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Integrating Nature-Based Solutions Into River Basin Planning: Standards, Participation, Appraisal And Implementation Pathways

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Abstract:
Nature-based Solutions, or NbS, are increasingly recognised as crucial instruments for addressing, in an integrated manner, water insecurity, climate risk, biodiversity loss and ecosystem degradation; yet their implementation remains fragmented, is frequently confined to pilot projects and is only episodically incorporated into ordinary river basin planning, public appraisal processes and investment programming. This article proposes an integrated technical framework grounded in the joint reading of international standards, European documents on water regulation and planning, guidelines on co-creation and co-governance, reports on appraisal and handbooks on implementation and financing, in order to show that the full operability of NbS depends on the interaction between a rigorous conceptual definition, a planning scale consistent with hydrological functioning, inclusive forms of social construction of measures, evaluative methods capable of representing their overall public value and institutional arrangements able to translate strategies and programmes into implementable and investable projects. Within this perspective, the river basin is assumed as the privileged territorial unit for the organisation of action, while negotiated instruments such as the River Contract are interpreted as operational devices situated within a broader architecture of river basin governance, useful for territorialising strategic objectives, coordinating actors, building shared priorities and rendering implementable portfolios of interventions distributed across space.

Key Words: *Nature-based Solutions; River Contracts; river basin planning; river basin governance; co-creation; climate adaptation; water resilience; multidimensional appraisal; blended finance; territorial implementation.*

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I. Introduction

In recent years Nature-based Solutions have progressively emerged as one of the most important operational frameworks through which water scarcity, climate risk, biodiversity loss and ecosystem degradation may be addressed in an integrated way. Their relevance does not depend solely on the fact that they can reduce exposure and vulnerability in relation to extreme events, erosion or diffuse pollution, but also on the circumstance that they make it possible to mobilise ecosystem processes able to generate simultaneous ecological, social, economic and territorial benefits, thereby opening a perspective of intervention broader than that generally guaranteed by grey infrastructures alone.[1]

In this article, consistently with the IUCN Global Standard, Nature-based Solutions are understood as actions aimed at protecting, sustainably managing and restoring natural or modified ecosystems in order to address societal challenges effectively and adaptively, while at the same time generating benefits for human well-being and biodiversity. The importance of this definition lies not only in establishing a shared lexicon, but also in preventing NbS from being reduced to an indistinct collection of green measures or to a rhetorical formula of policy, since it enables them to be treated as verifiable solutions, demanding in design terms and susceptible of being compared, on both the technical and institutional planes, with grey or hybrid alternatives.[1]

Within the same theoretical framework, River Contracts are here defined as voluntary, negotiated and participatory instruments of strategic planning and territorial governance, aimed at the rehabilitation, integrated management and enhancement of river systems together with their basin or sub-basin territories. They are grounded in the coordinated involvement of public institutions, private subjects, associations and local communities and seek to construct shared scenarios, action programmes, implementation responsibilities and monitoring arrangements that are consistent with objectives concerning water quality, hydraulic safety, ecosystem protection, landscape quality and sustainable local development. In this perspective, the River Contract is not treated as a simple voluntary agreement, but as an operational device of mediation between basin planning, multi-actor participation and the territorial implementation of measures, including Nature-based Solutions.[15,16]

Despite the consolidation of these two conceptual frames, the technical and institutional literature continues to signal a structural problem: NbS often remain confined to demonstration initiatives or localised interventions and struggle to enter stably into ordinary processes of territorial planning, public-investment appraisal and financial programming. The NAIAD manual explicitly describes this condition as an implementation gap, clarifying that many projects do not reach the stage of genuine investment projects because they lack a sufficiently robust business case, an adequate governance arrangement, a coherent procurement strategy and a credible financial structure. The OECD report on scaling up NbS confirms this diagnosis and shows that their wider diffusion depends far less on the simple availability of technical solutions than on the alignment among regulation, technical capacity, financial instruments and institutional coordination.[2,3]

Within this context, the question of territorial scale acquires decisive importance. The documents relating to the Water Framework Directive and to the river basin-wide approach make clear that water problems cannot be treated as a mere sum of punctual interventions, nor can they be adequately understood within purely administrative boundaries, because water quality, hydromorphological configurations, sediment transport, flood risk, land uses and upstream-downstream relations are organised according to systemic logics for which the river basin constitutes the most coherent territorial unit. The more recent evolution of European water law, culminating in the 2026 reform directive, reinforces this argument by confirming that pressures on surface and groundwater derive from the combined effects of mismanagement, climate change, hydromorphological transformation, urbanisation and unsustainable productive practices, and by stating that sustainable water management must now be integrated across the sectoral policies that use water or affect its status.[4,5,6,7]

