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Wetland Contracts as Sustainable Governance Tools: A Comparison between the Output of the Interreg Project CREW "Coordinated Wetland Management in Italy-Croatia Cross Border Region"

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Abstract: Wetlands are complex ecosystems, considered among the most productive environments of the world. They contain major biodiversity hotspots, providing the resources upon which countless species of plants and animals depend and they perform important environmental and economic functions. Wetlands reduce flooding events, improve water quality and represent a valuable cultural and natural heritage. It is estimated that 2/3 of Europe wetlands have disappeared since the beginning of the 20th Century, mainly lost through development processes which did not take their functions and values adequately into account. The European Directive (2000/60/EC) [1] requires to foster an integrated approach for wetland management through collaborative governance processes. The Wetland Contract is a tool that has been developed and implemented to set the ground for voluntary-based commitments for the sustainable governance of water systems. Among the Mediterranean countries, Italy and Croatia count on a rich variety of coastal wetlands that, together with the plants and animals inhabiting and crossing them, constitute an extremely precious natural heritage. The aim of this paper is to present and discuss, whit a critical approach, the output of the Interreg Project CREW [2] that, between 2018-21, contributed to the drafting of seven new Wetland Contracts.

Keywords: wetlands; Interreg Italy-Croatia; governance; biodiversity; protection; participation

1. Introduction

The "environmental contract" is a tool that has been developed and implemented to set the ground for voluntary-based commitments for the sustainable governance of water systems. The approach of the Interreg project CREW-Coordinated wetland management in Italy-Croatia cross border region is based on the concept of River Contracts [3], voluntary agreements on the integrated management of water resources, and according to the EU strategies and biodiversity indicators, developing cross border coordination, and activating contract processes in target areas. One of the main objectives of CREW has been the development of Wetland Contracts, a management tool that is coherent with ICMZ principles [4]. Several studies indicate that Ramsar [5]. sites in the Mediterranean region have made great progress with the development of management plans and Wetland Contracts in order to achieve overall effects on coastal wetlands ecosystems and socio-economic related systems. Many sites still lack governance schemes involving stakeholders. What happened in the CREW project pilot areas? Coastal wetlands face several challenges in contemporary territories: productive systems causing water consumption and pollution of water and soil; strong urbanization and population growth (often associated with undeveloped/nonexistent public sewerage systems) causing habitat loss and fragmentation; changing in global climate patterns; unsustainable tourism, particularly during the summer season; invasive alien species introduction and eutrophication; overlapping of different levels of spatial planning and duties by authorities in charge

for their preservation and management and scarce coordination and capabilities of administrative authorities to handle complex territorial dynamics; rarely taken into account of rivers and wetlands in territorial development strategies.

The first paragraph Background and Literature review On Wetland Contracts traces the birth of the 'Wetland Contract' instrument and the different implementations undertaken in France, Belgium, Spain and Italy from the 1980s to the present, highlighting differences and common aspects.

The section Research design: cases study and methodology highlight the specific objectives of the CREW project, a description of the partnership and mutual knowledge achieved during the process. Pilot area's morphology, and the relevant aspects regarding the natural and cultural heritage and the main critical issues related to governance processes observed during the project, and the different tools and approaches deployed are also described. The effectiveness of the implemented Contracts highlights the common and different weaknesses and obstacles that the Contract processes have faced, as well as the current and future positive/negative impacts that have been verified or are expected from the implementation of the instrument.

The last chapter is dedicated to the Discussion on Wetland Contracts between Italy and Croatia emphasizing common strategic objectives, such as: safeguarding and enhancement, integrated governance, awareness, raising and training; a cross-border approach, that compares the effectiveness of implemented Wetland Contracts with reference to the following components and indicators: biodiversity, water quality, ecosystem services, level of protection; involvement of actors; effectiveness of the instrument; financial coverage for planned measures and actions; positive and negative impacts.

In the Conclusions positive and negative impacts are evaluated and the comparison between processes and results gives the opportunity to analyse different experiences and to highlight similarities, differences and peculiarities between the signed Contracts.

2. Materials and Methods

In recent years, many Mediterranean coastal territories have taken advantage of the trend to address environmental governance of water resources with River Contracts [6,7] and the process develops a path that leads to the definition of a contract and whose fundamental elements are: sharing a clear objective; signing an agreement among key stakeholders based on such a shared objective; finding sponsors, available to provide the necessary resources to reach the set objective.

