determined by two different level processes: at a broader level, the evolution of state policy as a whole and at a more specific level, spatial policies aimed at sustaining safe development. More specifically, historical experiences demonstrate that crisis conditions and exceptional forms of demand caused by natural or manmade disasters might -though temporarily- enforce a radical transformation of state policy. This could

engage the extraordinary transfer of economic (and other) resources to those in needs and to the imposition of political power (expansion of state authority) in ways that contradict prevailing policy patterns and priorities during normal development periods. Thus, disaster demands are in principle accompanied by "exceptional forms of state intervention", the character of which is specific by definition; it relates to the affected population strata, to damaged economic sectors and obviously to affected geographical (disaster) areas. These demands also have an urgent-time limited character and embody a potential for exerting structural influence on socio-economic systems and developmental trends (O'Connor, 1987; Fine, 1984, 1999; Sernini, 1979, 1994). In addition, they inflict changes on pre-existing institutional-organizational structures by involving the joint mobilization of state agencies of various tiers, competences and by generating new relationships of "trust" between the state and society (Beck, 1992, Giddens, 1999, Wisner *et al*. 2004: 18).

Land policy has been strongly influenced by the implementation of distinct recovery policies (Grebler, 1956: 151) and/or those aimed at increasing future safety. In order to meet the demands posed by disasters and recovery processes, state institutions (national, regional, local) have been obliged to change the existing framework of operation especially in the land policy field (Mileti, 2001: 26). The land policy system is defined as the whole complex of socioeconomic and legal prescriptions that dictate how the land and the rights of use and access to land are to be allocated (UN/ECE, 1996). It incorporates a wide range of tools (expropriations rights, compensations mechanisms, land redistribution, value capture and property rights re-allocation) that guide state and social action for the control, acquisition and management of landed assets (Delladetsimas *et al.*, 2019). What is interesting in this respect is the way the aforementioned tools and mechanisms have developed historically under accentuated demands posed by crisis or disaster conditions and are implemented in different institutional vis a vis spatial planning contexts aiming to foster safe and resilient communities. At the same time the efficacy and evolution of land policy has relied strongly on the interrelationships structured with spatial planning, safety planning and socio-economic strategies; and how these are mobilized to meet exceptional demands.

Figure 1: Interconnected policy fields related to spatial development and safety planning.

This paper places land policy within the emerging trends of disaster mitigation planning in European regions. The rationale for such analysis associates to the identification of key issues that could be

possibly revealed from the comparative case study approach of two distinct risk environments and already adopted disaster (flood) mitigation policies. Clearly the European setting embodies exceedingly different experiences and policy patterns for the protection of local economies and societies. In this respect, empirical evidence is provided from the Greek case of the River Evros Basin, and the Belgian Scheldt River. The selection of the two countries/case-study areas is based on the key common characteristic defined by the dominance of small private land ownership (Delladetsimas, 2006; Broeck and Verachtert, 2016) and the way this affects safety policy; since natural disasters might pose demands and increase land shortages resulting in more competition for and increased conflict over land.

Land policy in a safety and planning rationale

The land policy system as implemented at the national, regional and local context has been reciprocally shaped by its interrelationships to spatial planning (land use plans, regional plans, development control), safety planning (emergency planning, recovery-reconstruction planning, risk prevention-mitigation planning), and socio-economic development (economic zones, economic incentives, compensations, agricultural policies). All these imply the structuring of strong links between decisions on land tenure and decisions on land uses made in the context of implemented plans. In addition, land policy and its impact on land tenure rights and rights of access to land allow for the development of improved land management as a component of adaptation to natural disasters. There have been, for instance, many cases in which the land policy system has historically assimilated risk mitigation demands and emergency management experiences; which in turn have been dialectically combined with the development of an effective spatial planning system, stipulating also a favourable (safe) environment for socioeconomic development. This has been the case of the Netherlands, for example; a country exhibiting a long-standing tradition in safety planning (water and polder management, land reclamation and flood prevention infrastructure). This tradition has lead to highly effective processes of upgrading and institutionally upholding land policy instruments, which has reciprocally shaped the development of an elaborated spatial planning system that further provided a complimentary spatial setting for socioeconomic development.

The spatial structure and urbanization history of Greece are tightly associated to disasters (earthquakes, landslides, floods, fires, man-made disasters) and the subsequent recovery processes, involving distinct rebuilding experiences for numerous cities, relocation of towns and villages, and the development of considerable safety practices, especially in the development control domain (seismic code, fire safety code, building regulations). Evidently we are dealing with an exceedingly multi-risk environment (earthquakes, floods, forest fires, extreme weather events), in which -interestingly enough- the land policy system has not developed strong links with spatial planning. It is worth mentioning that the Hellenic Cadastre was introduced in 1995 (Law 2308/1995) and is not yet completed. When it comes to safety planning and disaster recovery periods, implemented policies are limited to mere compensations of affected landowners and re-parceling procedures in urban expansions, as well as disjointed applications of expropriation policies and land use changes in compliance to land-use plan provisions. The prevailing role of land policy is mostly evident in economic development priorities as expressed (partly independent form spatial policies) in conjunction to major infrastructural works (expropriations), the long-standing experience of agricultural re-parceling and land systemization and on the whole to measures related to sectoral policy incentives (fiscal measures, economic incentives especially in agriculture). In relation to safety

policy, the land policy system is regarded as more active in emergency planning (land confiscations-expropriations for emergency sheltering) and in the recovery-reconstruction processes (rebuilding loans, crops compensations, business recovery programmes). Land policy proves to be rather inert or forgotten when it comes to prevention strategies and disaster mitigation planning. At the same time, safety planning exhibits two discrete features: a prevalence of structural technical priorities and an overwhelming emphasis on emergency planning as a mere civil-defense (command-control) practice. On the whole, the interrelationship between all these domains in Greece is highly disjointed and weak since each one appears to be following an independent trajectory. The situation is further conditioned by the proliferation of spatial governance systems for the implementation of safety measures, and by the absence of an effective land policy as a safety practice.

In the case of Belgium, the risk environment is determined by coastal, pluvial and fluvial flooding, and by numerous man-made industrial hazards. The country however, assumes particular importance as a multi-level governance setting (OECD, 2017) in relation to safety policy, conditioned by its decentralized system with the autonomous status of the three regions (Flemish, Walloon and Brussels-Capital Region). In the federal state of Belgium, competences on safety policy (especially flood protection and water management) and spatial planning have been transferred to the regions. In each of these, spatial planning and flood risk management thus fall within different legal trajectories and policy patterns (the central state however maintains overall competences related to crisis management and safety insurance policy). It could be argued that flood risk management and spatial planning are institutionally intertwined. A first bond is clearly revealed in the "2003 Act on Integrated Water Policy" (Flemish Government 2003), which clearly states that the water system is one of the ordering principles in spatial planning, meaning that the water system is amongst the first priorities when developing an area (Mees *et al*., 2016). Second, a spatial planning instrument used for risk mitigation purposes is the so-called 'signal areas' (*signaalgebieden*); endorsed in disaster prone zones in which spatial development objectives contradict with water management priorities, demanding particular spatial planning decisions to alleviate them. It should be stressed however, that both the Flemish and the Walloon Regions have established Coordination Committees in order to foster the co-operation between different water management agencies and spatial planning authorities (*Coordination Committee on Integrated Water Policy* and *Interdepartmental Flood Group* accordingly). Moreover, the Strategic Advisory Council on Spatial Planning provides advice during the preparation of water management decrees, while in the same context, Water Tests (*water toets*) present the assessment of the impact of a proposed plan on the water system, further fostering the compatibility of planning and water policies. Water assessment thus relates to plans, programs, and licenses not only with regard to building activities but also to environmental licenses (De Smedt, 2004). Within this context and in terms of land policy, water management institutions are equipped with the competence to exercise expropriation and pre-emption rights within their jurisdictions. Furthermore, the 2003 Water Policy Act systematized the enforcement of pre-emption rights and land acquisition processes in flood risk prone areas and signal areas (Mees et. al., 2016). In certain cases, a property owner may demand that the government acquires the property, for example, when the owner is confronted with a delineation of a retention area. With respect to development control, building requirements are enforced aiming to avoid rainwater damages by requiring a minimum storage capacity of 5,000 liters per property for (uni)family homes unless a green roof has been provided (Rainwater Regulations 2014). On the whole, the system requires the assessment of potential effects and in turn the adoption of mitigation or compensation measures. In Belgium, safety policies are also extended in the potential recovery-