The integration of NbS into basin planning, however, cannot be reduced to a question of correct geographical perimeter. The documents on co-creation and co-governance show that the quality of a nature-based solution depends substantially on the way in which the problem is diagnosed, shared, translated into scenarios and then accompanied throughout implementation. Processes of stakeholder mapping, co-diagnosis, co-design, co-implementation, co-monitoring and the intentional inclusion of subjects that are commonly excluded therefore do not represent an accessory or merely procedural element, but become part of the technical robustness and long-term sustainability of the intervention itself. A further critical node concerns appraisal, because cost-benefit analysis continues to occupy a central position in public decision-making, yet the literature reviewed here insists that, if used alone, it tends to under-represent ecosystem co-benefits, distributional effects, systemic resilience, avoided damages and the cost of inaction, thereby making necessary a broader and more adequate evaluative framework.[8,9,10,11]

II. Conceptual And Methodological Framework

The conceptual framework adopted in this article assumes that Nature-based Solutions cannot be adequately understood if they are treated as single green measures detached from the context in which they must operate. The analysed documents suggest, on the contrary, that they should be read as socio-ecological infrastructure, that is, as territorial and projectual configurations in which the functioning of natural or modified ecosystems is mobilised in order to produce water security, risk reduction, ecological quality, ecosystem services and territorial value. Such an interpretation makes it possible to avoid a double simplification, because it prevents NbS from being reduced, on the one hand, to merely naturalistic interventions and, on the other, from being treated as technical works separable from the social and institutional conditions that make their effectiveness possible.[1,2,3]

From a territorial point of view, the river basin is assumed as the fundamental unit of analysis and of organisation of action. This choice does not derive merely from a theoretical preference, but from the convergence of several documentary strands, since the Water Framework Directive, the guidance on River Basin Districts and the river basin-wide approach all show that the basin is the space in which surface drainage, groundwater, land uses, diffuse pressures, ecosystem functions and social needs intersect. The reference to the basin makes it possible, moreover, to address upstream-downstream interdependencies and the possible displacement of risk in a technically appropriate way, which becomes particularly relevant whenever one designs measures concerning diffuse retention, floodplain restoration, river renaturalisation or sediment management.[4,5,6]

Within this perspective, river basin governance is understood not as a simple administrative container, but as the set of rules, actors, decision-making processes and coordination instruments that make possible the integrated management of resources, risks and ecosystem services at basin scale. River Contracts, read in the light of the more recent literature, are fully coherent with this setting, because they are described as voluntary, negotiated and participatory practices capable of integrating basin planning with other scales of territorial government, while at the same time promoting a renewed culture of water and a more direct co-responsibilisation of riverine communities with respect to the management of common goods.[15,16,17]

The second pillar of the conceptual framework concerns co-creation. The European guidelines on co-creation and co-governance show that processes such as stakeholder mapping, co-diagnosis, co-design, co-

implementation and co-monitoring do not serve only to generate democratic legitimacy, but also improve the diagnostic and projectual quality of solutions, their social acceptability, the distribution of benefits and the capacity for long-term maintenance. The report on commonly excluded stakeholders reinforces this position by clarifying that the inclusion of vulnerable or under-represented groups improves the epistemic and operational quality of NbS, because it enlarges the range of available knowledge and reduces the risk of solutions that are formally correct but territorially fragile or socially blind.[8,9]

From a methodological point of view, this contribution adopts a technical-qualitative synthesis of heterogeneous yet complementary sources, including international standards, policy reports, implementation guidelines, project handbooks, normative documents and territorial case studies. The aim is not to produce an exhaustive bibliometric review, but rather to reconstruct an integrated operational framework from a corpus that converges on a set of common problems, namely the difficulty of scaling up, institutional fragmentation, the limits of traditional evaluative instruments, the weakness of implementation models and the need to work at basin scale. The interpretive hypothesis guiding the analysis is that NbS become genuinely operational and scalable only when ecological design, basin planning, co-governance, appraisal and delivery are conceived as segments of one and the same technical-institutional chain.[1,2,3,8,10]