Already tested mainly in France, Belgium, Spain and Italy, the River Contract is a methodology for water management coherent with the EU Environment policy (Water Framework Directive, Flood Directive, River Basin Management Plan), based on the active engagement of key stakeholders to a participatory planning. The Contract represents a formal agreement through which public and private territorial actors voluntarily commit themselves to carry out strategies and projects in which criteria of public utility, private economic return, social value and environmental sustainability are equally taken into account. The instrument of the River Contract was born in France in the early 1980s (Contrat de Rivière), with the intervention of a national steering act [8] (Ministère de l'environnement et du cadre de vie, 1981). The water policy in France has been based on watershed management since 1964, and the River Contract extends the "operations clean rivers" [9]. River Contracts are voluntary programs that last from 5 to 7 years, developed across the watershed and their main objective is the fight against pollution. They also intended to reduce flooding and improve the management of banks and structures (dams, locks, etc.). At the end of 2008, there were nearly 200 of them - of which a dozen are transboundary (Spain, Belgium, Switzerland) - at various stages of implementation. At the European level, the community texts give a central place to consultation while imposing a real contractual status to the approaches qualified as contractual.

In Belgium for more than 20 years, River Contracts have been successfully developed in the Walloon Region. Following the first Walloon experiences and the enthusiasm aroused among the water stakeholders, an official recognition of the approach was concretized by the ministerial circular of March 18, 1993 relating to the conditions of acceptability and to the methods of elaboration of River Contracts in the Walloon Region. From now on, the River Contracts are part of the Walloon water

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policy. To date, 89% of the territory is covered by these River Contracts. Inspired by the French model, the Walloon approach favours a participatory approach within a community of users who commit to the development and implementation of a program of actions for the restoration and management of rivers and watersheds [10].

In Spain the basic law regulating water management is the 1985 Water Act, adapted in 2003 to the European WFD. The recent publication of the Green Book on Governance (March 2020) also supports this methodology to promote the co-responsibility of society in water management through the implementation of at least one pilot experience of the River Contract in each River Basin District [11]. The River Contract for the Matarraña river basin was first implemented in Spain in 2011 and covers three autonomous communities and 27 municipalities within the Ebro River Basin Demarcation.

In Italy the River Contract has started since 2000 following different institutional courses, whether in EU programmes or in the setting of local and regional initiatives. Indeed, although the referenced experiences are being developed in the coherent framework of EU legislation, according to preliminary survey on the European River Contracts currently underway, the process to subscribe a River Contract is not codified under regulation, but follows a semi-codified procedure (consisting in the development of: framework of criticality environmental values, territorial policies, mid and long-term strategic scenario and action plan). For example, the Italian National Board of River Contracts with the participation of the Environment Ministry and ISPRA (Institute for Environmental Protection and Research) has defined the “Guidelines of recognition and quality criteria of River Contracts at national and regional level” and the Dlgs 152/2006 art. 68 bis has identified the River Contract as a tool for the implementation of the River Basin Management Plan.

The common approach of Wetland Contracts aims at overcoming the criticality originating from the high fragmentation in wetlands management, where approaches and objectives to conservation are both intertwined and overlapping, jeopardizing sustainable development and preservation of biodiversity [12]. By promoting a multilevel governance approach [13], the project aims at ensuring higher coordination among stakeholders and decision-makers, to limit and absorb rising conflicts between different issues: preservation and economic activities (agriculture, aquaculture, tourism), natural heritage valorization and protection of environmental values and functions. Furthermore, given the 'hydro social' dimension of wetlands [14], (understood as the "spatial configuration of people, institutions, water flows, hydraulic technologies and biophysical environment revolving around water management", it is instead important, also in the light of now established international provisions and recommendations (primarily the Water Framework Directive, but even earlier the Ramsar Convention and the Barcelona Convention), to translate participatory practice within and in synergy with the decision-making model, finalizing where possible, the inclusion of actors to empowerment in the implementation phase [15].

3. Results

The objective of the chapter is to present and discuss the results of the Interreg Project CREW-Coordinated Wetland Management in Italy-Croatia cross border region.

Faced with the main challenges that characterise wetlands in the cross-border area of Italy and Croatia, the CREW project has implemented a multi-level governance tool to achieve effective results on the Adriatic Sea coastal wetland ecosystems and related socio-economic systems, overcoming the fragmentation that often jeopardises the sustainable development and conservation of these fragile areas. CREW aimed to ensure greater coordination between different levels of spatial planning and wetland management authorities, while limiting conflicts between conservation issues and economic activities.

