Spatial Flood Risk Management

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Implementing Catchment-based Retention and Resilience on Private Land

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Edward Elgar PUBLISHING

Cheltenham, UK • Northampton, MA, USA

Cover image: Flooding in Schleching, Germany, 2013. Photo by Harald W. Hartmann.

Published by
Edward Elgar Publishing Limited
The Lypiatts
15 Lansdown Road
Cheltenham
Glos GL50 2JA
UK

Edward Elgar Publishing, Inc.
William Pratt House
9 Dewey Court
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Control Number: 2022932197

This book is available electronically in the Elgaronline
Geography, Planning and Tourism subject collection
http://dx.doi.org/10.4337/9781800379534

ISBN 978 1 80037 952 7 (cased)
ISBN 978 1 80037 953 4 (eBook)

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Juliane Albrecht and Sofija Nikolić Popadić

3.1 INTRODUCTION

There are many options for improving water-retention potential in the landscape. We can distinguish different categories of measures, such as agricultural and forestry measures, restoration of ecosystems, and technical measures in settlements (see Richert et al., 2007; Rieger and Disse, 2010; Wahren et al., 2011; Albrecht et al., 2017; see also Chapter 2 by Bourke et al., and Chapter 8 by Rinnert et al., in this volume). While agricultural measures are first of all aimed at adapted soil cultivation, increased structural diversity and extensification of farming, forestry measures concern afforestation and forest restructuring. Examples for renaturation measures are the development of water-parallel wooded, reedbed and/or tall shrub borders along and between watercourses, the extension of flow paths (meanders), and the creation of retention troughs in the floodplain. In the vicinity of sealed areas, desealing measures and technical measures of urban water management can delay or reduce rapid runoff.

The above measures often require changes in the use of land, which is usually in private ownership. They have to be implemented on larger areas in the river basin, which are used as agricultural land, forest land or settlement areas. In contrast to retention measures along the rivers like polders and dike relocations (see Albrecht and Hartmann, 2021), retention measures in the hinterland do not necessarily require ownership of the land but call for land-use restrictions and obligations imposing limitations of ownership rights. For example, the agricultural measures may come with decreased crop yield. The restoration of ecosystems and set-aside can reduce the arable area to be farmed or make it more difficult to use large agricultural machinery. Unsealing measures are very cost-intensive. From this it becomes clear that it is not always in the interest of landowners to implement such measures voluntarily.

Therefore, a legal obligation to implement such measures should be considered. But how and to what extent can ownership rights be limited in order to apply restrictions and obligations for water-retention measures? And what role do funding programs play in this context? To answer these questions, section 3.2 explains the requirements for and restrictions on land uses. It uses the category of flood generation areas ("Hochwasserentstehungsgebiete") provided in German water law as an example. This regulation is of great interest for the problem at hand as the German legislator has already presented a regulative approach with this, which is not yet to be found in any other country and can serve as a model. The designation and protection of such areas will protect and improve water-retention potential in the hinterland, providing obligations and restrictions for land users, in particular permission and compensation obligations.

In section 3.3, the compatibility of land-use obligations and restrictions with property rights is discussed. In this context, property rights in various European countries and possibilities of limiting them are described. The example of flood generation areas is used to examine whether and to what extent such obligations and restrictions are proportionate. In this context, the distinction between negative and positive obligations is relevant. Since the state's ability to intervene in the property rights of land users is limited, the legal instruments have to be supplemented by funding measures. Therefore, in section 3.4, the possibilities offered by funding programs and especially the instruments of EU agricultural policy to implement the necessary retention measures are examined. Finally, some conclusions are drawn concerning the obstacles of implementing water-retention measures in the hinterland and possible solutions from a legal perspective (section 3.5).

3.2 REGULATIVE APPROACH: FLOOD GENERATION AREAS IN GERMANY

An innovative regulative approach to manage water retention in the hinterland is the instrument of flood generation areas provided in Section 78d Federal Water Act in Germany (WHG, 2009, "Hochwasserentstehungsgebiete"). Flood generation areas are situated in the area of the headwaters, where the increased probability of heavy precipitation coincides with a morphology of the terrain (particularly characterized by steep gradients) that promotes rapid runoff. The protection of these areas aims at improving water retention in the hinterland where floods occur.

Flood generation areas are to be protected by decree. Their protection was newly introduced into the Federal Water Act by the Flood Protection Act II of 30 June 2017 (Flood Protection Act, 2017). The restrictions in the area covered by the decree are intended to prevent the risk of flooding from increasing

further as a result of construction or other measures that promote runoff and hinder infiltration. The regulation on flood generation areas in Section 76 Saxon Water Act (SächsWG, 2013), which has been regulated in the Saxon Water Act since 2004, served as a model.

The state government may determine flood generation areas by decree in accordance with the criteria laid down in Section 78d para. 2 Federal Water Act. In contrast to Section 76 para. 1 Saxon Water Act, according to which the water authorities are obliged to designate flood generation areas, Section 78d para. 2 Federal Water Act places the designation of the flood generation areas at the discretion of the federal states. The reason for this weak formulation is that the federal states (with the exception of Saxony) viewed the instrument with skepticism from the outset (Bundesrat, 2016, pp. 13 ff.). They feared an enormous administrative enforcement effort, costs for authorities and citizens for the approval procedures as well as a restriction of municipal development. Moreover, the exact delimitation of the areas is methodologically difficult. If restrictions are to be imposed on the land users in the areas concerned, the flood-reducing effect must be clearly demonstrable. Added to this is the fact that the topographical conditions for flood generation areas are not present in all federal states. Accordingly, the regulation has so far only been used in Saxony.

The methodology for determining flood generation areas is not defined by law, but is to be determined by the states. In this context, the hydrological and topographical conditions, in particular the ratio of precipitation to runoff, the soil properties, the slope, the settlement structure and the land use are to be taken into account (Section 78d para. 2 Federal Water Act). The Saxon State Office for Environment and Geology has developed a two-step methodology (Grafe et al., 2007). First, the expert system WBS FLAB[1] was used to identify areas with equal runoff formation based on available spatial data on soil/geology, slope, land use, and water network. These areas were subsequently combined with precipitation distribution data. Only areas where flood-triggering heavy precipitation (>50 mm per day) occurs with a frequency of ≥0.35 (equivalent to 3.5 times in 10 years) were considered.

By this procedure, 1,760 km² of the area of Saxony (corresponding to 9.5 percent of the area of the Free State or 8.4 percent without localities) were identified as flood generation areas, of which 52 percent are forest areas, 31 percent grassland, 14 percent arable land and 11 percent localities (inner areas) (Walther, 2008, slide 20; Müller, 2010, p. 318). These are primarily areas in the Ore Mountains, the Lusatian Mountains and the Zittau Mountains in the border triangle of Saxony, Poland and the Czech Republic (see Figure 3.1, 'specialist proposal' areas). This area map is the technical basis for the legal designation of the areas.

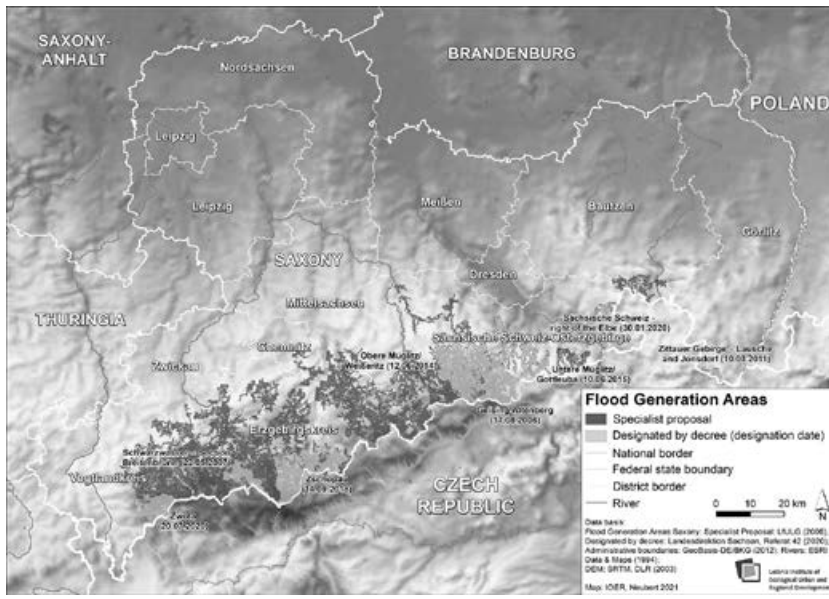

Figure 3.1 *Geographical location of the flood generation areas in Saxony*

The legal designation of flood generation areas is carried out by decree of the higher water authority (Landesdirektion of Saxony), which clearly describes their boundaries and presents them in map form (Section 76 para. 1 sent. 2 SächsWG). When designating the area, the authority has a technical margin of judgment regarding the concrete demarcation of the border. In total, a maximum of +/-10 percent may deviate from the area coverage which was determined by the Saxon State Office for Environment and Geology (Regierungspräsidium Chemnitz et al., 2007, p. 6). So far, a total of eight areas have been designated by decree of the higher water authority in Saxony (see Figure 3.1, 'designated by decree' areas).

The designation triggers the validity of the protection regime regulated in Section 78d para. 3 to 6 Federal Water Act: Section 78d para. 3 Federal Water Act establishes a general principle that, in order to prevent or reduce flood hazards, the water infiltration and water-retention capacity must be maintained or improved in designated flood generation areas (Köck and Maier, 2015, p. 808). In particular, the soil should be unsealed as far as possible and suitable areas should be sustainably afforested.

In addition, Section 78d para. 4 provides a permit requirement for certain projects that may significantly affect the natural water infiltration and water-

retention capacity, which are: 1. the construction or substantial alteration of building structures, including ancillary facilities and other areas with a total area to be sealed of 1,500 square meters or more, 2. the construction of new roads, 3. the removal of forest or the conversion of forest to another type of use, or 4. the conversion of grassland to arable land. This preventive control is intended to prevent a further deterioration of the current situation (Staatsregierung, 2004, p. 49). In accordance with Section 78d para. 6 Federal Water Act, the avoidance or compensation of an impairment of the water infiltration or water-retention capacity has also to be taken into account in the municipal planning of new build zones.

The projects under para. 4 and the plans under para. 6 may only be permitted if they do not impair the water infiltration or water-retention capacity of the soil or if they are adequately compensated by measures such as the creation of forests or the creation of retention areas in the designated flood generation area (Section 78d para. 5). To fulfill this obligation, first of all, it must be examined whether an impairment of the water infiltration and retention capacity can be *avoided*, for example by constructing the roof of a building as a green roof or by fixing the surface with loose gravel, gravel lawn or lawn grid stones.

If an impairment of the water percolation or water-retention capacity of the soil cannot be avoided, Section 78d para. 5 requires an appropriate compensation through the implementation of retention measures elsewhere. The law does not specify which measures are to be considered with regard to an improvement or an appropriate compensation of the water infiltration and water-retention capacity. An indication is given in Section 78d para. 5 sentence 1 No. 2, which mentions as examples the "creation of forest" and the "creation of retention areas". However, the actual spectrum is much broader (see section 3.1).

3.3 RESTRICTIONS OF LAND USE: COMPATIBILITY WITH PROPERTY RIGHTS?

The example of flood generation areas shows how the implementation of water-retention measures can be enforced. In order to apply those measures in practice, different land-use restrictions and obligations have to be imposed, which implies intervention in property rights of land users (see Tarlock and Albrecht, 2018 regarding the regulation of floodplain development). Private land users, especially farmers and private forest owners, are particularly affected.

In contrast to larger measures in floodplains (e.g. the construction of polders or dike relocations), which are concentrated along rivers and which often require the acquisition of land by the state (see Albrecht and Hartmann, 2021), the special feature of water retention in the hinterland is that it requires many

smaller measures distributed over the entire area (see Chapter 4 by Ungvári and Collentine in this volume). This means that a large number of landowners are affected. On the other hand, there is usually neither reason nor interest for the state to get ownership of these areas. Instead, the responsible water authorities must ensure that flood protection-adapted management is carried out on private land. But also in this respect, the question of compatibility with fundamental rights arises, especially with the property rights of the land users.

3.3.1 Property Rights in European Countries and Their Restrictability

Right to property is one of the fundamental rights that is guaranteed in international documents and conventions (see: Article 1 of Protocol No. 1 to the European Convention on Human Rights; Article 17 of Charter of Fundamental Rights of the European Union). Most civil codes and constitutions of European countries guarantee the right of property/ownership (Nikolić Popadić, 2021, p. 216). Ownership right gives the owner the widest right on things in his/her ownership (Sutter-Somm, 2014, pp. 23-24; Stojanović, 1963, p. 29). However, ownership right is not an absolute right (Sutter-Somm, 2014, p. 24). It is possible to restrict it. Examples of provisions that guarantee and protect ownership right, and provisions that allow restrictions to be imposed, can be found in many constitutions and civil codes.

One of the examples is the property right guaranteed in Article 14 Basic Law for the Federal Republic of Germany (Grundgesetz – GG, 1949). Para. 1 sent. 1 prescribes that its "content and limits shall be defined by the laws", which means that the manner in which the owner may use the object of property right/ownership right can be determined by law. So their freedom in that regard can be restricted. Paragraph 2 of Article 14 Basic Law also forms the basis for introducing the restrictions of ownership right: "Property entails obligations. Its use shall also serve the public good." This means that general interests must be taken into account when determining content and limits, i.e. justify restrictions on use. Expropriation must be distinguished from the content and limitation provisions of Art. 14 paras. 1 and 2. It is regulated in Art. 14 para. 3 and requires the complete deprivation of the existing property position by a sovereign act of the state, which is permissible only against compensation (Czybulka, 2020, p. 75).

Provisions which are similar to those contained in the German Basic Law can be found in the Constitution of the Republic of Croatia. Namely, it is prescribed that ownership shall be guaranteed. Besides that, "Ownership shall imply obligations. Holders of the right of ownership and its users shall contribute to the general welfare" (Art. 48 Constitution of the Republic of Croatia – URH, 1990). It is also prescribed that ownership right can be restricted by

law, so the owner is free to use his/her object of ownership within limitations determined by the law (Art. 30–33 Law on Ownership and Other Real Rights – ZOVDSP, 1996; Art. 50, 52 URH).

Other European countries also have provisions in their legislation which guarantee ownership right, but also allowing its limitation. In the Federal Constitution of the Swiss Confederation, guarantee of ownership is listed as one of the fundamental rights (Art. 26 BV, 1999). It is possible to restrict fundamental rights (such as ownership right) if there is a legal basis for restriction and if that would be for "justified public interest or for the protection of the fundamental rights of others" (Art. 36 BV). It is possible to limit or abolish a certain way of use and there is also the possibility of disposing of property rights (Waldmann et al., 2015, p. 521). The conclusion about possibility of limitations can also be drawn from the Swiss Civil Code, as it is stated that the owner is free to dispose of the object of ownership right at his/her will, but "within the limits of the law" (Art. 641 (1) ZGB 1907, amended 2016).

In France, the Civil Code contains similar provisions. It is prescribed that "Ownership is the right to enjoy and dispose of things in the most absolute manner, provided they are not used in a way prohibited by laws or regulations" (Art. 544 Code civil des Français – CC, 1804). According to the Austrian Civil Code when exercising ownership right, the owner cannot interfere with rights of a third party and he/she cannot "violate the restrictions prescribed in the laws for the preservation and promotion of the common good" (Section 364 (1) ABGB, 1811).

In Slovenia, right to private property is guaranteed by the Constitution according to which the manner of enjoining and acquiring property should be determined by the law "in such a way as to ensure its economic, social and ecological function" (Art. 33, 67 Constitution of the Republic of Slovenia – URS, 1991). The Law of Property Code contains a provision stating that ownership is the right to own, use, and enjoy the thing in the most extensive way, and restrictions of that right can be determined only by the law (Art. 37 SPZ, 2002).

Right to peaceful tenure of a person's own property is guaranteed also in the Constitution of the Republic of Serbia. Ownership right can be restricted or revoked only in public interest established by the law, and the manner of its using can be prescribed by the law (Art. 58 URS, 2006). The Law on Foundations of Property Law Relations prescribes that the owner is entitled to possess, use and dispose of their property, but only within the limits determined by the law (Art. 3 ZOSPO, 1980).

Practice of the European Court of Justice is also supportive when it comes to limitation of property rights in the general interest (see Nikolić Popadić, 2021, p. 218). In the decision on the case *Liselotte Hauer v. Land Rheinland-Pfalz* (C 44/79) regarding the prohibition on the new planting of grape vines in the

EU, the court concluded that limitations were not against Article 1 of the First Protocol to the European Convention for the Protection of Human Rights, as a State has the right "to enforce such laws as it deems necessary to control the use of property in accordance with the general interest" (European Court of Justice, 1979). The scope of that (property) right should be measured in relation to its social function; "the substance and enjoyment of property rights are subject to restrictions which must be accepted by each owner on the basis of the superior general interest and the general good" (European Court of Justice, 1979).

The necessary degree of legal operationalization of the property right by the legislator cannot be determined in general terms. In relation to the sustainable use of agricultural or forest land, for instance, legal norms are required that define the most important duties of the owners in the management of the land and provide the administration with a legal basis for measures if these obligations are not fulfilled (Czybulka, 2020, p. 75). Various control approaches and instruments are conceivable here, also side by side or cumulatively, for example with the help of economic incentives (Czybulka, 2020). This is also the case in terms of protecting various aspects of the public good, such as nature conservation or flood control. The restrictions laid down in German water law for flood generation areas are an example of the legal concretization of property rights.

3.3.2 Proportionality of Measures

From the previous, we can conclude that although property/ownership is guaranteed and the ownership right is the widest right on a thing allowing the owner to use it in the most extensive way, there is a legal basis for introducing limitations.

By assigning the legislature the task of defining the content and limits of property (see for example Art. 14 para. 1 sent. 2 of the German Basic Law; Art. 544 Code Civil des Français; Art. 362, 364 of the Austrian Civil Code; Art. 37 of the Law of Property Code of Slovenia; Art. 58 of the Constitution of the Republic of Serbia, Art. 3, 4 of the Law on Foundations of Property Law Relations of Serbia), the guarantee of property is under a legislative proviso ("Gesetzesvorbehalt"). However, not all restrictions are justified. The restrictions must pursue a legitimate objective and be appropriate and necessary to achieve that objective. Finally, the measure must be proportionate, i.e. the intended purpose must not be disproportionate to the severity of the interference with the fundamental right to property (Epping, 2019, margin number 480). The interests of the general public must be taken into account in the weighing process (see Art. 14 para 2 GG).

But what does this mean for the permissibility of land-use restrictions in the hinterland for the purpose of water retention? First of all, the land-use restrictions must pursue a *legitimate objective* and be appropriate and necessary to achieve that objective. These conditions are likely to be fulfilled as a rule: after all, flood protection is undoubtedly a legitimate purpose.

Measures to promote water retention in the area must also be *suitable* for flood protection, i.e. flattening the flood wave. In order to justify interventions in the property rights of landowners, water authorities must be able to show a clear correlation between flood-retention measures and their positive impact (Albrecht and Hartmann, 2021, p. 37). The flood-reducing effect of retention measures in catchments has been confirmed in principle in various research projects (Niehoff, 2002; Feger et al., 2010; Albrecht et al., 2017, pp. 372ff. with further references). Reforestation and forest conversion measures as well as technical flood-protection measures have the strongest effect with regard to water retention. Structurally enhancing renaturation measures have a higher impact than purely agricultural measures. An optimal effect can be achieved by a targeted combination of measures and by avoiding interventions that strongly increase runoff (deforestation, sealing). However, the aforementioned measures are generally only effective with moderate precipitation and soils that are not yet pre-saturated (Feger et al., 2010, pp. 41ff.). Also, flood-reducing effects turn out to be much higher in smaller catchments than in large river basins, where they are hardly measurable (Kirn and Weiler, 2019, p. 28). This should be taken into account when assessing the suitability of the measures.

The *proportionality* of the measure depends on the weight of the pursued purpose and the severity of the interference with the fundamental right. In order to assess the proportionality, we have to classify different types of measures for improving water retention. In doing so, we can distinguish between negative obligations to refrain from action (so-called 'prohibitions') and positive obligations to take certain actions (so called 'commands'). Negative and positive obligations represent different approaches in restricting ownership/property right, and they can be used to classify water-retention measures.

3.3.2.1 Negative obligations

A prohibition is a request for the owner to refrain from certain activities, which can also be qualified as a negative obligation. This can be, for example, prohibition to use agricultural land for construction purposes, or prohibition to use agricultural land for certain production like genetically modified organisms (GMO), prohibition to use pesticides near protected watercourses, etc. A distinction can be made between preventive prohibitions subject to permission (präventives Verbot mit Erlaubnisvorbehalt) and repressive prohibitions subject to exemption (repressives Verbot mit Befreiungsvorbehalt) (Heugel, 2018, Sect. 22 marginal no. 15).

In the case of preventive prohibitions, certain actions – which are basically permitted – are subject to a permit requirement so that the authority can check whether they impair the protective purpose of the area or object. An example is Section 78d para. 4 Federal Water Act, providing a permit requirement for certain projects that may significantly affect the natural water infiltration and water-retention capacity. If this is the case, the deterioration must be compensated. This compensation requirement is crucial as it imposes a prohibition of deterioration on land users. Such regulations do not appear disproportionate: it is not an unreasonable burden for the owner to apply for a permit before any possible deterioration of the status quo caused by him or her. Furthermore, it is in the public interest (and also in line with the polluter pays principle) that deteriorations caused by the intervention are compensated.

In the case of repressive prohibitions, on the other hand, certain actions are generally prohibited, as they commonly impair the protective purpose of the area or object. Exceptions can only be permitted in exceptional cases by way of an exemption, for example to avoid cases of hardship. Such a repressive prohibition represents a stronger encroachment on property rights than a preventive prohibition. It is neither contained in the Saxon regulation (Section 76 Saxon Water Act) nor in the federal regulation (Section 78d Federal Water Act) on flood generation areas.

3.3.2.2 Positive obligations

Commands require the owner to apply certain activities, to use his/her object of ownership right in a certain way (Nikolić, 2018, p. 59; Stojanović, 1963, p. 39). In contrast to prohibitions, commands are not directed at an omission, but at an action, whereby the boundaries can be fluid in individual cases (Heugel, 2018, Sect. 22 marginal no. 15). They can also be referred to as positive obligations. That can be, for example, obligation to use the land in a certain way, to apply certain agricultural methods or a certain composition of tree species in forestry use, etc. (Fischer-Hüftle et al., 2011, Sect. 22 marginal no. 26).

Examples for positive obligations are provided by Section 78d para. 3 sent. 1 Federal Water Act, establishing the obligation that in order to prevent or reduce flood hazards, the water-infiltration and water-retention capacity must be maintained or improved. This command is specified by sentence 2 of Section 78d para. 3 Federal Water Act, after which, in particular, the soil should be unsealed as far as possible and suitable areas should be sustainably afforested. Such obligations are associated with enormous burdens for the owner. Thus, unsealing and reforestation measures are very cost-intensive and, moreover, also associated with the change of the previous land use. Such positive obligations appear normally disproportionate because the owner cannot be expected to implement certain (costly) measures on their land that are primarily in the public interest (Köck and Maier, 2015, p. 808).

If we take a closer look at the regulation, however, we notice that the wording of the obligation is quite vague. In contrast to Section 78d para. 2 Federal Water Act of the first Federal Government's draft bill, according to which the competent authority can "oblige owners and beneficiaries of land to maintain or improve the natural water-infiltration and water-retention capacity of the soil", the adopted version of Section 78d does not contain any powers of intervention against private parties. Corresponding obligations can therefore at best be based on the general powers of water supervision according to Sect. 100 para. 1 sentence 2, which is doubtful, however (Köck and Maier, 2015, p. 809). It follows that the regulation is not readily enforceable, but rather a general principle (Bundesregierung, 2017, p. 31).

This is also consistent with the state of discussion in nature conservation law, according to which, for reasons of proportionality, maintenance, development and restoration measures in protected areas (in contrast to prohibitions), cannot generally be addressed to private parties (Heugel, 2018, Sect. 22 marginal no. 15). Rather, implementation is in the responsibility of the competent authorities, which usually fulfill their obligation through contractual agreements with the affected property owners or by commissioning third parties (Hendrischke, 2012, Sect. 22 marginal no. 23). Cost-intensive obligations to property owners would only be possible under the condition of compensation payments. The legislature can avoid the disproportionate nature of such an obligation by providing the obligation with a compensation provision in favor of the owner (see BVerfG, 1981). Such compensation regulations are of particular importance in environmental law in order to ensure the constitutionality of certain regulations.

3.4 INCENTIVES FOR VOLUNTARY MEASURES THROUGH SUPPORT PROGRAMS

An instrument of implementing measures on private land is funding programs of the government. Such measures can contribute to improve the water-retention potential in the hinterland. These measures are voluntary, i.e., the land owners may decide whether they apply for funding. Therefore, such measures are not in conflict with property rights.

In Saxony, for instance, several funding programs have been adopted in the fields of water management, nature conservation, agriculture and forestry, which can be used to support measures for the improvement of water retention in the hinterland. One example is the funding directive for water bodies/flood protection (RL GH/2018), which provides financial support for, among other things, measures to improve or restore water-retention capacity in flood generation areas (see No. 2.2.5 of the Directive). Under this directive, unsealing measures, for example, are eligible for funding. Funding recipients are, among

others, natural persons and legal entities under private law (No. 3.2 of the Directive). The preservation and development of ecologically valuable water bodies as well as the renaturation or improvement of the ecological potential of semi-natural, developed water bodies are also the subject of funding (No. 2.1.1 of the Directive). Such measures also have a positive effect on the water-retention capacity.

An important source of financial support for water-retention measures is the EU's common agricultural policy (CAP), which can be used for financing measures to improve water-retention potential in the whole European Union. Funds made available through the CAP support both farmers and rural regions. Through the means of agricultural subsidies, land use is influenced over a broad area. This corresponds with the spatial scale of decentralized flood protection, which requires water retention in the hinterland. From the perspective of flood protection, the aim is to direct land management in such a way that it contributes to water retention, e.g. by promoting special farming methods and forms of cultivation.

The starting point is the basic premium scheme for farms/single-area payment scheme under the first pillar of the CAP. It regulates certain positive and negative limitations regarding the way of use of agricultural land and measures that should or should not be applied within agricultural practice. Farmers should respect prescribed minimum standards without special compensation (see Art. 93 Regulation (EU) No. 1306/2013: "good agricultural and environmental condition of land"). If the beneficiaries of the area and livestock payments do not fulfill these obligations, the payments can be reduced or even completely cancelled.

In addition to the basic premium or single-area payment scheme, each farm receives an additional payment per hectare for the application of certain climate and environmentally friendly land-management practices ("greening") (Regulation (EU) No. 1307/2013). Member States must mandatorily allocate 30 percent of their national envelope to the financing of these "greening premiums". Three measures are envisaged in this context: crop diversification, maintenance of existing permanent grassland, and maintenance of land used in environmental interest (i.e. field margins, hedges, trees, fallow land, landscape features, biotopes, buffer strips, wooded areas, nitrogen-fixing plants) (Art. 44, 45, 46, Regulation (EU) No. 1307/2013). These measures can also have a positive effect on water retention. Any violation of the greening obligations entails extremely high penalties for the land users (Massot, 2020).

For measures that exceed the above-mentioned ecological minimum standard, different support/compensation schemes are prescribed within the second pillar of the CAP. One of the ways to "preserve and promote the necessary changes to agricultural practices that make a positive contribution to the environment and climate" are agri-environment-climate payments (Art. 28

Regulation (EU) No. 1305/2013). Such funding regulations could be established by all Member States of the EU. They are co-financed by the European Agricultural Fund for Rural Development and by regional or national funds. The implementation is carried out through rural development programs designed by the Member States. The programs are based on a package of measures to be combined from a catalog of European measures, the details of which are laid down in the Rural Development Regulation (Regulation (EU) No. 1305/2013).

The above-mentioned agri-environmental and climate measures (i.e. maintaining as well as promoting the necessary changes in agricultural practices that have a positive impact on the environment and climate) are a mandatory part of the programs. Financial support can also be provided for organic farming and the implementation of Natura 2000 and the Water Framework Directive. Forestry measures can also be funded by the European Agricultural Fund for Rural Development. This includes, among others, investments in the development of forest areas and improvement of forest viability (afforestation and planting of forests) as well as payments for forest environmental and climate services and forest conservation. As mentioned above, such measures also have a favorable impact on water retention. That model might be further developed in order to expressively integrate measures that can contribute to improvement of water-retention potential in the landscape.

The upcoming CAP funding period (2021–2027) may hold further potential for funding measures to strengthen water retention in the hinterland. One of the changes triggered by the CAP reform is the introduction of eco-schemes. The states should "establish the list of agricultural practices beneficial for the climate and the environment" which should be designed to meet at least one of the prescribed objectives: to "contribute to climate change mitigation and adaptation, as well as sustainable energy; foster sustainable development and efficient management of natural resources such as water, soil and air; contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes" (Art. 6, 28 COM(2018) 392 final). This results in a wide scope for the definition of measures. This system could give more flexibility to Member States to adapt the measures to their national and regional needs (Meredith and Hart, 2019, p. 19).

In the new CAP funding period starting in 2023, 20–30 percent of direct payments from the first pillar are earmarked for eco-schemes (Michel, 2020). The eco-schemes are voluntary for the farmers, which means that they are not a prerequisite for receiving the basic premium. This distinguishes the eco-schemes from the greening requirements (Michel, 2020). Payments should be annual and should cover commitments that go beyond a standard of good agricultural and environmental condition and minimum requirements for the use of fertilizers and plant protection products (Art. 28 COM 2018).

These commitments should also be different from agri-environment-climate commitments in the second pillar of the CAP. Member States can choose to grant this payment as an additional payment to the basic income support, or as a compensatory payment for all or for part of the additional costs and forgone income (Art. 28 COM 2018; Meredith and Hart, 2019, p. 21).

By January 1, 2022, the Member States are to submit a national strategy plan to the EU Commission on the design of future CAP support and the implementation of the eco-schemes. Discussions include, for example, the establishment of flower strips, multi-unit crop rotations, grassland extensification or an increase in non-productive areas, in addition to the minimum share prescribed by conditionality (Michel, 2020). There is overlap between measures that can contribute to water retention in the hinterland (on agricultural land) and the environmental requirements of the new CAP. This is due to the fact that the retention-improving measures in the hinterland do not only help to improve flood protection, but also benefit nature, soil, and water conservation and contribute to climate adaptation (Albrecht et al., 2017, p. 375). Accordingly, fulfillment of the ecological requirements under CAP and funding of measures that are beneficial for water-retention purposes are often congruent. The new eco-schemes should be used to more strongly integrate environmental aspects in general and water aspects in particular into agricultural land-use practices.

There are views in the literature that the minimum standard of environmental protection and good agricultural practice should be an integral part of the farmer's property right and that therefore the farmer's activities that comply with the basic environmental requirements do not involve compensation, while measures which exceed that minimum standard require compensation, including compensation for the reduction in yield resulting from the application of environmental protection measures (Rodgers, 2016, p. 45). This argues in favor of already setting a demanding basic level of ecological requirements within the framework of the conditionality of EU direct payments in the first pillar of the CAP and to tie the further payments of the eco-schemes and the second pillar to more ambitious ecological targets. This aspect should be considered in the decision of how to integrate flood protection purposes in the CAP.

3.5 CONCLUSIONS

Restrictions of ownership right are necessary in order to implement water-retention measures on private land. Constitutions and civil codes of European countries allow limitations of ownership/property rights in order to serve the public good. But the challenge is to establish to what extent the use of the land can be limited in conformity with property rights and when and which kind of compensations/payments should be involved. In accordance with constitutional law, the restrictions of ownership/property rights must fulfill

certain criteria in order to be allowed. Restrictions must pursue a legitimate objective and have to be necessary and appropriate to achieve this objective. Flood protection is certainly a legitimate purpose for introducing limitations of ownership right and the measures that promote water retention can contribute to flood protection. The proportionality of the measures has to be assessed in a weighing process in the individual case. The interests of the general public for an intact environment and for flood protection must be taken into account in this process.

The regulation of the instrument of flood generation areas in German and Saxon water law is an example of how to identify, designate and protect the water-retention potential in areas where floods arise. The aim of the legal provisions is to maintain and improve the water-retention capacity in these areas. All land uses are affected, especially agriculture and forestry, but also the use of the areas for settlement purposes. Protection is achieved through permit and water-retention compensation obligations for measures that impair water retention, as well as improvement requirements. While the permit and compensation obligations represent a proportionate restriction of the fundamental property right, this is not readily the case for costly improvement measures such as unsealing and reforestation measures. This requires the use of financial incentive and financial compensation to enforce such measures in a constitutionally compliant manner.

Challenges in implementation of water-retention measures might be overcome with different funding programs. As far as water-retention measures should be implemented on agricultural land, we can refer to CAP in search for potential solutions. Some of the measures that farmers should respect as minimum standards without special compensation, like in the case of good agricultural and environmental condition of land, are also beneficial for water-retention purposes. We suggest that minimum standards that should be followed within the CAP can also include more measures that will direct the land use in order to achieve objectives in the field of water retention for flood prevention. Environmental protection and climate-change mitigation/adaptation are part of the CAP and that scope can be expanded towards the integration of flood-prevention measures. This is supported by the fact that agricultural land use is directly connected to issues of all these three fields.

Unfortunately, to date water policy is only partially integrated into CAP, and the measures mostly focus on the protection of water against pollution (European Court of Auditors, 2014), although they might be further developed in order to also integrate measures of natural flood protection. Payments within the CAP are one of the ways for funding implementation of measures that go beyond the minimum standard and therefore need compensation to be compatible with property rights. The challenge under the new CAP is to draw the line between this minimum standard that does not require compensation and

more extensive measures that have to be compensated. The minimum standard should not be set too low and compensation payments should be linked to ambitious targets. That also applies with regard to water-retention measures.

ACKNOWLEDGMENT

The authors would like to thank Dr. Marco Neubert (Leibniz Institute of Ecological and Regional Development Dresden) for valuable comments and for preparing the figure. This research is an outcome of the COST Action No. CA16209 Natural flood retention on private land, LAND4FLOOD (www.land4flood.eu), supported by COST (European Cooperation in Science and Technology, www.cost.eu). Open access of this chapter is funded by LAND4FLOOD.

NOTE

1. *W*issens*b*asiertes *S*ystem *Fl*ächen gleicher *Ab*flussbildung (Knowledge based system areas of equal runoff formation) (Seidler and Merta 2005).

REFERENCES

ABGB (1811). Austrian Civil Code (Allgemeines bürgerliches Gesetzbuch für die gesammten deutschen Erbländer der Oesterreichischen Monarchie), JGS No. 946/1811, last amendment: BGBl. I Nr. 148/2020.

Albrecht, J. and Hartmann, T. (2021). Land for flood risk management: Instruments and strategies of land management for polders and dike relocations in Germany. *Environmental Science & Policy*, 118, 36–44.

Albrecht, J., Neubert, M., Bianchin, S., and Lupp, G. (2017). Hochwasserentstehungsgebiete: Leistungsfähigkeit und Grenzen eines innovativen Instruments zur Hochwasservorsorge. *Umwelt- und Planungsrecht*, 37(10), 368–377.

Bundesrat (2016). Stellungnahme zum Entwurf eines Gesetzes zur weiteren Verbesserung des Hochwasserschutzes und zur Vereinfachung von Verfahren des Hochwasserschutzes vom 16. Dezember 2016. Bundesrat printed paper 655/16 (Beschluss).

Bundesregierung (2017). Entwurf eines Gesetzes zur weiteren Verbesserung des Hochwasserschutzes und zur Vereinfachung von Verfahren des Hochwasserschutzes (Hochwasserschutzgesetz II). Bundestag printed paper 18/10879.

BV (1999). Federal Constitution of the Swiss Confederation (Bundesverfassung der Schweizerischen Eidgenossenschaft) of 18 April 1999 (Status as of 1 January 2021).

BVerfG – Bundesverfassungsgericht (1981). Beschluss vom 14.07.1981 – 1 BvL 24/78 (Pflichtexemplarentscheidung).

CC (1804). French Code Civil (Code civil des Français), last amended by Ordinance No. 2016-131 of 10 February 2016.

COM – European Commission (2018). Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic

Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulation (EU) No 1305/2013 of the European Parliament and of the Council and Regulation (EU) No 1307/2013 of the European Parliament and of the Council, COM(2018) 392 final – 2018/0216 (COD).

Czybulka, D. (2020). Eigentum an Natur – Das Waldeigentum. *Natur und Recht*, 42, 73–84.

Epping, V. (2019). *Grundrechte* (8th edition). Berlin: Springer.

European Court of Auditors (2014). Integration of EU water policy objectives with the CAP: A partial success. Luxembourg. https://www.eca.europa.eu/Lists/ECADocuments/SR14_04/SR14_04_EN.pdf.

European Court of Justice (1979). Judgment of the Court of 13 December 1979. *Liselotte Hauer v. Land Rheinland-Pfalz*, Case 44/79.

Feger, K.-H., Frank, S., and Wahren, A. (2010). *Ausgleichsmaßnahmen auf landwirtschaftlich genutzten Flächen in Hochwasserentstehungsgebieten*. Leitfaden.

Fischer-Hüftle, P., Schumacher, J., and Schumacher, A. (2011). § 22 BNatSchG: Erklärung zum geschützten Teil von Natur und Landschaft. In J. Schumacher and P. Fischer-Hüftle (eds.), *Bundesnaturschutzgesetz. Kommentar* (2nd edition). Stuttgart: Kohlhammer.

Flood Protection Act (2017). Gesetz zur weiteren Verbesserung des Hochwasserschutzes und zur Vereinfachung von Verfahren des Hochwasserschutzes (Hochwasserschutzgesetz II) of 30 June 2017. Federal Law Gazette I, p. 2193.

GG (1949). Grundgesetz für die Bundesrepublik Deutschland 1949, last amended 29.9.2020, Federal Law Gazette I, p. 2048.

Grafe, M., Seidler, C., and Walther, J. (2007). Entwicklung einer Methodik zur Identifizierung von Hochwasserentstehungsgebieten, Wasserbaukolloquium 2007: Fünf Jahre nach der Flut. In *Hochwasserschutzkonzepte, Planung, Berechnung, Realisierung*, Dresdner Wasserbauliche Mitteilungen 35, pp. 271–280.

Hendrischke, O. (2012). Erklärung zum geschützten Bestandteil von Natur und Landschaft. In S. Schlacke (ed.), *Gemeinschaftskommentar zum Bundesnaturschutzgesetz*. Cologne: Carl Heymanns Publishing.

Heugel, M. (2018). § 22 Erklärung zum geschützten Bestandteil von Natur und Landschaft. In S. Lütkes and W. Ewer (eds.), *Bundesnaturschutzgesetz. Kommentar* (2nd edition). Munich: C. H. Beck.

Kirn, L. and Weiler, M. (2019). *Projektbericht Hochwasserentstehungsgebiete*. Professur für Hydrologie, Albert-Ludwigs-Universität Freiburg.

Köck, W. and Maier, J. (2015). Die Ausweisung von Hochwasserentstehungsgebieten. *Sachsen, Natur und Recht*, 37, 805–811.

Massot, A. (2020). Die erste Säule der Gemeinsamen Agrarpolitik (GAP): II – Direktzahlungen an Inhaber landwirtschaftlicher Betriebe. https://www.europarl.europa.eu/factsheets/de/sheet/109/die-erste-saule-der-gemeinsamen-agrarpolitik-gap-ii-direktzahlungen-an-inhaber-l.

Meredith, S. and Hart, K. (2019). CAP 2021–27: Using the eco-scheme to maximise environmental and climate benefits. Report for IFOAM EU by IEEP. https://ieep.eu/uploads/articles/attachments/4791a221-8525-4410-848f-8fb84f5a621a/IFOAM%20EU_Eco-scheme_Report_Final.pdf?v=63718564537.

Michel, J. (2020). Gemeinsame Agrarpolitik. Was steckt hinter den Eco-Schemes? *Agrarheute*, 30 October. https://www.agrarheute.com/politik/steckt-eco-schemes-574501.

Müller, U. (2010). *Hochwasserrisikomanagement: Theorie und Praxis*. Wiesbaden: Vieweg & Teubner Publishing.

Niehoff, D. (2002). Modellierung des Einflusses der Landnutzung auf die Hochwasserentstehung in der Mesoskala. Dissertation, Universität Potsdam (Brandenburgische UmweltBerichte 11).

Nikolić, D. (2018). Climate change and property rights changes. In F. van Straalen, T. Hartmann, and J. Sheehan (eds.), *Property Rights and Climate Change: Land Use under Changing Environmental Conditions* (pp. 52–70). London: Routledge.

Nikolić Popadić, S. (2021). Flood prevention in Serbia and legal challenges in obtaining the land for flood risk management. *Environmental Science & Policy*, 116, 213–219.

Regierungspräsidium Chemnitz, Regierungspräsidium Dresden, Sächsisches Landesamt für Umwelt und Geologie (2007). *Grundlagen und Methodik der Ausweisung der Hochwasserentstehungsgebiete und Handlungsempfehlungen für Ausgleichs- und Ersatzmaßnahmen*.

Regulation (EU) No. 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No. 1698/2005, OJ L 347, 20.12.2013, pp. 487–548.

Regulation (EU) No. 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No. 352/78, (EC) No. 165/94, (EC) No. 2799/98, (EC) No. 814/2000, (EC) No. 1290/2005 and (EC) No. 485/2008, OJ L 347, 20.12.2013, pp. 549–607.

Regulation (EU) No. 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No. 637/2008 and Council Regulation (EC) No. 73/2009, OJ L 347, 20.12.2013, pp. 608–670.

Richert, E., Achtziger, R., Seidler, C., Mertha, M., Matschullat, J., Rüter, S., Wilhelm, E.-G., Schmidt, P. A., Zocher, J., and Roch, T. (2007). Wasser + Landschaft. Arbeitsgrundlage zur Optimierung einer nachhaltigen Landnutzung aus Sicht des Hochwasserschutzes und des Natur- und Landschaftsschutzes, ed. Deutsche Bundesstiftung Umwelt and Interdisziplinäres Ökologisches Zentrum (IÖZ) of TU Bergakademie Freiberg, Osnabrück.

Rieger, W. and Disse, M. (2010). Dezentraler Hochwasserschutz an Fließgewässern und im Einzugsgebiet. *Hydrologie und Wasserbewirtschaftung*, 27, 71–80.

RL GH (2018). Förderrichtlinie Gewässer/Hochwasserschutz of 18. Juni 2018, SächsABl, p. 832.

Rodgers, C. (2016). *Agricultural Law* (4th edition). London: Bloomsbury Professional.

SächsWG (2013). Saxon Water Act (Sächsisches Wassergesetz) of 12 July 2013, Saxon Law and Ordinance Gazette, p. 503, last amended by Act of 8 July 2016, Saxon Law and Ordinance Gazette, p. 287.

Seidler, C. and Merta, M. (2005). Prozess- und skalenbezogene Erfassung und Modellierung der Bildung schneller Abflusskomponenten. Abschlussbericht zum DFG-Bündelprojekt "Abflussbildung und Einzugsgebietsmodellierung". IHI Zittau (unpublished).

Staatsregierung (2004). Zweites Gesetz sur Änderung des Sächsischen Wassergesetzes. Gesetzentwurf, LT-Drs. 3/9974, S. 115.

SPZ (2002). Law of Property Code (Stvarnopravni zakonik) 2002, last amended Official Gazette of the Republic of Slovenia No. 23/2020.

Stojanović, D. (1963). *Positive-Legal Restrictions of Private Ownership* (Pozitivno-pravna ograničenja privatne svojine). Belgrade: Institut za uporedno pravo.

Sutter-Somm, T. (2014). *Schweizerisches Privatrecht*, Band V/1: *Eigentum und Besitz, 2*. Vollständig überarbeitete Auflage. Basel: Helbing Lichtenhahn Verlag.

Tarlock, D. and Albrecht, J. (2018). Potential constitutional constraints on the regulation of flood plain development: Three case studies. *Journal of Flood Risk Management*, 11(1), 48–55.

URH (1990). Constitution of the Republic of Croatia of 21 December 1990 (Ustav Republike Hravtske), last amended Official Gazette of the Republic of Croatia, No. 05/2014.

URS (1991). Constitution of the Republic of Slovenia (Ustava Republike Slovenije) from 1991, last amended Official Gazette of the Republic of Slovenia No. 75/2016.

URS (2006). Constitution of the Republic of Serbia (Ustav Republike Srbije), Official Gazette of the Republic of Serbia, No. 98/2006.

Wahren, A., Frank, S., Walther, P., Schmidt, W., and Feger, K.-H. (2011). Erstellung eines Leitfadens für Ausgleichsmaßnahmen auf landwirtschaftlich genutzten Flächen in den Hochwasserentstehungsgebieten Sachsens. *Hydrologie und Wasserbewirtschaftung*, 55(3), 155–163.

Waldmann, B., Belser, E. M., and Epiney, A. (eds.) (2015). *Bundesverfassung, Basler Kommentar*. Basel: Helbing Lichtenhahn Verlag.

Walther, P. (2008). Hochwasserentstehungsgebiete in Sachsen – ein Instrument für den Hochwasserschutz in Sachsen. Vortrag auf dem 10. Fachsymposium für Umwelt und Raumnutzung, 27 November.

WHG (2009). Federal Water Act (Wasserhaushaltsgesetz) of 31 July 2009, Federal Law Gazette I, p. 2585, last amended by Act of 19 June 2020, Federal Law Gazette I, p. 1408.

ZGB (2016). Swiss Civil Code (Schweizerisches Zivilgesetzbuch vom 10. Dezember 1907), last amended by Act of 17 June 2016.

ZOSPO (1980). Law on Foundations of Property Law Relations (Zakon o osnovama svojinskopravnih odnosa) 1980, last amended Official Gazette of the Republic of Serbia, No. 115/2005.

ZOVDSP (1996). Law on Ownership and Other Real Rights (Zakon o vlasništvu i drugim stvarnim pravima) 1996, last amended Official Gazette of the Republic of Croatia, No. 152/2014.