III. The River Basin As The Optimal Scale For Integrating Nbs Into Territorial And Water Planning

One of the most recurrent messages in the examined corpus is that Nature-based Solutions lose a relevant part of their effectiveness when they are conceived as isolated interventions detached from basin logic. The texts on the river basin-wide approach clarify that many relevant hydrological and ecosystem processes manifest themselves at scales wider than the site and that local measures of bank stabilisation, runoff reduction or erosion control may prove ineffective if the pressures generated upstream, including soil sealing, deforestation, inappropriate agricultural practices or interrupted hydraulic connectivity, are not addressed simultaneously.[6]

This observation is fully coherent with the architecture of the Water Framework Directive, which takes the basin as the natural unit of reference precisely because the processes of pressure, degradation and recovery of water bodies do not coincide with administrative borders. The Directive, together with the subsequent construction of River Basin Districts and of their management plans, makes evident that ecological quality, chemical quality, quantitative availability and risk reduction depend on the overall configuration of the drainage system and not on the mere sum of local decisions. The basin should therefore be understood not only as a geographic perimeter, but as a hydro-ecological and socio-territorial unit within which relations among ecosystems, land uses, settlements, local economies and instruments of public regulation are organised.[4,5]

The very nature of NbS confirms this conclusion, because the available technical repertoires show that effective interventions rarely coincide with a single work and much more frequently take the form of portfolios of measures distributed in space, including wetlands, buffer strips, vegetated ditches, retention basins, stream daylighting, river restoration, leaky dams and agro-forestry practices that must be placed inside coherent territorial arrangements supported by adequate governance conditions. The recent evolution of European water legislation further strengthens the centrality of basin scale, because the 2026 reform directive insists that pressures and impacts cannot be effectively addressed without a stronger coordination among water policy and sectoral policy, given that agriculture, public supply, industrial use, urbanisation and hydromorphological change all affect water status simultaneously.[7,12,13,14]

From this follows that the basin reappears as the space within which not only monitoring and programmes of measures are organised, but also a real integration becomes possible among source control of pollution, ecosystem restoration, water-use efficiency and climate adaptation. The river basin is therefore the optimal scale for integrating NbS into planning not merely because it corresponds to hydrological functioning, but because it enables the articulation of a governance capable of holding together biophysical processes, territorial interests, evaluative criteria and implementation pathways.[5,6,7]

IV. Co-Creation, Co-Governance And Inclusion As Conditions Of Effectiveness For NbS

In the debate on Nature-based Solutions, participation is often invoked as a requirement of democratic legitimacy or as a general principle of good governance, but the documents analysed here support a stronger claim, according to which co-creation constitutes a genuine technical condition of effectiveness. The quality of an NbS depends in fact on the capacity to build adequate processes of shared problem definition, measure selection, transformation of the organisational conditions necessary for implementation and verification of effects over time. This is all the more true in basin-scale interventions, where costs and benefits are distributed unevenly across space and time and where the technical definition of the solution cannot be separated from the construction of a negotiated process capable of rendering visible trade-offs, responsibilities and differences in capacity among actors.[8,9]

The European guidelines on co-creation and co-governance articulate with particular clarity the successive phases of the collaborative process, showing that it does not coincide with a single participatory moment, but with a chain of robustness-building that includes co-diagnosis, co-design, co-implementation, co-evaluation and co-monitoring. This setting is also theoretically relevant because it permits NbS to be conceived not as objects defined once and for all in the initial project phase, but as adaptive configurations whose success depends on the capacity to integrate, progressively, technical-scientific knowledge, local knowledge, social expectations and institutional constraints. It follows that a good intervention is not merely one that is technically well designed, but one that is constructed through a sequence of interactions capable of reducing conflict, increasing learning and sustaining local appropriation of the measure.[8]

In a complementary manner, the report dedicated to commonly excluded stakeholders shows that the inclusion of vulnerable or poorly represented groups does not concern only ethics or procedural justice, but constitutes a factor of project robustness, because it enlarges the repertoire of available knowledge and reduces the risk of solutions that are formally correct but locally fragile or socially blind. The literature on River Contracts makes it possible to specify this point further, because in the Italian and European context they are described as voluntary and concerted instruments capable of integrating negotiated agreements, territorial planning, sectoral policy and water-resources management, thereby favouring the passage from approaches centred exclusively on technical-hydraulic regulation towards more inclusive and participatory modes of governing the basin.[9,15,16,17]

The dual nature of River Contracts, at once technical and concertative, makes them especially useful for translating co-governance into operational platforms of coordination among public bodies, private subjects and settled communities, consistently with the principle of subsidiarity and with the objectives of integrated water management. This reading is reinforced by the gradual institutional recognition of River Contracts in Italy, which has transformed them from regional experimental practices into devices mentioned in climate-adaptation strategies, supported by national methodological guidance and formally recognised in the Italian environmental framework. Read in this way, the River Contract does not coincide either with a single pact or with a generic participatory table; rather, it becomes a structured process through which basin-scale priorities are translated into shared scenarios, action programmes, implementation responsibilities and arrangements of monitoring and revision.[15,16,17]

V. Evaluation, Appraisal And Prioritisation Criteria For NbS Beyond Cost-Benefit Analysis

One of the principal obstacles to the full integration of Nature-based Solutions into ordinary planning and investment processes lies in the difficulty of evaluating them through instruments coherent with their multifunctional nature. Unlike many conventional grey infrastructures, NbS generate benefits distributed across hydrological, ecological, climatic, social, landscape, sanitary and economic dimensions, and such benefits often manifest themselves with differentiated temporalities and on territorial scales that do not coincide with those of the decision-maker or the financier. This complexity renders problematic the exclusive use of simplified or narrowly financial metrics and requires an appraisal framework capable of representing co-benefits, distributional effects, avoided risk, ecosystem value and territorial quality.[10,11]

Cost-benefit analysis continues to occupy a central place within administrative and infrastructural culture, yet the Deloitte report shows clearly that, whenever it is applied to contexts characterised by high uncertainty, plural public purposes and non-market impacts, it tends to under-represent resilience, equity, inclusion, environmental quality and the spatial distribution of benefits. These limits become especially visible in the case of NbS, because interventions such as river restoration, floodplain reconnection, wetland rehabilitation, reforestation or buffer strips simultaneously produce risk reduction, improved water quality, enhanced biodiversity, carbon sequestration and recreational or landscape value, often with benefits that appear over long time spans and in diffuse form. A CBA used as the sole selective filter therefore risks systematically penalising NbS in comparison with grey options that are easier to quantify but less capable of generating overall public value.[10,11]

Among the alternative or complementary tools to CBA, cost-effectiveness analysis proves especially useful whenever the main objective is not to monetise all benefits but to compare the relative cost of different options in relation to a desired physical result, such as nutrient-load reduction, extension of retention areas, containment of flood peaks or improvement of ecological indicators. Multi-criteria analysis, for its part, makes it possible to represent explicitly the plurality of criteria involved in a decision, giving weight to heterogeneous dimensions and making visible the trade-offs that would otherwise remain implicit. Once inserted into a co-governance process, it can even become a structured space of informed mediation among actors attributing different importance to hydraulic safety, habitat, water availability, maintenance costs, compatibility with agricultural uses or community benefits.[10,12]

A further dimension strongly valorised by the corpus concerns avoided damages and the cost of inaction. The report on the nature-positive economy insists that nature loss produces systemic risks for the

economy and that ecosystem restoration and NbS can reduce future costs associated with extreme events, productivity losses, insured damages and territorial instability. The recent Commission guidance on Natura 2000 and climate change connects this perspective to a climate-adaptation framework that explicitly links habitat restoration, flood alleviation, erosion reduction, pollution reduction, securing water supplies and carbon storage as overlapping co-benefits that can be supported through joint action and intersectoral partnerships. In this way, the connection among NbS, risk management and basin planning appears not merely theoretical or political, but increasingly embedded in technical guidance concerning conservation and adaptation.[11,18]

In the light of these considerations, the evaluation of basin-scale NbS should be understood as an integrated and multi-level process in which economic, multicriteria, performance-oriented and institutional approaches play different yet complementary roles. Only such a framework can connect ecological effectiveness, public value, administrative feasibility and financing conditions, while avoiding both the reduction of NbS to mere environmental costs and their idealisation as automatically superior alternatives.[2,3,10,11]

VI. From Planning To Implementation: Delivery, Procurement And Financing Of Basin-Scale NbS

If the previous sections have shown that Nature-based Solutions require robust standards, a planning scale coherent with the basin, inclusive processes of co-governance and multidimensional appraisal tools, the decisive question of implementation nevertheless remains open. It is precisely at this passage that the examined corpus identifies the principal bottleneck, because the NAIAD manual clarifies that many NbS remain confined to the stage of demonstration project, pilot initiative or conceptual proposal without managing to transform themselves into programmes or interventions actually inserted into ordinary cycles of public and private investment. This difficulty derives not only from weakness in ecological design, but from the absence of an implementation arrangement capable of connecting the designed measure with a clear allocation of roles, responsibilities, risks, funding sources, contractual mechanisms and procurement strategies.[2]

This problem becomes even more evident in the case of basin-scale NbS, because such interventions are often spatially distributed, produce multiple benefits, require coordination among different bodies and lie at the intersection of water planning, land use, agricultural policy, forest management, risk reduction and territorial regeneration. Under such conditions, the traditional project model, centred on one client, one infrastructure, one benefit stream and one implementation chain, often proves inadequate. NbS instead require a more flexible and more complex approach able to structure portfolios of interventions, green-grey clusters, multi-actor coordination arrangements and differentiated combinations of funding and financing. The adaptation of the Five Case Model to NbS is especially useful in this regard because it distinguishes strategic case, economic case, commercial case, financial case and management case, thereby treating NbS as complex investments rather than as generic environmental good practices.[2,3]

On the financial plane, the literature converges in distinguishing clearly between funding and financing. Funding concerns resources made available to cover costs without expectation of direct financial return, such as public grants, environmental funds or philanthropic contributions, whereas financing refers to the provision of capital accompanied by expectations of repayment or yield. Many NbS, especially those serving diffuse public interests, require a combination of these two registers, and blended finance can play an essential role in mobilising private capital from a public or philanthropic base. The OECD report and the World Economic Forum white paper further show that the scalability of NbS depends decisively on the existence of fit-for-purpose financial mechanisms, stable basin-level partnerships and forms of adaptive water governance capable of connecting water valuation, multi-actor coordination and long-term investment.[3,19]

A particularly instructive case of translation from negotiated governance to operational architecture is represented by the Wetland Contract of the Marano Lagoon, developed within the CREW project. This case shows that a territorial contract can be constructed as a progressive device including the identification of governance bodies, the activation of participatory laboratories, the definition of strategic scenarios, the sharing of these scenarios, the drafting of an Action Plan and the formal subscription of the agreement. The interest of the case lies not only in the participatory dimension, but in the fact that the agreement already contains the typical elements of an implementation arrangement, because it associates activities, responsibilities, timing, expected results and possible financing sources with a governance structure providing for an assembly, a steering room, technical working tables and periodic verification of implementation. In this respect, the Marano case confirms that territorial contracts can function as devices translating co-governance into administrative delivery and into portfolios of interventions that are actually implementable.[20]

VII. Discussion: Towards An Integrated Framework For The Systematic Insertion Of Nbs Into River Basin Planning

The analysis developed in the previous sections shows that one of the main obstacles to the full integration of NbS into basin planning lies in the strong fragmentation of the available frames of reference. On the one hand there are standards and normative documents defining what NbS are and which criteria they should satisfy; on the other hand there are texts devoted to basin planning in hydrological and administrative terms; alongside these are placed guidelines on co-creation, reports on economic evaluation, implementation handbooks, climate-adaptation documents and territorial case studies. Taken separately, such contributions offer important but partial indications; read together, however, they restitute an almost complete chain running from conceptual definition to project translation, through planning, governance, evaluation and delivery.[1,2,3,4,8,10]

The main contribution of the present study therefore lies in the attempt to reassemble these registers into a single interpretive framework. NbS are no longer considered merely as a repertoire of ecological good practices nor as a simple policy category, but as complex technical-institutional objects that require, at the same time, standardisation, an appropriate territorial scale, co-governance processes, multidimensional appraisal tools and coherent implementation arrangements. The value of the proposed integrated framework lies precisely in showing that these dimensions are not additive, but mutually constitutive, in the sense that the weakness of one of them tends to undermine the consistency of the whole path through which NbS can be integrated into river basin planning.[1,2,3,8,10]

Within this framework, the River Contract can be positioned with greater precision, not as a substitute for basin planning, but as an operational and negotiated device internal to a broader architecture of river basin governance, capable of translating basin-scale strategic objectives at territorial scale, constructing multi-actor platforms for the selection of measures and accompanying the passage from planning to delivery through shared agreements on roles, timing, responsibilities and maintenance. A further strengthening element comes from the contemporary language of water resilience, as elaborated by the World Economic Forum, because the references to holistic water valuation, fit-for-purpose finance, sustained basin-level partnerships and adaptive water governance make it possible to reformulate the argument of the article in even more explicit terms, showing that the shift from isolated measures to territorial portfolios of NbS coincides with the construction of water systems more capable of anticipating, absorbing and recovering from future shocks and stresses.[15,16,19]

The discussion therefore permits the formulation of a central proposition: Nature-based Solutions become genuinely operational and scalable only when ecological design is inserted into an integrated technical-institutional chain composed of shared standards, basin-scale planning, inclusive co-governance, multidimensional appraisal and adequate implementation and financing arrangements. This proposition does not simply summarise the analysed literature; it also indicates a practical direction for territorial action, insofar as it suggests that the effectiveness of NbS depends less on the isolated excellence of the single measure than on the quality of the architecture through which measures are selected, related to one another, legitimised and made deliverable.[1,2,3,8,10,19]

VIII. Conclusions

The analysis developed in this contribution has shown that Nature-based Solutions can be integrated systematically into territorial and water planning only on condition that the reductive reading of them as punctual environmental interventions or simple local good practices is overcome. The examined documents converge instead in indicating that NbS should be treated as socio-ecological infrastructure oriented towards water security, risk reduction, improved ecological quality and climate resilience, and that such a function emerges fully only when ecological design is supported by robust standards, an appropriate territorial scale and coherent institutional arrangements. In this framework, the IUCN Global Standard provides the conceptual and methodological basis for stabilising the operational meaning of NbS, whereas the literature on integrated water management clarifies that the river basin is the most adequate scale for organising their planning, selection and coordination.[1,4,5,6]

A second central result concerns governance. The present study has shown that the success of NbS depends not exclusively on the correctness of biophysical design, but also on the quality of the process through which they are diagnosed, co-designed, legitimised, implemented and maintained. The guidelines on co-creation and co-governance demonstrate that stakeholder mapping, co-design, co-implementation, co-monitoring and the inclusion of commonly excluded subjects are not accessory dimensions, but technical components of project robustness and long-term sustainability. In this perspective, river basin governance cannot be understood as a mere administrative frame, but as the institutional infrastructure necessary to sustain distributed, multifunctional and interdependent interventions.[8,9]

A third result concerns appraisal. NbS still struggle to enter ordinary public decision-making processes not only for cultural or regulatory reasons, but also because conventional evaluative models tend to under-represent co-benefits, ecosystem value, distributional effects, risk reduction and the cost of inaction. For this

reason, the article has argued for the need to move beyond exclusive dependence on cost-benefit analysis by adopting a broader evaluative framework capable of integrating cost-effectiveness analysis, multi-criteria analysis, avoided-damages analysis and business-case construction. Only such an approach makes it possible to compare NbS fairly with grey or hybrid alternatives without turning their multifunctionality into a decision-making weakness.[10,11,18]

A fourth result concerns implementation. The analysed corpus shows that the true bottleneck for NbS is not the absence of project ideas, but the difficulty of transforming strategies and plans into implementable, investable and, in some cases, bankable projects. From this point of view, the NAIAD manual, the OECD report, the World Economic Forum paper and the case of the Marano Wetland Contract all highlight the necessity of constructing implementation arrangements founded on a clear articulation among strategic case, economic case, procurement, governance, funding and financing. Basin-scale NbS cannot be treated as isolated works; they require instead portfolios of interventions, green-grey clusters, multi-actor coordination and combinations of public and private resources. In this sense, River Contracts can be interpreted not as alternatives to basin planning, but as operational devices within a broader architecture of river basin governance, useful for translating strategic objectives into territorial agreements, shared priorities and NbS portfolios.[2,3,15,19,20]

In conclusion, NbS become genuinely operational not when they are simply added to existing planning, but when they contribute to reorganising the very way in which the basin is governed, evaluated and transformed. Their effectiveness depends on the capacity to connect ecological processes, planning instruments, collective learning and investment structures within a single technical-institutional chain. It is in this passage, from isolated green measures to territorial portfolios of socio-ecological infrastructure, that the possibility lies of making NbS not merely a promising category, but a structural axis of contemporary planning for water and territory.[1,2,3,19]

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