The specific objectives of the CREW project were:

1. To create a cross-border Observatory to monitor best practices and data on Italian and Croatian coastal wetlands;
2. To protect the biodiversity of Italian and Croatian coastal wetlands through the implementation of a coordinated methodology for wetland management (Wetland Contract). By enhancing the

 doi:10.20944/preprints202302.0261.v1

implementation of an integrated tool, the project ensures greater coordination between stakeholders and decision-makers, limiting and absorbing the occurrence of conflicts between conservation issues and economic activities, and favouring the achievement of long-term sustainable results;

3. Share a cross-border strategy and strengthen synergies between Italian and Croatian coastal wetlands;
4. Improve awareness of the value of wetland ecosystems among policy-makers, managers, professionals and the general public, and strengthen their active engagement in territorial governance.

3.1. The partnership

The CREW project partners were carefully selected to include representatives of the main authorities and stakeholders working in the field of environmental protection in Italy and Croatia **(Figure 1).**

This approach made it possible to adequately consider the different aspects related to Italian and Croatian coastal wetlands, as each partner brought its own national regulations, stakeholders and expertise to the project. Indeed, the Croatian partners benefited from the Italian experience on River Contracts and, on the other hand, the Italian partners had the opportunity to focus on the topic and exchange knowledge on wetland protection. To strengthen this cooperative approach, the partners shared a cross-border strategy developed through a continuous exchange of knowledge and data (cross-border monitoring system).

In particular, the CREW partnership included three Croatian institutions responsible for the protection and management of protected areas (Natura Histrica. Public Institution for the Management of Protected Areas in Istria County; Natura Jadera. Public Institution for the Management of Protected Areas in Zadar County; Public Institution for the Management of Protected Natural Areas of Dubrovnik - Neretva County); three Italian local authorities belonging to different geographical scales (Comunità Riviera Friulana; Municipality of San Benedetto del Tronto; Patto Territoriale nord barese-ofantino); two university institutions (Università Iuav di Venezia; Università degli Studi di Camerino).All partners, with the exception of the University of Camerino, identified a coastal wetland area of their interest and competence as pilot areas for the experimentation of participatory processes that should have led to the signing of Wetland Area Contracts.

The varied and articulated composition of the partnership made it possible to achieve a number of advantages: the academic partners have contributed to the construction and monitoring of the shared methodology, thanks also to the involvement of external experts in participatory processes, territorial governance tools and River Contracts; the Italian partners in charge of the management of the coastal territories examined have guided the institutional procedures and provided useful indications in terms of coordination among the different institutional levels variously involved in the management of wetlands and protected areas; the Croatian partners, bearers of direct experience in the management and promotion of protected areas, contributed to the construction of methodologies and procedures suitable for the involvement of local communities and active citizenship, the main users of the areas in question [16].

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Figure 1. Identification of project partners from the Italy-Croatia cross-border region bordering the Adriatic Sea: 1-VL -Università Iuav di Venezia; 2-Comunità Riviera Friulana; 3-Università degli Studi di Camerino; 4-Comune di San Benedetto del Tronto; 5-Patto Territoriale Nord Barese Ofantino; 6-Natura Histrica. Public Institution for the Management of Protected Areas in Istria County; 7-Natura Jadera. Public Institution for the Management of Protected Areas in Zadar County; 8-Public Institution for the Management of Protected Natural Areas of Dubrovnik - Neretva County.

3.2. Target areas

The wetlands considered by the CREW project are very diverse in terms of size, morphology and function. They are all vulnerable and fragile areas in need of protection at different levels: biodiversity, water quality, ecosystem services, etc. These areas are characterised not only by biodiversity and the presence of diverse flora and fauna habitats, but also by the combination of natural heritage with the presence of a stratified social and economic culture that has deposited artefacts, food culture, skills and practices over the centuries. As a double frontier of water and land, these territories are subject to formal and informal practices and are therefore highly regulated **(Figure 2).**

Figure 2. A bird's eye view of the northern Lagoon of Venice. Coastal wetlands are characterised by particular morphologies, such as salt marshes and mudflats, that thrive in balanced conditions related to water salinity and temperature, wind direction and strength, and the presence and development of hygrophilous vegetation.

There are seven Pilot Areas represented in the CREW project, four in Italy and three in Croatia, referred to here as:

1. VL - Northern Lagoon of Venice (Iuav University);
2. ML - Lagoon of Marano (Comunità Riviera Friulana);
3. OR - Ofanto River (Patto Territoriale Nord Barese Ofantino);

 doi:10.20944/preprints202302.0261.v1

4. SR - Natural Regional Reserve of Sentina (Comune di San Benedetto del Tronto);
5. RP - Special Ornithological Reserve of Palud (Natura Histrica);
6. VM - Veliko i Malo blato (Natura Jadera);
7. DN - Protected Natural Areas of Dubrovnik-Neretva (Dubrovnik-Neretva County).

3.3. Geo-morphological characteristics

The different wetlands share many of the typical morphological characteristics of these environments: they are coastal stretches of water of moderate depth, with brackish waters whose salinity varies with the tides and which, in recent years, have suffered from erosion and degradation phenomena due partly to anthropic pressures and partly to the effects of climate change [17,18]. Beyond these geo-morphological characteristics, however, the seven target areas of the CREW project differ profoundly, especially in terms of recent transformations, governance tools, bodies in charge of their care and accessibility to the public.

In order of size LV, DN and ML, the lagoons and the river delta, are the largest pilot areas: LV is about 220 km2, DN 200 km2, ML 160 km2. OR is 967.40 km2, a river basin, with an interregional dimension. Then there are the protected areas as bird reserves, VM of 4.61 km2 and RP of 2.26 km2. The smallest area is the SR of 1.77 km2 linked to the environment of the Tronto estuary. Its importance is linked to the fact that it is the only remaining wetland area in the vast stretch of Adriatic coastline, over 400 km long, between the Comacchio Valleys and the lagoons of Lesina and Varano.

From a morphological point of view, LV and ML have in common a history of canal excavation that has modified the hydraulic dynamics, and has kept the overall morphology sufficiently unchanged, with a good level of meanders that guarantee the correct exchange between fresh and saltwater. The geo-morphological characteristics of the areas have been largely modified by the action of man, who has progressively reclaimed, through reclamation for agricultural or industrial use, environments that were previously characterised by marshes that acted as a link between the land and the sea. The balance of transformations of the salt marshes, a historical economic activity common to LV and ML, is negative in the most recent period, with accentuated erosion phenomena. Among these, the main cause seems to be subsidence (resulting from the compaction of clay sediments and peat), followed by the transit of vessels and natural wave motion.

The territory of OR, has been the subject, in the past decades, of several River Contracts, developed along various parts of its course; within CREW, this pilot area has tried to coordinate the different existing instruments, to build a sort of 'contract of contracts'. Its peculiarity is that there are significant differences between the mouth of the Ofanto River and its Valley, which determine different needs and priorities that characterised the process. Consequently, most of the activities outlined in the action plan have a single geographical target, namely the mouth.

The SR presents relict ecological conditions in an almost completely anthropized territory. It currently presents unique floristic characteristics and, above all, from a faunistic point of view, plays a decisive role for migratory avifauna, thus representing a strategic element for the ecological network, even in a vast area.

The RP is basically a shallow brackish wetland with highly variable ecological conditions (temperature, salinity, oxygen levels). Approximately 240 bird species have been recorded over the years and in recent years some threatened and strictly protected species (Himantopus himantopus (VU), Tadorna tadorna) have begun to nest.

The VM reserve is unique in its area, characterised by its karst landscape; the wetland is surrounded by reed beds and offers an enormous variety of accessible food resources for birds in transit.

As for the DN pilot area, the Neretva Delta is the largest river mouth in Croatia, consisting of remnants of Mediterranean wetlands with preserved coastal lagoons. Particularly important are the reed beds where many endangered animal species live. In the Neretva Delta area, six geographically defined areas with a total surface area of 1,624 hectares are protected by a nature protection law.

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3.4. Natural and cultural heritage

All pilot areas were selected for various relevant aspects of natural and cultural heritage. UNESCO declared Venice and its lagoon a World Heritage Site in 1987, recognising the presence of a widespread and diverse heritage: environmental and landscape, archaeological, historical, architectural and ethnological.

The DN delta has been declared a Natura 2000 ecological network area of particular importance for the European Union as a Special Protection Area and Site of Community Importance, with a total surface area of approximately 23,800 hectares. DN is also a POP (areas of importance for the conservation and exploitation of the favourable status of wild birds of interest to the European Union, as well as their habitats and areas of importance for the conservation of migratory bird species, in particular wetlands of international importance) and RAMSAR AREA - wetland habitats are included in the list of wetlands of international importance (Convention on Wetlands, 1971).The RP was proclaimed a Special Bird Reserve in 2001 and the VM in 1989.

3.5. Critical issues in governance processes

Critical issues are specific to each area and were addressed, within the participatory processes that led to the signing of the Contracts, with different tools and approaches.

For LV, the most difficult aspect to manage was the active involvement and continuous participation of local administrations, which did not proceed in a united and collaborative manner among themselves. Also, in LV several territorial administrative configurations followed one another during the project funding period, which constituted moments of suspension of the process.

The RS, which is managed by the Municipality of San Benedetto del Tronto, immediately embarked on a strongly institutionalised process, proceeding more swiftly than others in the various phases of participation.

In the case of OR, the main aim was to integrate the already existing government and governance tools, reconnecting the different administrative parts, local and regional, that make up the river territory.

For the RP, which is also characterised by highly variable ecological conditions, the main effort was to build a community around the wetland area, even before the Contract. The VM saw efforts focused on discussing management tools with local communities. In the case of the ND, the aspect of securing and managing unauthorised access within the wetland area was the main critical issue to be addressed during the process (**Figure 3).**

Figure 3. Ornithological Reserve Veliko i malo blato, Croatia.

Similarities and differences between the target areas represented a significant advantage in the development of the project and in the construction of a cross-border observatory: on the one hand, the morphological characteristics common to the wetlands considered allowed the construction of a truly shared methodology, based on common urgent themes, and a technical-scientific knowledge

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base useful to all partners; on the other hand, the differences implied diverse participatory paths, tailor-made within each context, producing, at the end of the project, a rich catalogue of Wetland Contracts.

4. Discussion/ Wetland Contracts between Italy and Croatia

This section intends to draw an overall reading of the proposals implemented by the different Wetland Contracts within the CREW project. The aim is to understand, on the one hand, how the different Contracts responded to a shared programme on time, and thus observe how individual actions were able to specify general intentions; on the other hand, to bring similar experiences closer together in order to assess their overall potential on an international scale. This reading, which is both vertical and horizontal, makes it possible to observe the actions of the Contracts at different scales and to measure them in relation to the objectives of the Interreg project.

4.1. Common and strategic objectives

The objectives of the Interreg CREW project are the result of a continuous exchange between partners that has matured and thickened over time a wide range of shared intentions and instruments, far beyond the most schematic initial intentions. On the one hand, there are objectives that have had a physical impact within the 7 different target areas. The vision that unites them can be found in the European expectations for the protection of wetlands: these include landscape and environmental protection of the territory, monitoring of ecosystems and protection systems that can guarantee their balance and protection. On the other hand, there are objectives that we can define as strategic. They aim to identify shared priorities for a cross-border strategy for wetland management based on the experience of River Contracts. To do this, a multi-level governance model is proposed [19,20,21], with the aim of managing local fragilities and opportunities in an integrated, collaborative and sustainable way.

Among the elements that can provide a useful perspective for reading the results that follow, there are three in particular that are worth highlighting. These represent some of the most relevant aspects of the entire process: their centrality has been unilaterally reaffirmed by all the Contracts as they describe, within the more obvious framework of protection and safeguarding, actions that are fundamental to the achievement of multiple objectives.

a. Safeguard and valorisation

Not only safeguard and protection: all the Wetland Contracts have highlighted how promotion, valorisation and development actions, which for a long time have often been carried out in contrast with protection actions, must be rethought in the light of environmental sustainability [22]. This means systematising effective solutions for the improvement and protection of wetlands, watercourses and the territories connected to them, taking into account public interests, economic repercussions and the social values that characterise them. But it also means considering promotional actions that are supportive of these same protection actions, capable, for example, of simultaneously enhancing ecosystem characteristics and local activities, promoting the accessibility of lagoon environments through slow and conscious mobility, as well as their recreational, naturalistic and cultural usability; it means imagining a sustainable integration between economy and uses, enhancing identity elements and traditions [23].

b. Integrated Governance

The role of governance processes is a central topic of discussion for all projects, and is articulated through a number of shared needs. First of all, there is the need for a political stance that takes charge of territorial resources through care operations, and that is realised within administrative and regulatory choices that are no longer ambiguous. This is perhaps the first step towards a desired cooperation between different sectors (public-private). Moreover, by bringing non-institutional institutional actors into communication, it can represent a resource capable of supporting actions that

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are truly understood and shared by local communities [24,25,26,27]. The Wetland Area Contract and the Assembly connected to it constitute, in this regard, a powerful decision-making hub that, it is hoped, can give continuity and meaning to desired or existing plans and projects that respond to the need for territorial protection and enhancement [28].

c. *Awareness-raising and learning*

Among the actions to which the projects gave most prominence were those dedicated to awareness, sensitisation and learning. In fact, each experience found that, at the basis of all other actions, there must be awareness of the role and importance of wetlands [29]. This means improving the public perception of the value of wetland ecosystems among policy makers, but also, and first and foremost, that of a large pool of users and inhabitants. Therefore, the sense of belonging to a unique natural/anthropic system, the sense of care and affection, the importance of education and training activities also for intermediate actors capable of raising awareness of protection and prevention among the wider public are all recalled. Both actions with an immediate physical impact and governance actions can benefit from a broader awareness in order to guide project choices and strategies over time [30,31].

4.2. