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Rivers and flood risk management in rural areas: some evidence from classical Roman law

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Abstract
Especially in antiquity, rivers would both consist of a great resource, and they would exert a fearsome destructive power—*vis cui resisti non potest*, as Roman jurists used to assert. To prevent the risk of floods, Romans would not only carry out important public works, but also establish technical-juridical rules to induce both private individuals and communities to take care of the problem. Those rules were partly drawn up in public documents (such as praetorian *edicta, leges dictae* and so on), partly conceived by Roman jurists in a continuous debate starting at least from the first century AD to the third century AD and partly developed by discussions among Roman land surveyors.

Keywords Rivers · Floods risk · Roman jurists · Roman land surveyors · Measures to prevent floods

Introduction

In the ancient Roman world—possibly much more than nowadays, at least in relative terms—large and permanent rivers were widely exploited as a useful resource: not only for fishing, water drawing, channelling through irrigation canals, supplying towns with water, but also for the transport of passengers and goods particularly for commercial purposes (Campbell 2012, 21–30; 199–235; 246–328; Felici 2016; Bruun 2019, 73–89). Just think of the case of the Po valley, where a large network of rivers and artificial canals (*fossae*) was created to permit an easy movement of goods over a large rural territory, even to the cities' centres or across alpine valleys (Uggeri 1975, 1987; 2015–2016; Calzolari 2004; Campbell 2012, 219–229; 302–309; Franceschelli and Dall'Aglio 2014, 2–14; Felici 2016, 203–247; Corti 2018, 205–215). To do so, Romans would exploit the currents of rivers or use the technique of towing.

However, in antiquity nobody would doubt that rivers could also be a source of extreme danger. Anyone was aware of the destructive, sudden, untameable and terrifying forces of the waters: a true punishment from the gods that had even hit Rome itself several times

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(Segarra Lagunes 2004; Leveau 2008, 137–146; Campbell 2010, 318–320; Maganzani 2010a, 175–193; Maganzani 2010b, 247–262; Montero 2012; Mattioli 2013, 19–26; Maganzani 2014a, b, 65–80). This is why Roman jurists would describe *inundationes* along with *incendia*, *ruinae*, *naufragia*, *terrae motus* etc. as a «*vis maior cui resisti non potest*» (example [ex.] I.3.23.3; D.19.2.15.2; D.50.17.23) and Ulpian (third century A.D.) in particular would ascribe a sort of '*vis divina*' to these phenomena (D.39.2.24.4).

In fact, rivers are often unstable by nature and not only can flood but also erode banks and carry away debris or large portions of land depositing them further downstream, sometimes even abandoning its course to flow elsewhere (Campbell 2012, 4–9: see for example Fest., v. *torrens*, 484 L.; Sic. Flac., *De cond agr.*, Th. 15,3; Hyg. grom, *De gen. contr.*, 87,12–15; Isid., *Etym.* 13.21.1–2; Ovid., *Rem. am.* 651–654). The power of these phenomena was perhaps more evident in ancient times than it is nowadays: the fact is not that rivers no longer provoke natural disasters—on the contrary «river valleys … in the Mediterranean area will have been much the same in the ancient Roman world as they are today» (Campbell 2012, 11)–, rather that rivers have often been forced to flow between artificial riverbanks (ex. Colucci 2007; Russo 2017; Pasquaré Mariotto and Tibaldi 2019) and this has, in part, reduced the risk of regular floods: as, for example, in Rome with the construction in the eighteenth century of the so-called 'muraglioni'.

Public and imperial works

Public interventions to prevent the floods of rivers and *fossae* (such as dredging; the digging of diversion canals; the cleaning of riverbeds; the bordering and fortification of riverbanks; the ban on abusive occupations of the just mentioned riverbanks, etc.) are all well attested.

A famous example is the excavation of diversion canals carried out by *Marcus Aemilius Scaurus* in 115 or 109 BC at the confluence of the Po river with the Trebbia river between the towns of Piacenza and Parma (Dall'Aglio and Franceschelli 2012, 77–104; Dall'Aglio 1995, 87–93). The magistrate—observes Strabo, *Geogr.* 5.1.11—«drained the plains by navigable canals from the Po to the country of the Parmesans. For the Trebbia meeting the Po near Placentia, and having previously received many other rivers, is over-swollen near this place» (Dall'Aglio 1995, 87–93).

Of course these secondary canals were not always enough to prevent any river's flood: like for example on the Po delta where Plinius the elder attests (*Nat. hist*. III.20.119) that «*Nec alius amnium tam brevi spatio maioris incrementi est. Urguetur quippe aquarum mole et in profundum agitur, gravis terrae, quamquam diductus in flumina et fossas inter Ravennam Altinumque per CXX, tamen, qua largius vomit, Septem Maria dictus facere*» ("Nor does any other river increase so much in volume in so short a distance; in fact, the vast body of water drives it on and scoops out its bed with disaster to the land, although it is diverted into streams and canals between Ravenna and Altino over a length of 120 miles; nevertheless where it discharges its water more widely, it forms what are called the Seven Seas.").

We also know from Gellius' *Noctes Atticae* 11.7.2–4 that in Republican times public contracts used to be stipulated by censors with publicans to clear the rivers from the trees protruding from the riverbanks or immersed in water: in particular Gellius informs us of an old praetorian edict (*edictum de fluminibus retandis*) he had found in the library of Trajan, which provided an action against publicans who had not carried out their

assignments in a correct way (Viganò 1969, 168 ss.; Albanese 1991, 19 ss.; Masi Doria and Cascione 2010, 290–292).

Walls, *moles* and *aggeres* aiming at preventing erosion or overflow along public riparian streets or near public bridges are also attested by archaeological studies (Quilici and Quilici Gigli 2020, 162–163): for example in a stretch of the via Appia along a swamp between *Minturnae* et *Sinuessa* (so-called 'Pantano di Sessa'), one can still see some «blocs polygonaux … dans un terre-plein syrélevé d'un demi-mètre par rapport à la surface du sol …» (Biundo 2014, 101) probably erected to prevent the problems of swamp formation and floods typical of the area.

Moreover, several sources document the taking charge of the problem by emperors. They are well known for the city of Rome (a summary in Gregori 2017, 207–209): for example, the works of enlargement and cleaning ordered by *Augustus* on the *alveum Tiberis* and its riverbanks (Svet., *Aug*. 30.1; *Hist. Ps.-Isidor*. 5); the institution of the *curatores alvei Tiberis et riparum* by Augustus (Svet., *Aug*. 37.1) or Tiberius (Cass. Dio 57.14.7–8; Tac., *Ann*. 1.76.1: Masi Doria, Cascione 2010, 287; Campbell 2012, 317–319); the big project of *Ateius Capito* and *Lucius Arruntius* in 15 AD to divert the river's tributaries to protect the town (Tac., *Ann.* 1.76, 79. Aldrete 2007, 199; Leveau 2008, 137–146; Cappelletti 2009, 235–253) which, although unfulfilled, shows the mastery of the Roman administration «de concevoir un plan de protection contre le risque à l'échelle d'un bassin, le premier sur lequel on possède des détails» (Leveau 2008, 139).

Some cases of imperial interventions in Italy are also documented by the inscriptions: a significant example is the famous set of inscriptions celebrating *Claudius* (CIL XIV.85) and *Traianus* (CIL XIV.88) for having saved Rome from flood with digging diversion canals from the *Tiber* to *Portus*; another example is a stone inscription from Capua attesting some works of Caracalla along the via Appia («*viam inundatione aqu(a) e/interruptam restituit*»: Biundo 2014, 102).

Imperial interventions are attested also in the provinces, both for civil and military goals, usually achieved by the troops (Felici 2016): on the civil side, for example, *Augustus*, soon after the acquisitions of Egypt «set his soldiers at work cleaning out all the canals into which the Nile overflows, which in the course of many years had become choked with mud» (Svet., *Aug.* 18). The fact that, under this emperor and later, Egypt was the main supplier of grain for the population of Rome, can also explain an Ulpian's fragment, D.47.11.10 IX *de off. proc*.: it issues an *extra ordinem* procedure in front of the *praefectus* of Egypt and a conviction to forced labor or mines for the criminal offence of reducing the capacity of the embankments to maintain the water from the flood. The *crimen* consisted in breaking or pulling down the embankments designed to contain the waters of the Nile, digging up some typical trees suitable to firm «*aggeres niloticos, per quos incrementa Nili dispensantur et coercentur*», or dikes, sluices and breaches made in the embankments (Skalec 2016, 211–213).

A further example are two letters of Hadrian found in a city archive of Koroneia, in Boiotia, in which the emperor ordered the town to build embankments in the river basin of Kopai lake to prevent floods (Fossey 1991, 9–10 no. 6–7; Fossey 1981–82, 48–49 no. 6–7; see also Bruun 2012, 26 nt. 75; Maganzani 2014a, b, 73 nt.11).

On the military side, one can mention, for example, *Germanicus* during his military campaign in Germany in 15 AD: hurrying his troops in quick marching against the Chatti from *Taunus mons*, he left behind his legate *Lucius Apronius* to carry out works of *munitiones viarum et fluminum* fearing that «rains and floods were to be apprehended on the return journey» (Tac., *Ann.* 1.56).

Another example is the excavation of a diversion canal of Orontes river in Seleucia Pieria during the Flavian and Antonin dynasties and the following dredging works ordered by Diocletian (Liban., *Orat*. 20.18) and Valens (CTh. 10.23.1).

We can also quote in full the significant and striking description by *Ammianus Marcellinus* 28.2.1–4 of the military works ordered by Valentinian in 369 AD along the Rhine, for which the emperor put in charge *artifices periti aquariae rei*: «Valentinian, having several great and useful projects in his head, began to fortify the entire banks of the Rhine, from its beginning in the Tyrol to the straits of the ocean, with vast works; … 2. At last considering that one fortress, of which he himself had laid the very foundations, though sufficiently high and safe, yet, being built on the very edge of the river Neckar, was liable to be gradually undermined by the violent beating of its waters, he formed a plan to divert the river itself into another channel; and, having sought out some workmen who were skilful in such works and collected a strong military force, he began that arduous labour. 3. Day after day large masses of oaken beams were fastened together, and thrown into the channel, and by them huge piles were continually fixed and unfixed, being all thrown into disorder by the rising of the stream, and afterwards they were broken and carried away by the current. 4. However, the resolute diligence of the emperor and the labour of the obedient soldiery prevailed; though the troops were often up to their chins in the water while at work; and at last, though not without considerable risk, the fixed camp was protected against all danger from the violence of the current, and is still safe and strong».

Finally we can mention the so-called 'Justinian system' created in 525 by the byzantine emperor to prevent the recurrence of flood disasters in the city of Urfa due to the Karakoyun river: so he built a huge wall of stone, an artificial channel and three bridges that would have been used for centuries by many civilizations after (Kürkçüoğlu et al. 2013, 683–691).

The task of this paper

I hope I will pay more attention to all this evidence of public or imperial works on rivers in a future research; but in this text, I prefer to focus on the defence strategies from river floods, which turn out to be applied in rural contexts by communities and individuals and with the technical-juridical remedies elaborated by classical Roman law in order to promote this widespread involvement in the prevention of floods. In fact—as recently noticed—the water infrastructure protection was «Gegenstand der Zusammenarbeit von Privaten, lokalen, provinzialen oder kaiserlichen Behörden» (Möller and Ronin 2019, 9, 17).

Some of these rules and remedies were fixed in the so called *leges agro dictae* issued by the founders on the occasion of a colonial foundation or in the colonial and municipal statutes; but there were also private law rules and good practices we learn both from the texts of the Roman jurists and the Roman land surveyors treatises.

In fact, confronted by the ambiguity of rivers that, on one hand, were significant resources, and on the other had terrible destructive powers, these specialists often intervened to elaborate a series of rules, in an uninterrupted debate, expecially from the first to the third century A.D. (Campbell 2012, 100–117). Actually *iuris periti* and *agrimensores,* «while performing different functions and responding to different needs, both dealt with legal issues arising from the alteration of public rivers» (Keenan-Jones 2014, 239). In particular, jurists made several clarifications on terminology and definitions (*flumen, flumen publicum/privatum; rivus, fossa, incile, saepta* etc.), commented on the contents of the

praetorian *edicta* on the matter (*interdicta de fluminibus* etc.) and solved disputes among individuals (Fiorentini 2003, 62–65). Land surveyors dealt with issues such as *condiciones agrorum* (*agri divisi et adsignati, occupatorii* etc.) and possible *controversiae* in the different types of land among communities (*coloniae, municipia* etc.: ex. *controversia de iure territorii; de locis publicis; de locis relictis et extra clusis*), communities and individuals (ex. *controversia de subsicivis*) and individuals themselves (ex. *controversia de alluvione* etc.: Maganzani 1997a; Castillo Pascual 2013, 221–233). But both *iurisperiti* and *agrimensores* show that Strabon (*Geog*. 5.3.8) told the truth noting that Romans, after obtaining several advantages from the nature of their country, added others beyond their foresight (*προσεθεσαν δε Ῥωμαιοι και τα εκ της προνοιας*).

The jurists who more often address these issues are Ulpian and Paul (third century AD), but it is notable that they often quote the opinions of earlier jurists, dating back to the Augustan age or shortly afterwards (ex. *Labeo, Tubero, Cassius*). Also the jurist *Florentinus* (third century AD) wrote a significant text about the so-called *ius alluvionis* (see § 2) quoting *Trebatius,* a member of the entourage of *Caesar*, but still alive and active at the age of *Augustus* (D. 41.1.16: Maganzani 1993, 207–258; Fiorentini 2003, 243–255; Maganzani 2022, 123–128).

This is true also for the *gromatici veteres* we will quote in the present paper, dating back to first-third century AD (*Hyginus, Agennius Urbicus, Hyginus gromaticus, Siculus Flaccus*): in fact they do not fail to mention opinions of Roman jurists of the first century AD too (ex. *Cassius*).

I do not think it is a fortuitousness.

Actually, it was in the first century AD that the Roman jurists, perhaps also because directly solicited by the emperor (Montero 2012), intervened to fix some rules in the regulation of water management, with particular reference to rural Italy, a geographical area characterized by abundant waters, potentially dangerous, above all in the context of undulating terrain (Maganzani 1997b, 343–390; 2014, 65–80; Masi Doria 2004, 201–218; Pavese 2004; Campbell 2009 189–193; Castillo Pascual 2012, 1–23; Barbati 2014, 349–378; Barbati 2015, 218–293; Barbati 2017, 31–42; Ronin 2018, 107–115; Hermon 2020, 375–418; Hermon 2021,1–26). By the way, this interest can be explained in the light of the Augustan intervention of territorial and administrative reorganization of Italy, particularly documented by the land surveyors' sources (Maganzani 2018, 220).

In this paper, I will not deal with the complex distinctions between public and private rivers, waterways, *fossae*, torrents, *rivi* etc., widely discussed by the jurists and extensively examined by the Roman law scholars (see Fiorentini 2003, 67–158), unless this topic will be relevant to a specific situation I mention. In fact, on the one hand, what I care about is describing the forms and the rules of the private and collective participation of Roman peasants to the prevention of floods, on the other, it is well known that also small, not perennial and private rivers often provoke, even nowadays, big flood damages (Quilici Gigli 2008, 217–228; Quilici and Quilici Gigli 2020, 161–192; Bannon 2017, 60–89). Furthermore—as recently said (Bannon 2017, 64)—flowing water is a 'commons' and «rather than a discreet legal category, a 'commons' is a resource, public or private, that is open to shared use, difficult to regulate, and diminished by use». So the main question is: «how are rights in them configured?».

Regarding the epigraphic documents, the ones we will quote in this paper date back to the period between the first century BC and the second century AD. Most of them come from Italy and Spain because of the vast amount of evidence on the matter available in these regions. Of course, all data must be interpreted in their own context without any generalisation. In fact, the territorial extent of the Roman Empire embraced regions with a

very distinct geography and equally specific climate and river systems engendering a wide range of flooding effects (Campbell 2012, 21–30). This is even noted by the Roman land surveyors (Agenn. Urb., *De contr. agr.*, Th. 49, 7–8): «… *in Italia aut quibudam provinciis non exigua est iniuria, si in alienum agrum aquam immittas; in provincia autem Africa, si transire non patiaris*» (Transl. Campbell 2000, 47) ("In Italy or in certain provinces, it is a serious offence if you divert water onto someone else's land, but in the province of Africa, if you prevent water from crossing their land").

Agri limitati and arcifinii

A further preliminary remark is required about the different approach to the environmental upheavals caused by watercourses in the territories which had been subject to colonisation or 'viritane' assignments (*agri divisi et adsignati* or *limitati*) and in the unsurveyed ones (*agri arcifinii*). To better explain my point of view I will divide this paragraph in three parts.

a. When a territory was *divisus et adsignatus*, the distribution of allotments was preceded by a careful evaluation of the area for the purpose of a complete territorial planning: usually the founders would orientate the axes on the base of the orographic and hydrographic features, on the slope of the land, on the flow of rainwater along the drainage channels or on the base of pre-existing lines of communication like *viae* and waterflows (see the texts of *Corpus Agrimensorum Romanorum*: Blume et al. 1967; Thulin 1913; Clavel-Levêque et al. 1993, 1996; Guillaumin 1996; Behrends et al. 1998; Campbell 2000; Behrends et al. 2005; Guillaumin 2005, 2010, 2017; see also Toneatto 1994–1995; Del Lungo 2004; Chouquer and Favory 2001; Chouquer 2010; Campbell 2012, 103–104; Fögen 2014, 215–238; Guillaumin 2015, 9–34; Cera 2018, 101–105). Moreover, in areas crossed by major and dangerous rivers, the control of the waterflow could be obtained also by reducing the volume of the latter through diversions such as secondary canals: their effect was on the one hand to create a rational irrigation system, on the other «un'efficiente valvola di sicurezza contro i pericoli di inondazione delle zone più declivi, in quanto in caso di necessità 'era' possibile alleggerire la portata e l'onda d'urto della piena deviando parte della fiumana nei canali artificiali» (Mattiocco—Van Wonterghem 1995, 201; see also Campagnoli and Giorgi 2009, 299–311; Dall'Aglio 2009, 279–297; Camerieri et al. 2009, 325–345; Campbell 2010, 320–321; Ortalli 2010, 335–354; Capogrossi Colognesi 2011–2012, 203–228; Franceschelli, Dall'Aglio 2012, 77–104; Biundo 2014, 97–114; Dall'Aglio et al. 2014, 21–38; Maganzani 2014a, b, 71–72; Felici 2016).

These technical choices were made by the *agrimensores* as part of a complex project of territorial planning decided by the central power: it was a project redefining in detail not only the overall design of a vast area, but also the legal framework, the relationship between public and private, the intended use of single parts (agriculture, pasture, swamps, rivers, artificial canals, waterways, etc.) and their measures in *iugera* (Dall'Aglio and Franceschelli 2012, 84–85). All this was reported in a bronze *forma agrorum*, kept both locally and in Rome. Other documents, often called *commentarii*, would contain the names of the assignees of the lots and the *modus* granted to each one.

This is well explained in a quotation from the jurist *Trebatius* (caesarian-augustean age) in a fragment of *Florentinus* (third century AD): «*Trebatius ait agrum … limitatum fuisse ut sciretur quid cuique datum esset, quid venisset, quid in publico relictum esset*» ("*Trebatius* says that a territory … has been limited for the purpose to let people

know what has been given to anyone, what has been sold, what has been left as public": D.41.1.16, 6 *inst.*: Maganzani 1993, 207–258; Maganzani 2022, 123–128). This human intervention on the territory was considered by the contemporaries so invasive that *Florentinus*, in the same text, specifies that in *agri limitati* «*ius alluvionis locum non habere constat*» adding that this has also been set by a constitution issued by the emperor *Antoninus Pius*: this means that the natural law rule according to which the surface of a riparian land could increase or decrease as a result of the river flow (Maganzani 2022, 123–128) could not be applied in centuriated areas. In fact, the allotments had been measured in *iugera* and were accordingly mentioned on the *forma agrorum* or on documents attached (see for ex. Sic. Flac., *De cond. agr.*, Th. 118, 16–19). Because of this, eventual riverbed strips abandoned by the water remained public as riverbed.

b. In contrast, the so-called '*agri arcifinii*' or '*occupatori*' were not measured out (*qui nulla mensura continentur*) and, according to a long-standing practice, continued to have natural boundaries (such as rivers, ditches, mountains, roads, pre-existing trees, watersheds and so forth: ex. Front., *De agr. qual.*, Th. 2,8–12; *De contr.*, 5,12–15; Hyg., *De gen. contr.*, Th. 89, 6–92,10; Sic. Flac., *De cond. agr.*, Th. 102,16–115,1).

This is why private owners of lands delimited by a watercourse (Sic. Flac., *De cond. agr.*, Th. 114, 12–14) knew that according to the natural right of alluvion (*ius alluvionis*) they would have acquired the ownership of the strips of land along their banks that had become dry because of either the changes of the riverbed or the deposits originating from upstream areas. However, they also knew that they could have lost the ownership of either small or big strips or sections of their land, if these strips or sections had been carried away by the waterflow.

All this explains why the so-called '*munitio riparum*', that is the management of the riverbanks carried out by the possessors by building artificial embankments, strengthening the natural ones, planting trees and shrubs on riverbanks and so on, was especially recommended on *agri arcifinii* (Campbell 2010, 320; Campbell 2012, 102–103; Felici 2016, 73–80): an activity that was useful not only to the private user(s), but also to the community. For example, on the *rivus* (meant here as small natural watercourse: Fiorentini 2003, 99–107) *Siculus Flaccus*, *De cond. agr.*, Th. 114,25–115,2 writes that «if a stream gradually removes someone's land from one place and deposits it on the land of someone opposite, a process called erosion and alluviation, no claim for the return of land is granted; for it introduces the requirement of shoring up the banks. This indeed seems a proper precaution, to ensure that land remains intact for landholders, and also for the public good» ("*qui si aliquius terras minutatim ex alia parte abstrahat et alii contrario relinquat, quod vocant abluvionem et alluvionem, repetitio finium ha<u>d datur: inducit enim necessitatem riparum tuendarum. Quod iuste videtur prospectum, ut terrae possessoribus salvae sint, etiam publicae utilitatis causa*": Campbell 2000, 117).

As we will see, *munitio riparum* is very often mentioned by jurists too.

Of course, this does not mean that public interventions to prevent rivers' floods were not accomplished on unsurveyed territories. For example the intervention mentioned above of *Marcus Aemilius Scaurus* at the confluence of both rivers Po and Trebbia was not the result of the enlargement of the centuriation of Parma—as believed for a long time –, but the outcome of the digging of diversion canals running from west to east regardless of the previous centuriation «con un andamento subparallelo a quello del Po … nella fascia leggermente depressa immediatamente a sud dell'area di diretta pertinenza del fiume» (Franceschelli and Dall'Aglio 2012, 77–78).

c. Anyway, the ordinary *munitio riparum* made by either private people or communities in both surveyed and unsurveyed areas was important as these big public interventions were (evidence in Quilici and Quilici Gigli 2020, 161–192).

Since the time of the XII Tables, the verb '*munire*' has been technically referred to *viae*. In turn, roads, rivers, canals, *oppida*, *castra* and so on were called '*munita*' whenever they had been the object of a «durevole sistemazione e stabilizzazione del percorso» (Antico Gallina 2008, 373; Fedeli 2016, 73–80). Consequently *munire loca*, *fossa*, *vallum*, *castra*, *oppida*, *ripam* would mean «provvedere di quanto può costituire garanzia di sicurezza» (ex. Nep., *Them*. 6.2: *loca munita*; Caes., *Bell. gall.* 5.18.3: *ripa autem erat acutis sudibus praefixis munita;* 5.21.2: *oppidum … silvis paludibusque munitum*; Sall. *Bell. iug*. 45.2: *vallo atque fossa munire*; 61.1: [*urbibis,*] *quae … satisque munitae loco atque moenibus erant*; 75.7: *castra … munita*; 100.4: *castra munire*; Lucr. 2.607: *eximiis munita locis*; Tac., *Ann.* 1.56: *L. Apronio ad munitiones viarum et fluminum relicto*; Svet., *Iulius* 44.5: *viam munire a mari Supero per Appennini dorsum ad Tiberim usque*; Pseudo-Hygin. *De munit. castr.* 22: *… munitionem castrorum*; 53: *aggere facto munitionem castris praebet*).

Works of *munitio riparum* are attested by literary sources: for example Varro, *De re rust*. 1.14.3 talks about collective works: «At several points along the via *Salaria*, in the district of *Crustumeria*, one may see banks combined with trenches to prevent the river from injuring the fields» ("*ad viam Salariam in agro Crustumino videre licet locis aliquot coniunctos aggeres cum fossis ne flumen agris noceat"*: Fiorentini 2009, 71; Cappelletti 2010, 213; Zannier 2010, 201–216). Instead, Martial 10.85.4 describes an individual work: in fact he mentions Ladon, a boatman on the Tiber who «bought himself when grown old a bit of land on the banks of his beloved stream. But as the overflowing Tiber often invaded it with raging floods, breaking into his ploughed fields, converting them in winter into a lake, he filled his worn-out boat, which was drawn up on the beach, with stones, making it a barrier against the floods. By this means he repelled the inundation …» ("*Iam senior Ladon Tiberinae nauta carinae / proxima dilectis rura paravit aquis / Quae cum saepe vagus premeret torrentibus undis / Thybris et hiberno rumperet arva lacu, emeritam puppem, ripa quae stabat in alta, / inplevit saxis obposuitque vadis. / Sic nimias avertit aquas …*": Fiorentini 2009, 71; Cappelletti 2010, 213).

Operae of *munitio riparum* along with structures, like check-dams and weirs, are also attested by various archaeological studies. In fact, wooden structures, in particularly the ones made of acacia, have not been preserved, but—as Stefania Quilici Gigli has explained—in rural, hilly and mountain areas of lower Sabina, Etruria and Umbria it is common to find various weirs built in stone that offer «a precise indication of the spread in central Tyrrhenian Italy of this type of structure and could prove useful for a structural understanding of this kind of building work in antiquity» (Quilici Gigli 2008, 218–219).

These studies have also shown that structures like check-dams, weirs and embankments built «along steep and precipitous watercourses» had two related functions: on the one hand «that of regulating the water, holding back the current and the down-wash of materials, on the other hand where the course of the water broadens out, the construction of the same structures may have also answered the needs of collecting and distributing the water» (Quilici Gigli 2008, 222). The *Ager Falernus*—a plain situated in northern Campania between *Mons Massicus* and *Volturnus* that has been known since antiquity for the periodic overflowing of its torrential streams—has also been studied from both an archaeological and a topographical point of view: so scholars have shown that after its centuriation and colonisation, it was subject to several management works to prevent floods and swamps: for example «des fossés et des digues tout au long de terre-pleins érodés, qui apparaissent être d'époque classique … visible encore aujourd'hui dans les cartes (1:25.000) … dépôts

de colmatage, formés par le placement de sédiments dans des zones marécageuses … nombreux systèmes de canaux creusés jusqu'à la roche et de galeries … de systèmes complexes d'aménagement pour endiguer les eaux» (Biundo 2014, 102–103; Cera 2018, 90–110).

These works—according to Stefania Quilici Gigli (2008, 226)—document a specific guideline drawn up by the Romans «in the area of hydraulic engineering for the management of torrents … a tangible and well thought-out organisation of the landscape, the planning, construction and maintenance of which, given its complexity, must have needed recourse to specific skills, founded on knowledge, even though acquired in an experimental way, which was well codified and widespread» (Quilici Gigli 2008, 226). This can also suggest—according to the author—that either riparian communities or individual owners could have resorted «to experts in water management, designers and specialized master-crafts-men, capable of building lasting structures» (Quilici Gigli 2008, 227).

Leges agro dictae

The *mensor Hyginus* (*De cond. agr.*, Th. 80, 14–19) specifies that «*Divisi et adsignati agri … leges accipiunt ab his qui veteranos deducunt, et ita propriam observationem eorum lex data praestat*» ("Divided and allocated lands … receive conditions from the men who settle the veterans, and the law that had been issued provides for an appropriate application of them in each case": Campbell 2000, 85). This means that the territories which had been surveyed were organized on the base of *leges agro dictae* issued by the founders. These *leges* reported both the technical choices adopted in the territorial planning (a, b) and the rules and regulations concerning the relationships among either individual assignees or between individual assignees and the colony itself (c).

a. For example, a *lex dicta* could decree that a plain along the river had to be left free so that eventual floods, changes of the riverbed or alluvions taking place on it would not cause any damage to private properties (Campbell 2010, 320–321). This was a real flood retention basin graphed on the *forma agrorum* too. First of all this practice is attested by *Hyginus*:

Hyg., *De gen. contr.* Th. 88, 4–9: *Scio enim quibusdam regionibus, cum adsignarentur agri, adscriptum aliquid per centurias et flumini. Quod ipsum providit auctor dividendorum agrorum, ut quotiens tempestas concitasset fluvium, quo[d] excedens [alpes] alveum per regionem vagaretur, sine iniuria cuiusquam defluere*. ("I know that in several regions when a land was being allocated, throughout the *centuriae* something (i.e. an area of land) was set aside even for the river. The man responsible for the land division ensured in this precise way that whenever a storm had stirred up the river, so that it burst its banks and spread all over the region, the flood would not inflict harm to anyone" (Transl. Campbell 2000, 91, 93)).

It is also proven by *Siculus Flaccus*, with specific reference to the river *Pisaurum* (nowadays 'Foglia') in Italy:

Sic. Flac., *De cond. agr.*, Th. 122,6–122,15:

… deinceps et ultra ripas utrimque aliquando adscriptum modum per omnes centurias, per quas id flumen decurret. Quod factum auctor divisionis assignationisque iustissime prospexit: subit enim violentisque imbribus excedens ripas defluet, quo<a>d etiam ultra modum sibi adscriptum egrediatur vicinorumque vexet terras. …

("Then, even beyond the riverbanks on both sides an area is sometimes written in, throughout all the *centuriae* through which that river flows. In doing this the author of the division and allocation exercised a most equitable foresight. For the river, swollen by sudden and violent storms, breaks its banks and flows over the land, going even beyond the area assigned to it and damaging the land of its neighbours" (Campbell 2000, 125)).

A good example of this practice has been found in the *ager centuriatus* of Padova: there—as observed by Mauro Varotto—«attraverso una prima demarcazione tra bassure riservate alle acque (occupate da paludi e boschi che costituivano la naturale "cassa di espansione" fluviale) e terre più alte destinate alla colonizzazione agraria, l'opera di centuriazione appianò gli squilibri idraulici tra zone palustri e terre asciutte, garantendo rese colturali e livelli di benessere fino ad allora sconosciuti» (Varotto 2002, 99–100; see also Varotto 2005; Varotto 2012, 347–350; Varotto 2019, 109–111).

But this was not always the case. Roman land surveyors inform that the juridical condition of a river in a centuriated area could be various. In fact, the founder could either include the river's area in the allocation or qualify it as a *subsecivum* or as an *ager exceptus*:

Sic. Flac., *De cond. agr.*, Th. 121,26–122,3:

In quibusdam regionibus fluminum modus assignationi cessit, in quibusdam vero tamquam subsecivus relictus est, aliis autem exceptus inscriptumque FLUMINI ILLI TANTUM.

("In some regions the area of rivers was included in the allocation. In some it was omitted, just like a *subsecivum*; in others an area was excluded with the notation 'So much for that river'" (Campbell 2000, 125)).

In the first case, the riverbed was allocated to individual colonists and «no width was set aside» for the river. *Agennius,* who claims to have seen this in some old *formae agrorum,* explains that this choice was made when the shortage of land had «persuaded the founder to proceed in this way». In this case the settlers would receive only water or both water and land, but—*Agennius* comments—if «the lot had turned out that way» the colonist «had to put up with it with equanimity», also because «it was not unwelcomed for a landholder to be adjacent to the boon of a water supply»:

Agenn. *Urb.*, *De contr. agr.*, Th. 43,12–24: *Multa flumina et non mediocria in adsignationem mensurae antiquae ceciderunt: nam et deductarum coloniarum formae indicant, ut multis fluminibus nulla latitudo sit relicta. Sequitur in his fluminibus artem mensoriam aliquem locum sibi vindicare, quando exacto limite accepta finiatur, qua[e] vel aqua <m> vel agrum vel utrumque habere debeat unus. Fuit enim fortasse ratio non simplex, qua deberet quis quid deductorum etiam <a> quae accipere. Primum quod exiguitas agrorum conditorem ita suadebat. Deinde <quod> non erat ingratum possessori proximum esse aquae commodo. Tertio quod, si sors ita tulerat, aequo animo ferendum habebat.*

("Many non-insubstantial rivers have fallen within the allocation of an old survey. Moreover, the maps of colonies that were founded show how, for many rivers, no width was set aside. It follows that in the case of these rivers, the surveyor's profession claims some place for itself in deciding, when the *limites* have been completed and each allocation is being demarcated, how an individual settler should have water or land or both. Perhaps in those days there was no simple reason why any of the colonists had also to receive any part of the river. Firstly, because a shortage of land persuaded the founder to proceed in this way; secondly, because it was not unwelcomed for a landholder to be adjacent to the boon of a water supply; thirdly, because if the lot had turned out that way, he had to put up with it with equanimity" (Campbell 2000, 41)).

In the second case, the area of the river was qualified as '*subsecivum*', that is an unassigned land (Chouquer and Favory 2001; Pavese 2004; Capogrossi Colognesi 2004, 579–604; Capogrossi Colognesi 2011–2012, 203–228; Tassi Scandone 2017, 97–100).

Agennius Urbicus, *De contr. agr.,* Th. 44,3 ss. acquaints that this option was selected at *Emerita* in *Lusitania*, an Augustan colony crossed by the river *Ana*: there, «because of the huge extent of the lands, the founder settled veterans for the most part round the outer boundary just like boundary markers, but very few round the colony itself and round the river *Ana*; the residue remained to be filled up later. Notwithstanding the fact that a second and third allocation took place, the quantity of land could not be exhausted by distribution and an amount remained unallocated» (Campbell 2000, 41). These unassigned lands were then occupied by the colonists, as usual without them paying any *vectigal*. But when *Vespasianus* reacted to this abuse widespread all over the empire by requesting the occupants to pay the overdue *vectigalia,* the latter implored the provincial governor «*ut aliquam latitudinem An<ae>flumini daret*» ("to designate a specific width for the river *Ana*": Campbell 2000, 41). So, on the request of the colonists, «*modus flumini est constitutus*». Let me add that the matter was settled some years later by *Domitianus* who*,* further to the demands of the occupants*,* granted them free possession of the so-called '*subseciva*' (Agenn., *De contr. agr*., Th. 41,24–26: … *ad hoc beneficium procurrit et uno edicto totius Italiae metum liberavit*; Hyg., *De gen. contr.*, Th. 96,21—97,8: … *Domitianus [imp.] per totam Italiam subsiciva possidentibus donavit, edictoque hoc notum universis fecit*). Probably as a consequence of this imperial *edictum,* the areas of the river began to be considered open to private occupation and this explains why Ulpian, in the third century AD, writes that those areas could be acquired as private landed property by *occupatio* (D. 43.12.1.7 Ulp. 68 *ad ed.*).

The third case would take place whenever the colonial *lex dicta* expressly indicated a *modus fluminis*, i.e., a surface of land along the banks expressly reserved to the river: so future allocations would be excluded (*modus inscriptus flumini illi tantum*). This was also the best way to avoid damages to both individuals and properties.

b. A further type of remedy to control hydrological instability prescribed by *leges dictae* consisted in maintaining the long-standing installations (such as canals, levees, sluices and so on) that had hitherto been useful to the management of the soil and the prevention of floods, even if a new colony had moved out of the territory (Möller 2018, 9–29). *Siculus Flaccus* talks about this in a text of his work *De condicionibus agrorum*:

Sic. Flac., *De cond. agr.*, Th. 121,18–25: *auctores divisionis assignationisque leges quasdam colonis describunt, ut qui agri delubris sepulchrisve publicique solis, itinera viae actus ambitus ductusque aquarum, quae publicis utilitatibus servierint ad id usque tempus, quo agri divisiones fierent, in eadem condicione essent, qua ante fuerant, nec quicquam utilitatibus publicis derogaverunt.*

("The authors of the division and allocation lay down certain laws for the colonists, so that those lands that served shrines, tombs, and public areas, and those rights of pathway, public rights of way, rights of way for driving cattle, rights of way around buildings, and water channels, that served the public interest up to the time when the division of the land was taking place, should remain in the same status as they had before; therefore they inflicted no loss on the public interest" (Campbell 2000, 125)).

This is confirmed by a prescription of the *Lex coloniae Genetivae Iuliae seu Ursonensis* (Gabba and Crawford 1996, 393–454): in fact regarding the *fluui rivi fontes lacus aquae stagna paludes* existing in the territory before the colonial foundation, this statute decrees that the colonists will maintain the rights of both passage (even with animals) and water collection that the previous inhabitants used to own and that this *itineris aquarum lex* will be applied also in the future:

Lex coloniae Genetivae Iuliae seu Ursonensis LXXIX: *Qui fluui rivi fontes lacus aquae stagna paludes / sunt in agro, qui colon(is) h[ui]usc(e) colon(iae) divisus / erit, ad eos*

riuos fontes lacus aquasque sta/gna paludes itus actus aquae haustus iis item / esto, qui eum agrum habebunt possidebunt, uti / iis fuit, qui eum agrum habuerunt possederunt. / Itemque iis, qui eum agrum habent possident ha/bebunt possidebunt, itineris aquarum lex ius/que esto.

("Whatever rivers, streams, fountains, pools, waters, ponds or marshes there are within the land, which shall have been divided among the colonists of this colony, there is to be passage for men and animals to those streams, fountains or pools and to those waters, ponds or marshes and access to water for those who shall hold or shall possess that land, in the same way as there was for those held or possessed that land. And the condition and law for passage to water is to exist in the same way for those who hold or possess or shall hold or shall possess that land" (Gabba and Crawford 1996, 424)).

c. The *lex dicta* could also regulate the relationships among private people: for example in D.39.3.1.23 Ulpian, quoting his predecessor *Labeo* (first century A.D.), writes that the *lex dicta* of a colonial territory crossed by a big river could decree that a colonist owner of a plot of land situated at a distance from the riverbanks could keep levees or ditches (*aggeres vel fossas*) on the riparian part of the neighbour's land in order to reduce the risk of floods:

D.39.3.1.23 Ulp. 53 *ad ed.*: *Denique ait condicionibus agrorum quasdam leges esse dictas, ut, quibus agri magna sint flumina, liceat mihi, scilicet in agro tuo, aggeres vel fossas habere:*

("Finally, he (i.e., Labeo) says that (in some cases) *leges dictae* have been created with reference to lands; so that, if on certain tracts there are large rivers, it may be permitted for me to keep riverbanks or ditches on your ground.").

Natura, vetustas

Instead, with regard to both *agri arcifinii* (i.e., lands not surveyed and not regulated by a *lex dicta*) and possible damages provoked by watercourses, Paul and Ulpian explain that the rules to be applied by neighbours have to be determined on the base of the '*natura loci*' and the '*vetustas*' (Mantello 2007, 201–248; Salerno 2008, 271–275; Salerno 2009, 151–162; Donadio 2014b, 149–193; Möller 2016, 9–28).

D.39.3.2*pr*. Paul. 49 *ad ed.*: *In summa tria sunt, quae inferior locus superiori servit, lex, natura loci, vetustas: quae semper pro lege habetur, minuendarum scilicet litium causa.*

("In short, there are three causes by which a lower tract of land may be subject to a higher one: the law, the nature of the site, the established custom, which last is always regarded as law, for the purpose, of course, of reducing disputes.").

This means that if, for example, a mass of water naturally flowed from a higher field to a lower one, the owner of the latter had to endure it, being aware that the damage depended on the nature of the places. So—Ulpian writes in D.39.3.1pr. 53 *ad ed.* – should the water cause some damage by its nature, an action could not be brought against the owner of the upper plot of land (*a. aquae pluviae arcendae*). In fact, the possible *incommodum* caused by an overflow of water to a lower property was compensated by the *commodum* that such flows usually carried with them:

D.39.3.1.23 Ulp. 53 *ad ed.*: *… si tamen lex non sit agro dicta, agri naturam esse servandam et semper inferiorem superiori servire atque hoc incommodum naturaliter pati inferiorem agrum a superiore compensareque debere cum alio commodo: sicut enim omnis pinguitudo terrae ad eum decurrit, ita etiam aquae incommodum ad eum defluere.*

("However, if there is not a *lex agro dicta*, the natural conditions must be preserved, the lower tract will always be subject to the upper one, but this inconvenience was considered compensated for by other advantages: in fact, as all the fertility of the soil is carried to the lower, so, also, the inconvenience of the water flowing upon it must be tolerated.").

A fortiori, as we have seen, the rule was applied whenever the water had flowed down from the higher field as a result of a river alluviation. Nevertheless in the same fragment Ulpian adds that, lacking a *lex agro dicta, vetustas* can replace the latter:

Si tamen lex agri non inveniatur, vetustatem vicem legis tenere.

("But if no special law relating to the tract of land in question can be found, ancient custom is held to take the place of law.").

This means that old installations for water conduction found *in loco* had to be maintained as if they had been prescribed by the law and no one could modify on their own initiative the organization of a territory that had been existing for a long time. No doubt this also applied to long-standing installations useful to prevent floods (such as walls, ditches, weirs, canals, levees and so on) placed for a long time in rural territories crossed by dangerous rivers or torrents: all of these installations had to be preserved as well.

Epigraphic documents

In several epigraphic documents reporting colonial or municipal statutes or, we can find some important rules that could be referred to water courses and their management by local magistrates.

a. First of all, chapter LXXVII of the *Lex coloniae Genetivae Iuliae seu Ursonensis* (dating to 44 BC) on the colonial *viae*, *fossae* and *cloacae* decrees as follows:

Si qu<a>s vias fossas cloacas IIvir aidil(is)ve publice / facere inmittere commutare aedificare mu/nire intra eos fines, qui colon(iae) Iul(iae) erunt, volet, / quot eius sine iniuria privatorum fiet, it is face/re liceto.

Gabba and Crawford (*Roman Statutes* 1996, 424) translate the text interpreting the Latin '*fossae*' as 'ditches' and the Latin '*munire*' as 'to pave':

("Whatever roads, ditches or drains a *IIvir* or aedile shall wish publicly to construct, to introduce, to change, to build or to pave within those boundaries which shall be those of the *colonia Iulia*, whatever of that shall be done without damage to private individuals, it is to be lawful for them to do that.").

Actually, several sources use the term '*fossa*' to indicate a private or a common 'ditch', for example Fest., v. *rivus*, L. 337 and Sic. Flac., *De cond. agr.*, Th. 111,19–113,20. But in D.43.12.1.8 and D.43.14.1.5 Ulp. 68 *ad ed*. taken from the section of Ulpian's commentary to the praetorian edict on *interdicta de fluminibus publicis* (D.43.12–15), '*fossae*' are technically defined as 'public artificial waterways' (Felici 2016, 36, 49–57). Furthermore, it is well known that in the same section Ulpian (along with the praetorian edict) talks about *interdicta de viis* (D.43.10–11) and *de cloacis* (D.43.23). It is therefore logical to assume that the triad '*viae, fossae, cloacae*' and the adverb '*publice*' mentioned by chapter LXXVII of the *Lex Ursonensis* referred to public goods.

As already pointed out, the verb '*munire*' technically alludes to safeguarding activities related in particular to *viae*, rivers and artificial canals. Martínez de Morentin Llama (2016, 162 n. 74) has also recently claimed that «el verbo *facere* comprendería por tanto la introducción de conducciones (*inmittere*), la renovación o reparación (*commutare*),

las obras de albañilería (*aedificare*) o las obras de aseguramiento (*munire)* y la limpieza de los canales y conducciones».

If this hypothesis is well-founded, the chapter of the colonial statute signifies that within the colonial boundaries the public task of digging new roads, canals, sewers, changing their course, as managing them fell within the competence of the above mentioned *magistrati coloniales* (*IIvir*, aedile) on condition that these activities would not damage private interests.

Similar rules were issued by the *lex municipi Tarentini*, probably following a common model. In fact, the text of this statute entrusts local magistrates with the task to open, change, build, manage and safeguard (*munire*) *viae, fossae* (artificial canals?) and *cloacae* located in the territory (town and countryside) provided that this would not damage private interests:

col. I, ll. 39–42: *Sei quas vias fossas cloacas IIII[*^{v}*]vir IIvir eius municipi caussa / publice facere immittere commutare aedificare munire volet intra / eos fineis quei eius municipi erun[t], quod eius sine iniuria fiat, id ei facere / liceto*.

("Whatever roads, canals or drains a *IIIIvir, IIvir* or aedile on behalf of that *municipium* shall wish publicly to construct, to insert, to change, to build or to safeguard (*munire*) within those boundaries which shall belong to that *municipium*, whatever of it may be done without damage, it is to be lawful for him to do that.").

Again, I do not agree with the translation 'to pave' for the Latin verb '*munire*' proposed by Galsterer and Crawford (1996, 308) because the *munitio riparum, viarum* and so on properly consisted of a technical operation (Antico Gallina 2008, 371–396).

Finally, chapter LXXXII of the *Lex Irnitana* deals with a similar theme, but it differs from the quoted above texts because on one hand this chapter only mentions the power of local magistrates of '*inmittere*' and '*commutare'* (without considering the activities of 'constructing', 'building', 'safeguarding'), on the other it speaks of *flumina* along with '*viae, itinera, fossae, cloacae*':

R(ubrica). De viis itineribus fluminibus fossis cloacis. Quas vias itinera flumina fossas cloacas inmittere commutare eius municipi IIviri ambo alterve volet, dum ea ex decurionum conscriptorumve decreto et intra fines eius municipi et sine iniuria privatorum fiant, Iiviris ambobus alterive facere ius potestasque esto. Si quaeque ita immissa commutata erunt, ea ita esse haberi ius esto.

Some scholars have proposed to translate the word '*flumina*' as 'natural rivers' in opposition to '*fossae*' as 'artificial canals' (González 1986, 195, 227; Cappelletti 2010, 219–222; Bruun 2012, 15; Campbell 2012, 88), but I think that a local magistrate would be unlikely to 'introduce' (*immittere*) a natural river within the boundaries of the community. Maybe altering (*commutare*) the course of a river (for example through the excavation of both an *incile* and a canal to divert its water) can be surmised. Therefore, in my opinion, in this context '*flumina*' could maybe be better translated as 'streams'. Consequently the text of chapter LXXXII of the *Lex Irnitana* could be translated as follows:

> "Rubrica. Concerning roads, ways, streams, canals, drains. The *duumviri*, either or both, must have the right and power of enter <or> commute the course of whatever roads, ways, streams, canals, drains at that *municipium* the *duumviri*, either or both, wish, provided that this takes place by decree of the *decuriones* or *conscripti* and within the boundaries of what *municipium* and without damage to private interest. Whatever is created or altered in this way, it is so to be and remain".

Anyway, even regardless of these details, it seems to me that all these texts imply that in municipal or colonial frameworks the public task of managing streams, artificial canals and perhaps rivers was the local communities' responsability through their magistrates.

Some clues in favour of this hypothesis can be found in some literary sources. The first one concerns the artificial canal dug by *Curius Dentatus* in 272 BC in *ager Reatinus* to partially drain Velino lake by cutting limestone rocks and opening an artificial canal to divert waters over a precipice and into Nera river above Interamna (Cascata delle Marmore). Cicero (*Ad Att*. 4.15.5; *Pro Scaur*. 12.27) and Varro (*De re rust.* 3.2.3), who had villas there (Varr., *De re rust*. 2.1.18; Cic., *Ad Att.* 4.15), speak of a legal dispute that took place in 54 BC between *Reatini* and *Interamnates*: since none of them had cleaned this artificial canal, the latter was partially occluded by a deposit of debris with the consequent big risk of flood (Cappelletti 2010, 210–214). The public trial (*'publica causa'*: Cic., *Pro Scaur*. 12.27) was celebrated *'apud consulem et decem legatos'* (Cic., *ad Att.* 4.15.5) and Cicero pleaded the case of Reatini in court. This dispute and the respective trial show that the duty of managing the canal lied upon *civitates* obviously through their magistrates.

Another clue in favour of this assumption is taken from an ancient source referring to a senate debate that took place 69 years later, in 15 AD, after a great flood of the Tiber. As already pointed out, on that occasion *Ateius Capito* and *Lucius Arruntius* proposed the diversion of the tributaries of the Tiber (among which there was the Nera river) to protect Rome from new floods. However, the plan was abandoned after listening to the claims of the members of the deputations representing the concerned municipalities and colonies: «The Florentines pleaded that the Clanis should not be deflected from its old bed into the Arno, to bring ruin upon themselves. The Interamnates' case was similar:—'The most generous fields of Italy were doomed, if the Nar should overflow after this scheme had split it into rivulets'. Nor were the Reatines silent:—'They must protest against the Veline Lake being dammed at its outlet into the Nar, as it would simply break a road into the surrounding country'» (Tacitus, *Ann*. 1.79). I do believe that also this source shows that floods occurring on a civic territory were under the surveillance of the local magistrates.

b. Other chapters of both *Lex coloniae Genetivae Iuliae seu Ursonensis* and *Lex Irnitana* deal specifically with the already mentioned *'munitio'*. The *lex Ursonensis* exacted this personal involvement from either colonists or whomever had *domicilium praediumve* in the colony. In turn, the *lex* of Irni required the same commitment from both *municipes incolaeve* and whomever would have inhabited or would have had the land (*habitabunt agrum agrosve habebunt*). Of course this task was materially carried out by both slaves and animals belonging to the afore-said persons.

Lex col. Gen. Iul. seu Urs. 98: *Quamcumque munitionem decuriones huiusce coloniae decreverint, si maior pars decurionum atfueit, cum ea res consuletur, eam munitionem fieri liceto, dum ne amplius in annos singulos inque homines singulos puberes operas quinas et in iumenta plaustraria iuga singula operas ternas decernant. Eique munitioni aediles qui tum erunt ex decurionum decreto praesunto. Uti decuriones censuerint, ita muniendum curanto, dum ne invito eius opera exigatur, qui minor annorum XIIII aut maior annorum LX natus erit. Qui in ea colonia intrave eius coloniae fines domicilium praediumve habebit neque eius coloniae colonus erit, is eidem munitioni uti colonus parento*.

("In the case of performance of any public work having been decreed by the decurions of the said colony, a majority of the decurions being present when the said matter is discussed: it shall be lawful for such work to be performed, provided that in anyone year no more than five days' work for each adult male nor more than three days' work for each yoke of draught animals is decreed. The said public work by decree of the decurions shall be superintended by the aediles then in office. They shall provide that the work shall be

performed, as the decurions resolve, as long as no labour is required, without his own consent, from any person less than fourteen or more than sixty years of age. Persons possessing a domicile or an estate in the said colony or within the boundaries of the said colony but not being colonists of the said colony shall be liable to the same amount of labour as a colonist.").

Lex Irn. cap. 83 *De munitione*: *Quod opus quamque munitionem decuriones conscriptive eius municipi fieri oportere decreverint, ita uti non minus quam tres quartae partes decurionum conscriptorumve adessent, exque iis qui adessent non minus quam duae tertiae partes consentirent; et ut ne amplius, in annos singulos homines (singulos) et iuga singula iumentorum, qui homines quaeque iumenta intra fines eius municipi erunt, quam operae quinae exigantur decernantur; et dum, si quit in eo opere eave munitione damni cui factum erit, ex re communi aestimetur dum ne cui invito operae indicantur exigent urve ab eo qui natus annos pauciores quam XV aut plures quam LX erit: quicumque municipes incolaeve eius municipi erunt, aut intra fines municipi eius habitabunt, agrum agrosve habebunt, ii omnes operas dare facere praestareque debento. Aedilibus. Isve qui ei operi sive munitioni praererunt ex decreto decurionum conscriptorumve, earum operarum indicendarum exigendarum et pignus capiendi, multam dicendi, ut aliis capitibus cautum conprehensumque est, ius potestasque esto.*

("Concerning buildings. Whatever work or building the *decuriones* or *conscripti* of that *municipium* decide ought to be undertaken, provided that no less than three quarters of the *decuriones* or *conscripti* are present and of those who are present no less than two thirds agree, and provided that no more than 5 days of work each should be exacted or decreed in one year from one man and one yoke of animals who are within the boundaries of that *municipium*, and provided that if any loss is inflicted to anyone in the course of that work or that building compensation should be provided from common funds, and provided that days of work should not be imposed or exacted from anyone who is under 15 or over 60 against their will; whoever is a *municeps* or *incola* of that *municipium* or lives or has a field or fields within the boundaries of that *municipium*, all of them are to be obliged to give, carry out and provide those days of work. The *aediles* or those who are in charge of that work or building by decree of the *decuriones* or *conscripti* are to have the right and power of imposing or exacting those days of work and of seizing a pledge or imposing a fine, as is prescribed and laid down in [others] chapters" (Transl. by Crawford in González 1996, 195)).

No doubt that the managing of the streets was also included among these compulsory *operae*, as it is documented by the *Tabula Heracleensis* (Crawford 1996 335–91 n. 24). In fact ll. 20–23 contains the rule—regarding Rome but probably extended to the local context of Heraclea—that «each owner of property fronting on the streets … shall keep such portion of the street in repair at the discretion of that aedile who has jurisdiction in this quarter of the city by this law». In turn ll. 32–49 state that, if the private owners had not done the those works, the aedile would have entrusted them to publicans with expenses charged to the defaulters (López-Rendo Rodríguez 2016, 510–520; Campedelli 2014, 28 ss.).

Siculus Flaccus, De cond. agr., Th. 110,3–12 also deals with the so-called '*munitio viarum*' making a distinction between *viae publicae* and *viae vicinales* (Pavese 2021, 20–21): the former «*publice muniuntur … nam et curatores accipiunt, et per redemptores muniuntur. nam et in quarundam tutela <m> a possessoribus per tempora summa certa exigitur*». The latter «*aliter muniuntur, per pagos, id est per magistros pagorum, qui operas a possessoribus ad eas tuendas exigere soliti sunt. aut, ut comperimus, uni cuique possessori per singulos agros certa spatia adsignantur, quae suis impensis tueantur*» ("… are

maintained at public expense … They have curators and are maintained by contractors. For the maintenance of some roads a set sum is regularly exacted from landholders. … local roads … are maintained in a different way, by *pagi*, that is, by the officials of the *pagi*, who normally demand labour from the landholders for their upkeep. Or, as I discovered, set lengths of road running through individual fields, are assigned to each landholder": Campbell 2010, 113).

c. Until a few years ago, the fact that the same rules we have just reported on the management of the streets, also applied to the management of rivers, streams, *fossae* and *canales* was a simple speculation. But nowadays this theory has been confirmed by various epigraphic evidence that have been the object of in depth studies during the last twenty years. In particular after the publication in 2006 of the so-called '*Lex rivi hiberiensis*' by Francisco Beltràn Lloris, we have become aware that in rural contexts the management of watercourses was allocated among the *pagi* and that in turn the *magistri pagorum* would individually or in groups allocate this task among the peasants as a *munus* (Campedelli 2014, 59–60).

On the basis of a famous text by Ulpian, D. 50.15.4*pr*. 3 *de cens.* (the content of which is confirmed by other sources like the *Tabulae alimentariae* of both Velleia and the *Ligures Baebiani* along with the so-called 'Bronze de Bonanza' or '*Formula baetica*', CIL II 5042) we have always thought that the principal function of the *pagi* was connected with *census* and taxes (Tarpin 2019, 113; Tarpin 2002; Capogrossi Colognesi 2002; Sisani 2011 etc.). In fact, Ulpian informs us of the so-called '*forma censualis*', a public document containing census' information essential to identify a private plot of land and its owner, like *nomen fundi, civitas* and *pagus* which the piece of land belonged to, the names of the two nearest neighbours and so on.

In 2002, thanks to a monograph by Capogrossi Colognesi on this topic, we have also understood that this type of census and tax registration would take place both in limited and non-limited territories. In fact, the *forma agrorum* of the centuriation and the documents attached used to report the different typologies of land the territory was divided in (private, public, *pascua, subseciva, agri vectigales* and so on) along with the respective measurements and, as to *agri publici* leased out to individuals, the due *vectigalia*; indeed the *forma censualis* usually recorded the elements to identify the *fundi* belonging to every single *pagus* of each town.

However, in 2006, the Bronze of Agón gave us a new important piece of information: the *pagi* were not only the territorial base of the census' registration of lands, but also «des communautés d'usage d'équipements publics, dont elles assument la responsabilité devant la cité ou l'État car elles en ont l'usage et non la pleine propriété» (see also Cato, *Rust.,* 2: Tarpin 2019, 125). This epigraphic text dates back to the time of Hadrian and contains a sort of *lex dicta* «relating to the running of an irrigation community situated on the right bank of the middle Ebro, in the hinterland of *Hispania Citerior*» (Beltràn Lloris 2006, 147). This irrigation community would share a long *fossa* fed by the river Ebro and, according to the *editio princeps*, it consisted of two *pagi* belonging to the Roman colony of *Caesaraugusta* (*pagus Gallorum* and *pagus Segardenensis*) and a third one (*pagus Belsinonensis*) belonging to the Latin *municipium* of *Cascantum*. On the contrary, according to Castillo García (2008, 257) and Tarpin (2019, 113), the *lex* was supposed to concern the *pagus Gallorum* with its enclave (that is a *castellum*) belonging to the *pagus Segardinensis,* both situated within the boundaries of *Caesaraugusta* / Saragosse» (III 40–42 *quae lexs est ex conventione paga/[nica (?) omnium (?) C]aesaraugustanorum Gallorum Cas/[tellanorum Bels]inonensium paganorum …*).

Anyway the *lex* had been granted by the Roman *legatus propraetor* upon the request of a *magister pagi* (Beltràn Lloris 2006, 148). On the other hand, the *magistri pagi*, holding this office for 1 year starting from the calends of June, were liable for the good administration of the *rivus* and for this purpose they were also authorized to impose fines and seize the *rivales'* assets. Furthermore, in the 5 days following their appointment, they had to convene an assembly to let the community members decide how to accomplish the annual operation of emptying and cleaning out the main channel (*rivus hiberiensis Capitonianus*) from the very beginning to the land of *centurio Rectus* (Beltran Lloris 2006, § 2b, l. I.21–26: *Ad ri/uom Hiberiensem Capitonianum purgandum / reficiendumue ab summo usque ad molem i/mam quae est ad Recti centurionis omnes pa/gani pro parte (vacant 4) sua quisque praestare debe/ant*). This task would consist of «getting rid of the material … that might hinder the flow of water or cause its level to rise (sludge, vegetation, etc.), and … repairing the walls and clearing any vegetation growing thereon» (§ 2b, I.21–26: Beltràn Lloris 2006, 173–174).

Moreover, each irrigator had his own obligation of *operae* in proportion to his right of water (*ius aquae*): in fact the members of the irrigation community had to clean and repair the secondary channels jointly used, the *moles* (sluices) (§ 3a, I.27–33), the *canales* and the *pontes* individually used (§ 3b, I.34–38: Beltràn Lloris 2006, 170). They used to carry out these tasks under the control of a labour director (*qui operis praeerit*: I.9–10), some *curatores* or the *magistri pagi* (§ 2a, I.16–21: Beltràn Lloris 2006, 171). If the landowners did not perform these works, the *magistri pagi* could delegate the local publicans to replace them in carrying out the job with expenses to be borne by the defaulting ones (§§ 8–10).

There was also a judicial formula provided by the provincial jurisdictional authority (*Augustanus Alpinus*) with which every member of the community could exercise an action against whoever had broken the regulations contained in the *lex* (§ 15, III.38–43: Nörr 2008, 108–188; Maganzani 2014a, b, 181–222).

The inscription of the Bronze of Agón was probably kept in the so-called '*paganicum*', an institutional office where a *praeco* by order of the *magistri pagi* used to sell the confiscated assets of the community members who had not participated in the corvées as they should (§ 9, l. III.1).

Here we cannot examine the various means by which the *magistri pagi* could force the *possessores* to fulfil their obligations. Instead, what really matters is that the decisions were taken by the assembly of the *pagani* according to their own quantity of water and under the control of the *magistri pagi*. Actually, as Tarpin has well underlined (2019, 116), «La nécessité de décisions collectives s'explique entre autres par le fait que l'usage de l'eau et des voies est en indivis, ce qui rend les bénéficiaires solidaires et responsables de l'ensemble. De là découle la suite de la *lex,* dans laquelle on voit que les *pagani* doivent *operas praestare* tous ensemble». This author adds that, in his opinion, the inscription presents some 'articles standardisés', which means «que la question de la gestion de l'eau figurait dans les normes administratives de l'empire et que les *possessores* avaient des devoirs d'entretien de tous les éléments publics ou communs» (Tarpin 2019, 119).

If all of this is acceptable, this hypothetical reconstruction could show how the organization of the streams and the management of the canals might have been more complex than we expected and how this kind of system might have been totally or partially common to several similar realities, at least in the western part of the empire. In any case, this particular organization must have taken place within the *pagi* belonging to both centuriated territories and non-centuriated ones. This has been substantiated by some inscriptions coming from undoubtedly limited areas in which we can find the words '*opus*' or '*operae*

pagorum' (CIL XII.1243; *ILL Concordia,* 2, 77; 2, 78. *Alba AE* 1901–6; *ILG* 374) (Tarpin 2019, 123–126).

d. But this is not all: we also must think that in 'irrigation communities' like the one described by the Bronze of Agón, the water of the main *rivus* diverted by single *moles* was further diverted by other *moles* to reach several private lands thanks to the constitution of predial servitudes (Maganzani 2017, 187). This further distribution could take place both through a single canal jointly used by several *possessores* and through a more complex system in which the water would flow into a basin (*lacus*) and then be distributed to other lands by different canals. Of course, these details are not specified by the *Lex rivi Hiberiensis,* but there are several Roman juridical fragments from the Digest of Justinian that refer to this topic expressly dealing with *servitutes aquarum* on common *rivi* (Maganzani 2017, 197–207). We could indeed say more than this about water management carried out by groups of individuals through a common *rivus*.

The title called '*De aqua et aquae pluviae arcendae*' of the praetorian edict was divided into two parts, one generically concerning *aqua*, the other regarding *actio aquae pluviae arcendae*. The content of the latter is well known and has been extensively studied (see later). On the contrary, it has never been thoroughly clarified what exactly the former (that is the part of the title '*De aqua*') was about. In his reconstruction of the possible content of the Perpetual Edict (last edition 1927), Otto Lenel had supposed that this part of the title was referring to the servitude of water, next to *actio aquae pluviae arcendae* because water was a common theme for both. However some other texts concerning *servitutes aquarum* are found in the titles of the Edict expressly devoted to servitudes.

Well, both the reading of the epigraphic texts on irrigation communities and the existence of the material remains of these communities on the ground have led me to believe that in this part of the title the *praetor* (along with the commentaries of the jurists) would consider water servitudes set up among various members of an irrigation community (Maganzani 2017, 197–207). The problems discussed by the jurists in this context are right on the topic: for example, one could wonder whether it was possible to derive water from a public river to the advantage of more than one person: so in D.39.3.10.2 Ulpian citing Labeo asserts that if a river is navigable the praetor must not let any water run from it that may make it less navigable and the same goes whenever another navigable river arises from the water run. With regard to the relationships among community members, it is frequently emphasized by the jurists that, whenever an irrigation community would like someone to join as a new member, it is essential that all members agree because—as Ulpian states in D.39.3.8—whenever there is a possibility that the right of each member of the community is decreased, it is inevitable to investigate whether there is consent on such a decrease.

Ius civile and honorarium

We can finally examine some technical-juridical remedies on this matter relevant to the field of both *ius civile* and *ius honorarium*.

a. First of all, we can talk about an ancient judicial instrument to prevent farmers from altering the natural flow of water on their own fields with damaging effects on the owners of lower locations. I am referring to the so-called '*actio aquae pluviae arcendae*', an action already mentioned by the Twelve Tables (Meola 2020, 1–29) aiming at both preventing of and paying for the damages caused by free running rain-water

over land (Sitzia 1999; Kacprzak 2007, 271–298; Salerno 2007, 197–208; Salerno 2008, 271–275; Salerno 2009, 151–162; Parenti 2012, 1–56; Donadio 2014a, 231–253; Donadio 2014b, 149–193; Pulitanò 2014, 255–272; Scotti 2013, 9–39; Scotti 2014, 273–308; Pulitanò 2015, 740–766; Humbert 2016, 5–29; Cursi 2018, 425–448; Cursi 2019, 183–196; Pilloni 2018, 147–173; Pilloni 2019, 139–165).

As we said above, D.39.3.1.23 is a fragment coming from Ulpian's commentary on the *formula* of *actio aquae pluviae arcendae* (53 *ad ed.*), currently located in the title of the Digest on this action (*De aqua et aquae pluviae arcendae*). In this passage, Ulpian specifies that this lawsuit cannot take place whenever the damage is due to an *opera aquae mittendae causa publica auctoritate facta* or depends on the existence of man-made constructions in the territory since time immemorial.

We find the same observation in a text by *Paulus* citing *Cassius*, a jurist of the first century AD:

D.39.3.2.3 Paul. 49 *ad ed.*: *Cassius autem scribit, si qua opera aquae mittendae causa publica auctoritate facta sint, in aquae pluviae arcendae actionem non venire in eademque causa esse ea, quorum memoriam vetustas excedit*.

("Instead, Cassius states that, if any works are constructed by public authority for the purpose of conducting water, this action will not take place; and in the same way there is no action for works whose antiquity goes beyond memory.").

The *actio aquae pluviae arcendae* could be brought by a neighbour in a lower location against a neighbour in a higher one if the latter had carried out an artefact on his land which had altered the natural flow of the water downward so as to actually or potentially damage the land of the former. It was both a precautionary and reparatory action. In fact, this action could be used—as Ulpian writes in D.39.3.1.1 53 *ad ed.*—even in case of '*damnum nondum factum*' – 'damage not yet provoked'—as a way of preventing possible future disasters. In other words, the action to ward off rainwater would lead the landowner in the higher location to remove the new artefact and restore the natural pre-existing flow of the rainwater in order to avoid paying future and possible damages. But it also could guarantee the plaintiff compensation for damages actually caused by the defendant, who consequently would be convicted to pay them (reparatory action).

As regards the aim of this research, it is remarkable that whenever Roman jurists were dealing with *aqua pluvia* (rainwater) they were referring not only to rainwater itself, but also to any flow of water following a rainfall. In the latter case, the water flow could run onto the lower field with disastrous consequences, especially if the water was coming from a river that in turn had flooded after heavy rain. We can read this in a text by Ulpian following the opinion of *Tubero* (first century AD), where both jurists thought it was possible to take this legal action even when the damage had been caused by rainwater mixed with other water like the one coming from a river swollen by rain:

D.39.3.1*pr*. 53 *ad ed.*: *Aquam pluviam dicimus, quae de caelo cadit atque imbre excrescit, sive* per se *haec aqua caelestis noceat, ut Tubero ait, sive cum alia mixta sit.*

("By rainwater we mean that which falls from the sky, and increases after a heavy rainfall, whether it provokes the damage itself, or, as *Tubero* says, is mixed with other water.").

This is confirmed by another fragment belonging to Ulpian where the jurist follows the opinion of *Labeo* (first century AD) maintaining that to take the action it is not important where the water originated—from the private land of a neighbour or from a public or sacred place. In fact, this means that the action could be taken for damages derived from a public rain-swollen river too:

D.39.3.1.18 Ulp. 53 *ad ed.*: *Nec illud quaeramus, unde oriatur: nam et si publico oriens vel ex loco sacro per fundum vicini descendat isque opere facto in meum fundum eam avertat, aquae pluviae arcendae teneri eum Labeo ait.*

("We do not inquire from where the water derives, because, if it has its origin in a public or a sacred place, and runs through the land of a neighbour, and this neighbour, by some means, diverts it onto my land, *Labeo* says that he will be liable according to this action..").

So we can think that even taking the *a.a.p.a.* one could prevent in some way the risk of floods. Actually in a fragment on *actio a.p.a.* coming from the Digest *Paulus* precisely refers to a damage caused by a river swollen by rain:

D. 39.3.2.5 Paul. 49 *ad ed.*: *Item Varus ait: aggerem, qui in fundo vicini erat, vis aquae deiecit, per quod effectum est, ut aqua pluvia mihi noceret. Varus ait, si naturalis agger fuit, non posse me vicinum cogere aquae pluviae arcendae actione, ut eum reponat vel reponi sinat, idemque putat et si manu factus fuit neque memoria eius exstat: quod si exstet, putat aquae pluviae arcendae actione eum teneri. Labeo autem, si manu factus sit agger, etiamsi memoria eius non exstat, agi posse ut reponatur: nam hac actione neminem cogi posse, ut vicino prosit, sed ne noceat aut interpellet facientem, quod iure facere possit. Quamquam tamen deficiat aquae pluviae arcendae actio, attamen opino utilem actionem vel interdictum mihi competere adversus vicinum, si velim aggerem restituere in agro eius, qui factus mihi quidem prodesse potest, ipsi vero nihil nociturus est: haec aequitas suggerit, etsi iure deficiamur.*

("Again, *Varus* ait: water pressure pushed down an embankment in a neighbour's field, and as a result, rainwater caused me damage. *Varus* says that, if the embankment was naturally formed, I cannot use the *actio aquae pluviae arcendae* to compel my neighbour to replace it or to allow its replacement, and he holds the same to be true even if the embankment was man-made but no record of its construction survives. But if such a record does exist, he holds that the neighbour is liable to the *actio aquae pluviae arcendae*. *Labeo*, however, holds that, if the embankment is man-made and even if no record of its construction survives, the action can be brought to ensure that the neighbour allows its replacement though not one to compel him to replace it. For this action cannot be used to compel anybody to benefit his neighbour, but can be used to stop him damaging his neighbour or interfering with him if the latter is acting legally. However, even though the *actio aquae pluviae arcendae* may be inapplicable, nonetheless, I hold the view that an *actio utilis* or an interdict is available to me against my neighbour if I wish to restore an embankment on his land whose construction will be to my advantage and will not harm him in any way.").

This text is about the destruction of the embankment in a neighbour's field caused by a swollen river with great damages to the other bordering private land. The owner of the damaged land (*Titius*) asks the riparian owner (*Caius*) to restore the embankment or to let others restore it. The latter refuses. First *Paulus* quotes the opinion of *Alfenus Varus* (2nd half of the first century BC) who thought that *Titius* could sue *Caius* with the *actio a.p.a.* to compel him to restore the embankment only if this one was artificial and relatively recent, not if it was natural or existing on the riverbank since time immemorial. Then *Paulus* reports the different view of *Labeo* (first century AD) according to which *actio a.p.a* could be taken even if the artificial embankment had been on that riverbank since time immemorial (*agger 'cuius memoria non exstat'*). Finally, *Paulus* expresses his own opinion: even if the *praetor* had not granted this *actio civilis*, it would have been *aequum* to allow *Titius* to sue *Caius* with an *actio utilis* or an *interdictum*. In fact, the general interest to maintain the territorial hydraulic balance would justify some limitations to the absolute right of the riparian owner. A further example of such limitations is described by *Iavolenus* (second

century AD) who specifies that, if the public road bordering a river was destroyed by its current, the private neighbour had to give up a strip of his land to rebuild it:

D.8.6.14.1 Iav. 10 *ex Cassio*: *Cum* via *publica vel fluminis impetu vel ruina amissa est, vicinus proximus viam praestare debet*.

("When a public roadway is destroyed by a river flooding or by some other disaster, it is the duty of the landowner, whose land is closest to it, to provide a means of passage." (Watson 1998)).

Finally, the jurist *Scaevola* (second century AD) denies the owner of a house that occupies both riverbanks the right to build a private bridge on a public river. This choice is probably dictated by utilitarian reasons: bridges not only could disturb ships, but, if destroyed by a swollen river, could also worsen the flow of floods with their debris (Alline 2007, 11):

D.43.12.4 Scaev. 5 *resp*.: *Quaesitum est, an is, qui in utraque ripa fluminis publici domus habet, pontem privati iuris facere potest. Respondit non posse*.

("A question arose whether someone who had a house between the two banks of a public river could build a private bridge. He replied that he could not.").

b. Of course, to be in effective control of both rivers and torrents and to prevent riverbanks from both erosion and risk of floods, it was also necessary, on one side, to officially prohibit any private intervention on riverbeds or banks of public rivers from altering their flow, and on the other side, to assure private interventions corresponding to the above mentioned '*munitio riparum*' legal protection (Alburcherque 2002, 199 ss.; Alburquerque 2003, 53–60; Alburquerque 2004, 37–62; Fiorentini 2003, 159–275; Fiorentini 2009, 73–89; Fasolino 2010, 15–31; Signorini 2014, 309–331; Abelenda 2016; Schiavon 2019, 287–374; Rainer 2019, 47–53; in general, Di Porto 2013, 1–42; see also Biscardi 2002, 9–98).

So, to start with, a *quivis ex populo* (D. 43.13.1.9 Ulp. 68 *ad ed.*) was legitimated to ask the *praetor* to promulgate an interdict forbidding anyone from carrying out works on a public river or on its banks that could cause the water to flow otherwise than it had done during the previous Summer:

D.43.13.1.1 Ulp. 68 *ad ed.*: *Ait Praetor: 'In flumine publico inve ripa eius facere aut in id flumen ripamve eius immittere, quo aliter aqua fluat, quam priore aestate fluxit, veto'.*

("The Praetor says: 'I forbid doing anything to the public river or banks or putting anything into them which has the effect of altering the river flow in respect to the previous Summer'….").

Ulpian also explains that the purpose of this *interdictum 'prohibitorium'* is to avoid any artificial modifications of the *modus ac rigor cursus aquae,* like overflows and migrations of riverbeds damaging the neighbours (D.43.13.1.3: *hoc interdicto prospexit … ne derivationibus minus concessis flumina excrescant vel mutatus alveus vicinis iniuriam aliquam adferat*). However, so far as these interventions was concerned with the useful activity of '*munitio riparum*' or, *a fortiori*, with the protection of lands from floods of large and dangerous rivers, some jurists thought that the *praetor* could evaluate whether denying the interdicted protection. This emerges from a text by Ulpian:

D.43.13.6–7 Ulp. 68 *ad ed.*: 6. *Sunt qui putent excipiendum hoc interdicto 'quod eius ripae muniendae causa non fiet', scilicet ut, si quid fiat, quo aliter aqua fluat, si tamen muniendae ripae causa fiat, interdicto locus non sit. Sed nec hoc quibusdam placet: neque enim ripae cum incommodo accolentium muniendae sunt. Hoc tamen iure utimur, ut praetor ex causa aestimet, an hanc exceptionem dare debeat: plerumque enim utilitas suadet exceptionem istam dari*. 7. *Sed et si alia utilitas vertatur eius, qui quid in flumine publico fecit (pone enim grande damnum flumen ei dare solitum, praedia eius depopulari), si forte*

aggeres vel quam aliam munitionem adhibuit, ut agrum suum tueretur eaque res cursus fluminis ad aliquid immutavit, cur ei non consulatur? Plerosque scio prorsus flumina avertisse alveosque mutasse, dum praediis suis consulunt. Oportet enim in huiusmodi rebus utilitatem et tutelam facientis spectare, sine iniuria utique accolarum.

("6. There are some people who think that an exception to this interdict can be pleaded on the ground that the work was only done for the purpose of repairing the banks: so that if anyone causes the water to flow in a different direction for the purpose of repairing the banks, there will be no ground for the interdict. This opinion is not accepted by others, for the banks should not be repaired if it causes inconvenience to those living in the neighbourhood. We are, however, accustomed to have the Praetor decide, after investigation, whether he ought to grant this exception, for very frequently it is advantageous to permit this to be done. 7. If, however, any other advantage is obtained by the person who did something to a public stream (suppose, for instance, that the water usually caused him a great deal of damage, and that his land was overflowed), and he raised levees, or took other measures to repair the banks, so as to protect his land, and this, to some extent, altered the course of the river; why shouldn't his interest be consulted? I know that several people, with a view to the protection of their land, have absolutely diverted the course of streams, and changed their beds, for it is necessary in cases of this kind to take into consideration the benefit and safety of the party interested, if no damage is sustained by other people in the neighbourhood.").

At the request of a private person the *Praetor* could also issue an *interdictum* '*restitutorium'*: in fact whoever had in his possession something that had been built or placed in *flumine publico ripave eius* with the effect to modify their *modus* would have had to restore everything in its former condition:

D.43.13.1.11 Ulp. 68 *ad ed.*: *Deinde ait praetor: 'Quod in flumine publico ripave eius factum sive quid in flumen ripamve eius immissum habes, si ob id aliter aqua fluit uti priore aestate fluxit, restituas'.*

("Then the Praetor says: 'If you have anything in your possession which has been built or placed in a public river, or on the bank of the same, by means of which the water is caused to flow in a different direction from that in which it flowed during the previous Summer, restore everything to its former condition'.").

The *praetor* used to assure protection of interdicts also to individuals fortifying the riverbanks of a public river provided that such works did not hamper navigation. This meant that anyone who intended to carry out works of *munitio riparum 'ripae agrive qui circa ripam est tuendi causa'* was protected by the *praetor* against whoever had prevented him from doing so because of the fear of a possible damage to his land. However, in the presence of guarantors, the riparian owner willing to carry out those works had to formally promise (with *cautio* or *satisdatio*) that he would pay for any damage caused by his works within the following 10 years (Maganzani 2014a, b, 68–69).

D.43.15.1 Ulp. 68 *ad ed.*: *Praetor ait: 'Quo minus illi in flumine publico ripave eius opus facere ripae agrive qui circa ripam est tuendi causa liceat, dum ne ob id navigatio deterior fiat, si tibi damni infecti in annos decem viri boni arbitratu vel cautum vel satisdatum est aut per illum non stat, quo minus viri boni arbitratu caveatur vel satisdetur, vim fieri veto'.*

("The Praetor says: 'I forbid force to be employed to prevent anyone from doing any work in any public river, or on the bank of the same, which he has a right to do for the purpose of strengthening the said bank, or protecting his land which adjoins it; provided that, by so doing, no interference is made with navigation, and security against threatened damage is furnished for ten years, in accordance with the judgment of a good citizen; or where

it is not the fault of the party in question that no obligation or sureties have been given for this purpose'.").

The good practice of *munitio riparum* would be supported by emperors too: in 239 AD Gordian the 3rd stated that «Although it is not permissible to divert the natural course of a river in another direction by artificial methods, nevertheless, it is not prohibited to strengthen its bank against the surge of a powerful river» (Campbell 2010, 320; Tarozzi 2018, 55–57).

An *interdictum utile* is then mentioned in Ulpian's commentary on the first *interdictum de fluminibus publicis* that aimed at ensuring protection to river navigation (D.43.12.1*pr.* Ulp. 68 *ad ed.*: *Ne quid in flumine publico facias … immittas, quo statio iterque navigio deterior sit fiat*): here the jurist quotes the opinion of his eminent predecessor *Labeo* who thought it would be fair for the *praetor* to consider depending on the case whether to forbid any violence against whoever was carefully trying to *tollere demoliri purgare restituere* works done or things inserted into the bed or along the banks of a river, even not navigable, with the effect of drying it up:

D.43.12.1.12 Ulp. 68 *ad ed.*: *… Labeo scribit non esse iniquum etiam si quid in eo flumine, quod navigabile non sit, fiat, ut exarescat vel aquae cursus impediatur, utile interdictum competere 'ne vis ei fiat, quo minus id opus, quod in alveo fluminis ripave ita factum sit, ut iter cursus fluminis deterior sit fiat, tollere demoliri purgare restituere viri boni arbitratu possit'.*

("… *Labeo* writes that even if anything is done to a river that is not navigable, which may cause it to dry up, or which obstructs the course of the water, it will not be unjust to grant an *utile interdictum* to prevent any violence from being employed against removing or demolishing a structure which has been built in the bed of the stream, or on its bank, that interferes with the passage or current of the river, and to compel everything to be re-established in good condition, in accordance with the judgment of a reliable citizen.").

This could take place, for example, if someone had derived water, built a man-made construction in the river (like a dam or a weir), abandoned things (like waste) or let undergrowth grow on the riverbanks ending up with blocking the water flow. Well, according to *Labeo*, if anyone trying to remove and tear down this artifact, to clean the riverbed and banks so as to allow the water flow or to restore the original condition of the land had been prevented with violence from doing so, this person could ask the *praetor* for an *utilis* interdictal protection (Fiorentini 2003, 222–230).

Finally, one can briefly quote the *interdictum de rivis* aiming at protecting from somebody's violence anyone restoring or cleaning a *rivus*, a *specus* or some *saepta* in order to easily exercise his *servitus aquaeductus*, as he had done the previous summer. Besides the attention paid by Ulpian in trying to explain the meaning of every single term of the praetorian text is undoubtfully remarkable:

D.43.21.1 Ulp. 70 *ad ed.*: *Praetor ait: 'Rivos specus septa reficere purgare aquae ducendae causa quo minus liceat illi, dum ne aliter aquam ducat, quam uti priore aestate non vi non clam non precario a te duxit, vim fieri veto'. 1. Hoc interdictum utilissimum est: nam nisi permittatur alicui reficere, alia ratione usu incommodabitur. 2. Ait ergo praetor 'rivum specus'. Rivus est locus per longitudinem depressus, quo aqua decurrat, cui nomen est* ἀπό τοῦ ῥεῖν. *3. Specus autem est locus, ex quo despicitur: inde spectacula sunt dicta. 4. Septa sunt, quae ad incile opponuntur aquae derivandae compellendaeve ex flumine causa, sive ea lignea sunt sive lapidea sive qualibet alia materia sint, ad continendam transmittendamque aquam excogitata. 5. Incile est autem locus depressus ad latus fluminis, ex eo dictus, quod incidatur: inciditur enim vel lapis*

vel terra, unde primum aqua ex flumine agi possit. Sed et fossae et putei hoc interdicto continentur. 6. Deinde ait praetor 'reficere purgare'. Reficere est quod corruptum est in pristinum statum restaurare. Verbo reficiendi tegere substruere sarcire aedificare, item advehere adportareque ea, quae ad eandem rem opus essententiarum continentur. 7. Purgandi verbum plerique quidem putant ad eum rivum pertinere, qui integer est: et palam est et ad eum pertinere, qui refectione indiget: plerumque enim ut refectione, et purgatione indiget.

("The Praetor says: 'I forbid force to be employed against anyone to prevent him from repairing or cleaning any aqueduct, canal, or reservoir, which he has a right to use for the purpose of conducting water, provided he does not conduct it otherwise than he has done during the preceding Summer, without the employment of violence, or clandestinely or under a precarious title'. 1. This interdict is extremely useful, for unless anyone is permitted to repair a conduit, he will be inconvenienced in his use of the same. 2. Therefore, the Praetor says, 'An aqueduct and a canal'. A canal is a place excavated throughout its length, and derives its name from a Greek word meaning to flow. 3. A reservoir is a place from which one looks down, and from it public exhibitions are named. 4. Conduits are opposed to ditches, and are for the purpose of conducting and forcing water from a stream, whether they are of wood, stone, or any other material whatsoever. They were invented for the purpose of containing and conveying water. 5. A ditch is a place excavated at the side of a stream, and is derived from the word incision, because it is made by cutting; for the stone or the earth is first cut, in order to permit the water to be brought from the river. Pits and wells are also included in this interdict. 6. The Praetor next says, 'to repair and clean'. To repair is to restore anything which is injured to its former condition. In the term 'repair' are included to cover, or support from below, to strengthen, to build, and also to haul and transport everything necessary for that purpose. 7. Several authorities hold that the term 'clean' only has reference to a canal which is in good condition, but it is evident that it also applies to one which needs repair, for frequently a canal needs both repairing and cleaning.").

Remember that also the text *Ex libris Magonis et Vegoiae auctorum*, Lach. 349 deals with obligations of cleaning of the *rivi* by the *privati possessores* (Peyras 2007, 159). Some scholars think that the interdictal protection could be granted by the local magistrates too (lastly Schiavon 2019, 106–109): if this is true, the prescriptions quoted above about the powers of the local magistrates would have been even more effective.

c. Other praetorial remedies granted that one could block an activity or work undertaken on the riverbed or banks potentially dangerous for the surroundings: for example the so called *interdictum quod vi aut clam* (D. 43.24) was issued against whoever forcibly or secretly had changed a public or private land (D.43.24.20.5 Paul. 13 *ad Sab.*) and it forced him to restore the *locus* to its previous condition (Fargnoli 1998; Magalhães 2020, 213–239).

We can also mention another classical remedy provided by the Praetor's edict against whoever was making an *opus novum* that could be dangerous for the *nuncians* himself (*iuris nostri conservandi causa aut damni depellendi*) or even for the public interest (*publici iuris tuendi gratia*: D.39.1.1.16 Ulp. 52 *ad ed.*: Fasolino 1999, 38–64; Santucci 2001; Pellecchi 2002, 95–203; Fiorentini 2003, 215–217). The *nuntiatio* consisted in protesting against the *opus* on the spot where the work was proceeding, in the presence of the owner or of the people who were working on his account and without filing any application to the *praetor*. The effect was forbidding the work progress until the *nuntiatio* was *remissa* by the *praetor* or until a security (*cautio, satisdatio*) was given by the *nuntiatus* with which he promised to restore possible damages the new *opus* could provoke. As we can read in D.39.1.1.17 Ulp. 52 *ad ed.*, the *nuntiatio* could also be done for works made «*in publico*

ripave fluminis, quibus ex causis et interdicta proponuntur». In this case—*Ulpianus* says—«*omnes cives nuntiare possunt*» (D.39.1.3.4 52 *ad ed.*) because «… *rei publicae interest quam plurimos ad defendendam suam causam admittere*» (D.39.1.4 Ulp. 48 *ad ed.*).

It is notable that chapter XIX of the *Lex Rubria de Gallia Cisalpina* seems to attest that this means could be used also in the municipal and colonial contexts under the supervision of the local magistrates (Arcaria 2000, 155–174; Schiavon 2019, 106–109).

Conclusions

This complex system, according to which also individuals and local communities could play an active part together with public institutions in the protection of the rural territory from rivers' floods, worked until the third century AD: in particular «within these local riverine communities the inhabitants learned the river's ways, adapted to the floods, and in the main managed the consequences of the long terms changes brought by river action» (Campbell 2012, 11).

I think that this sort of 'collective awareness' on preventing the floods of rivers and preserving 'commons' in rural contexts that we find in Roman sources has both social-economic and legal reasons: on the one side, the watercourses were exploited and managed in local communities and—as Elinor Ostrom has admirably proved (Ostrom 1990)—«the conditions for a successful management of common resources are that the rights regime be designed and implemented by local communities» where conflicts are more easily solved and every member is equally interested in preserving 'commons' for his own private interest (Bannon 2014; Cole and Ostrom 2012, 37–64). It is notable that—as recently noted—«in the Roman world, 'local' water communities may be as small as two neighbors or as large as an irrigation community or a city» (Bannon 2017, 64).

On the other hand, in the classical Roman world, both the *praetor* through his power of *iurisdictio* and the jurists through their *interpretatio* of *ius civile* and *honorarium*, not only implicitly implemented these principles, but create a legal system in which social competition co-existed with and even strengthened «the normative force of community designed rights regimes» (Bannon 2017, 64).

On the contrary, when the formulary procedure was abolished in 342 AD by a constitution of *Costantius* and *Constans* (C.2.57.1) and the management of rivers and their banks was reduced or even stopped, floods and marshland were favoured (Dall'Aglio and Franceschelli 2018, 165–187). The centuriation itself with its «regular field system bordered by channels that acted as collectors of the excess of water» (Abballe and Calavazzi 2022, 1) started to malfunction and several tracts of land were abandoned (Solidoro 2008, 74–75). A contributing factor to this default was perhaps the worsening climate from 400 to 600 AD. (McCormick et al. 2012, 191–199).

So, even if a renewed attention to both management of rivers and prevention of floods is attested in fifth–sixth centuries AD by some imperial constitutions (Barbati 2014, 349–378; Bassanelli Sommariva 2018, 1–10; Bono 2022; 206–222) and various texts of the Roman land surveyors (Peyras 2014, 76), the above-mentioned remedies such as that also private individuals and communities could be participants in the general interest, were not applied anymore.

Also in current legislations this sort of 'collective awareness' in the matter of soil management and hydrogeological instability does not exist anymore (Goutx 2012, 1–23) and almost every related function is delegated to public institutions. However, on one side, it

is a real pity to loose ancient remedies, like popular proceedings that could be useful even nowadays, but on the other side—as authoritatively claimed (Quilici Gigli 2008, 227)—the ancient interventions on the local management of rivers and canals «with the incentive of the consequent boost of revenue, can offer useful suggestions for best planning practice in the present». This is why I think that the historical-juridical research in this field can be interesting also to reconsider the current prevention measures against floods.

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