reconstruction period with the inclusion of flood damages in the general fire insurance. After modifications of water management legislation in 2010 and 2013, advice by water authorities has now become mandatory in the formation of spatial planning and its scope has been broadened even further to 'leave more room for water' (Mees *et al.* 2016). Hence the Belgian (Flemish) experience has been adjusting to the presence of small property structures diversifying its policy and moving towards "flood risk and flood risk prevention" and also to preparedness and to (potential) recovery-reconstruction measures as a proactive rationale.

Insights from the case of the Evros River Basin

In the Eastern Balkan Peninsula, Evros River extends on the borders between Greece and Bulgaria and between Greece and Turkey. Only 6,3% of its total length extends in the Greek state (3,340 sq.km) having as the main tributaries the rivers Ardas and Erythropotamos. A plethora of activities related to Evros have been historically developing and vary from irrigation, domestic water supply, urban sanitation and power supply, corroborating the high contribution of the river to the socioeconomic trajectories of the wider area. More than the 70% of the total dry cotton and sunflower seeds production in Greece, among others, comes from the Evros region. Due to the fact that the fertile agricultural land uses alongside the river basin has been systematically contributing to the local as well as national economy, land policies implemented in the regional unit of Evros has been focusing on the increment of agricultural efficiency. Land consolidation and readjustment measures have been undertaken during '50s, '60s and '90s adding plots for cultivation designated as 'highly productive agricultural land' alongside the river. In 2018, a new wave of land consolidation plans came into force for 50.000 acres in the regional unit of Evros, as a consequence of constant pressures by local farmers.

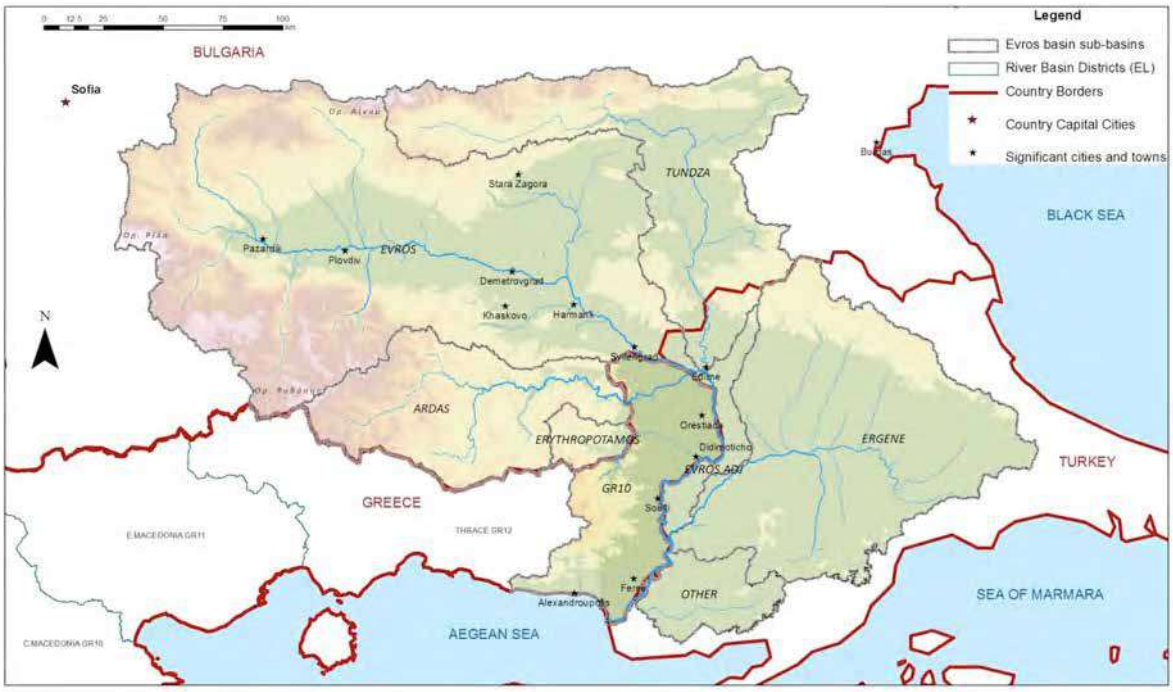

Figure 2: The location of the Evros River basin on the country borders of Greece, Turkey and Bulgaria (Ministry of Environment and Energy [MEE], 2016:8).

At the same time, the areas of high agricultural productivity experience accentuated social and economic vulnerability. The long-standing riverbed management and numerous interventions revolving around the pressures of the farmers to preserve arable land have reduced the capacity of the flood plains (Chouvardas and Papapostolou, 2016). Moreover, the land consolidation plans were not followed by the necessary flood risk infrastructure development, further aggravating the existing flood risk levels (Tsesmelis, 2006). Devastating floods have been a constant concern for local communities as well as for local and regional authorities, while the capability of national response amid extreme weather events is being questioned. Flood risk management works date back to 1934, when the Greek and the Turkish government signed an mutual agreement (The Agreement on the Installation of Hydraulic Systems to start hydraulic and flood protection works on both sides of Evros river). In 1963, the Protocol on the rehabilitation of the Evros River Basin, brought the issue of flood management back to the two countries agenda. The development of infrastructure initiated at that time, lasted until the mid '70s through a number of bilateral agreements and included channels alignment, the construction of levees and dams-reservoirs. It was further accompanied by land policy measures for agricultural land reclamation and state border adjustments. During the same period - although with less conflicts- similar policies were agreed upon Greek and Bulgarian state for their shared part of the river. The aforementioned works remain up to present the dominant flood control engineering structures and have oftentimes proved inefficient to address severe floods (Kanellopoulos *et al.,* 2007). Besides, agricultural activities have expanded and intensified through time without the proportional development and enhancement of the irrigation system, the pumping stations, and the flood control infrastructure (Tsesmelis, 2006).

Some of the most recent flood disasters records denote the huge damages inflicted on infrastructure and agriculture in 2005, the evacuation of two settlements as well as damaged transportation and water supply networks in 2006, the flooding of several households in 2010, and severe damages in 2018. Since 2005, risk management actions undertaken by local and regional authorities, as well as by the General Secretariat of Civil Protection are merely based on: (1) the restructuring and the improvement of engineering infrastructure (embankments, drainage systems etc.), (2) command-control emergency management including the evacuation of households and settlements and the controlled flood events in order to protect inhabited areas, and (3) post disaster relief measures based on compensations for affected population and cultivated land. Indicative of the focus of the prevailing disaster management system on emergency response and post-disaster recovery is the distribution of local and regional expenses. In 2018, for example, the Greek army received in Evros region received 6.000.000 euros to strengthen disaster preparedness, and disaster recovery costs were around 400.000 euros only for Didimoticho municipality (Kritou, 2018). In 2019 compensations to affected population in the area reached 1.164.013 euros. Set in this context, it could be argued that the risk management system regarding Evros floods focuses on tackling flood impacts rather that mitigating flood risk. Land policy instruments are almost absent in flood prevention, with the exception of cross-border land readjustment alongside the Evros River basin.

What has to be underlined here, is that even in the Evros Flood Risk Management Plan (FRMP), enacted in 2018 (Law 2639/2018) -in compliance with the European Commission's Directive- the preservation of agricultural land appears as its outmost priority. More specifically, in the FRMP report it is stated that any flood risk mitigation measures and interventions should be implemented with a view to preserving agricultural land and to avoiding land use fragmentation; especially in the case of

High Agricultural Productivity lands, where any proposed work or activity should not jeopardize the preservation of its qualitative characteristics (Par.1.4.-L2639/2018). Furthermore, the FRMP proclaims the restructuring of agricultural crops in the inundation zones, but not involving land consolidation and land use reallocation processes, but for incentivizing the cultivation of certain species that could operate as a barrier to future flood hazards (Par.1.8. - L2639/2018). On the whole, it could be argued that land policy measures implemented through the years have not been combined to flood risk mitigation, but have acted autonomously and what's more have aggravated the vulnerability conditions of the area.

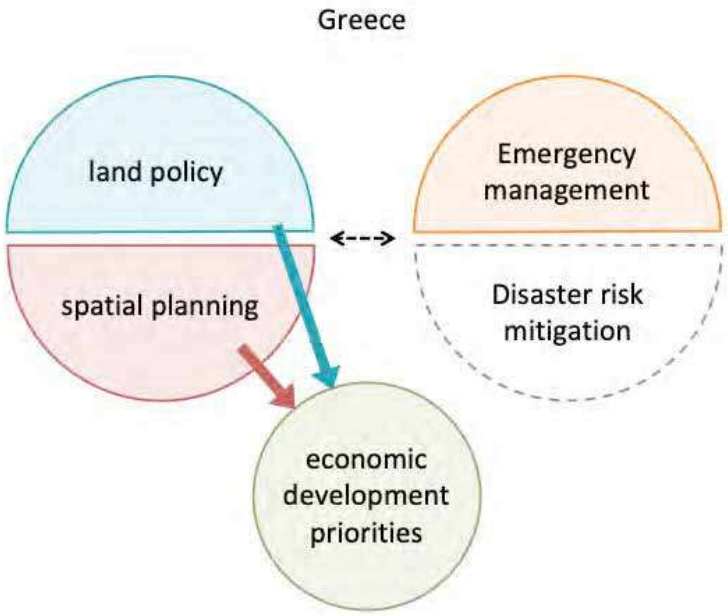

Figure 3: The operation of the Greek land policy system in conjunction with other policy sectors. Emphasis is given to tools that serve planning implementation and socioeconomic priorities (related to agricultural development in the case of Evros River Basin).

Insights from the case of the Scheldt River Basin

The Scheldt River flows from the northern part of France, crosses Belgium, and reaches the North Sea through the Dutch territory. It constitutes an important waterway, having a long navigable part and several canals that connect the river with significant industrial areas of Belgium. What is more, its banks host one of the largest European ports, in Antwerp. However, major fluvial and pluvial floods have been recorded on the Scheldt River Basin (1953, 1976, 1998, 2002, 2010) and have historically demanded for particular water management actions. Until the end of the '90s, flood management included merely engineering projects and infrastructure works for dams, dikes and water barriers. Since European Directives on Water and Flood Management emerged and were incorporated into Flemish and Walloon legislation, flood management became part of an integrated water policy that operates in line with spatial development strategies, urban and regional plans and environmental protection guidelines. One of the most indicative examples that reveal the crucial and leading role of

spatial planning in coordinating policies of flood management, land use regulation and environmental protection in Belgium is the *Sigma Plan*. After the devastating floods that hit the wider area of the Scheldt River in 1976, the Belgian government launched a plan, named 'Sigma' from the initial letter of the river Scheldt, inspired by the Dutch Delta Plan. Since 2005, the Plan has been updated and several Sigma projects have been developed integrating different strategies and measures associated with flood prevention, spatial development, land use planning and environmental protection. Moreover, the Sigma Plan forms a legal-institutional underpinning for the coordination of multiple actors, ranging from Agencies in charge of Sigma projects, namely the Agency for the Management of Flemish Waterways (De Vlaamse Waterweg nv) and the Agency for Nature and Forests (Agentschap Natuur en Bos), to several public and private actors such as local and regional authorities, the Flemish Land Agency, farmers associations, NGOs etc.

Figure 4: Scheldt River and Sigma Plan projects (source: *sigmaplan.be*).

The nexus developed between flood management and spatial planning has provided a fertile ground for the integration of land policy tools into several phases of the Scheldt's flood management cycle, especially in mitigation strategies. These include land reclamation, expropriation and compensation, land exchange through the Flemish Land Bank, compulsory land purchace, re-parcelling and land swap. Land expropriation and land swap have taken place either to 'move' plots located in vulnerable areas to low-risk zones, or for the permanent evacuation of flood control areas and the construction of hydraulic engineering. One of the largest expropriation projects was implemented in the Kruibeke-Basel-Ruppelmonde Flood Control Area (KBR-FCA) for the complete transformation of 600 hectares land uses and the removal of a quarter of the local community. Despite the conflicts and the resistance by farmers, who apart from ceasing their agricultural activities, were consequently excluded from related European subsidies supported by the European Agricultural Policy, the project was realized and the area was transformed into a flood control zone, a meadow for protected bird species, a sustainable tourism destination and recreational services (Bruzzone, 2013). Moreover, *signal areas*

have been defined alongside the river Scheldt, where land-use allocation and rezoning options are examined (De Smeldt, 2014). In signal areas, a wide range of land policy tools can be implemented in order to minimize flood disaster risk. For instance, re-parcelling with land swap can be effectuated in line with the Decree on Land Organisation for transferring population located on high vulnerable areas to safer zones, followed by related provisions for land expropriation and compensation. However, several procedures are 'time and money consuming', thus take a long time to be completed. In this regard, expropriations and compensations often constitute a significant economic burden for local authorities, given the extremely high land values in the Belgian territory, hindering the implementation of re-parceling and land swap in flood prone areas. Especially in Wallonia, such mechanisms are followed by negotiations on land prices that even lead to Peace Court, often resulting in spatial development halts (Mees *et al*., 2016).

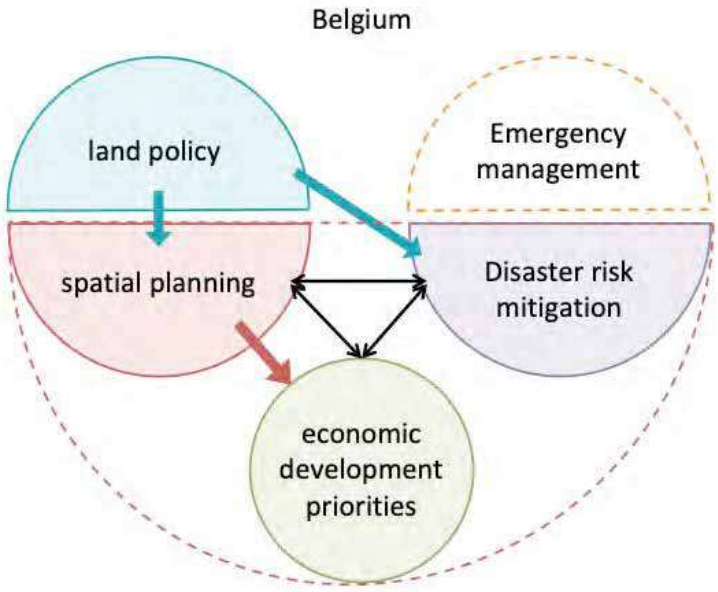

Figure 5: The operation of the Belgian land policy system in conjunction with other policy sectors. It provides tools for the implementation of spatial plans, flood mitigation strategies and environmental protection policies.

Two additional flood risk mitigation instruments have to be highlighted here. First, the 2013 modification of the Decree on Integrated Water Policy (DIWP) introduced the "*duty to inform*", with which risk mitigation measures are incorporated in all real estate transactions in Flanders. Consequently, all actors involved in private contracts for selling or renting out properties alongside the River Scheldt, as well as for transferring usufructs, leasehold, and superficies (notaries, owners, brokers) are obliged to inform candidate buyers and tenants whether the assets are located on flood vulnerable areas (Doorn-hoekveld, 2017). Second, of particular relevance are the complementary regulation on insurances and disaster compensations. Flood affected population and buildings used to be compensated by the National Disaster Relief Fund if the flood was recognized as a natural disaster. Since 2003, the Belgian Federal government enforced a mandatory insurance coverage against floods as an extension of the fire insurance policy, and only damages caused by very exceptional events are

eligible to compensation by the Belgian State (Boardman *et al*., 2010). Moreover, the disaster fund used for compensations has been transferred from the central state to the regional governments, aiming to better align prevention and recovery strategies (Mees *et al*., 2016). The aforementioned provisions are partially implemented and still lack institutional clarifications and legislative improvements especially in the Wallon Region (Mees *et al.*, 2016:47). Nevertheless, it can be argued that in the case of the Scheldt River, the Belgian land policy system provides a plethora of tools that can be mobilised within the competences of other policy sectors (spatial planning, water management, flood prevention), and even in real-estate market, to achive safe and resilient land development.

Conclusions

The two cases presented in this study demonstrate how the interconnectedness between land policy and risk management may determine the vulnerability of a given area, and thus the amount of losses and damages in cases of extreme disaster (flood) events. First, the Greek case reveals the disjoint operation of spatial planning and flood disaster management, but also the aggravation of flood disaster risk caused by previously implemented land policies. In the wider area of the Evros River Basin land consolidation measures adopted during different periods, since 1950 and up to 2018, were the result of social demands aiming to safeguard and improve the agricultural sector. Flood damages that mostly hit cultivated land in the same area are addressed through post-disaster relief measures and high compensations. On the other hand, in Belgium, land policy instruments are applied in flood risk mitigation projects strengthening the relationship between spatial development and flood prevention. Moreover, spatial planning appears as an institutional 'umbrella' for the integration of different sectoral policies (environmental, agricultural, economic) and for the cooperation between several public and private actors involved. In this context, the Sigma Plan operates as a basis for coordinating actions in different areas under its jurisdiction and principally those emanating from the Scheldt water management strategies. This study has also underlined the differentiated operation of compensation mechanisms in Greece and Belgium; a policy tool whose use seems to further influence the links between spatial policy and risk management. Belgium, adopts disaster compulsory insurance as a proactive tool for a potential recovery-reconstruction phase. In Greece, the policy system heavily gravitates on post-disaster recovery compensation relief measures; thus acting as a mechanism to cover the weaknesses and voids of spatial plans, safety regulations and implemented land policies. On the whole, the cases examined present two crucial differentiations that are both associated to the focal role of private landownership and the embeddedness of the land policy system into spatial development and risk management. In the case of Belgium, land policy has been an active domain making use of distinct tools (expropriations, pre-emption rights, re-parceling) in co-ordination (relatively) and combination with other policies (spatial planning, water management, flood prevention-mitigation). Thus the whole system departs by inherently recognizing the role of land tenure relations and realistically structuring a coherent safety strategy. In Greece, the aforementioned domains remain disjoined, while land policy mechanisms are mostly activated in compliance to demands posed by landowning groups related mostly to the economic sustainability of the existing tenure regime and the associated land-use patterns. Thus, as a result, disaster mitigation and prevention appears as an "external" (exceptional) policy domain, shifting the emphasis to emergency and post-disaster recovery measures.

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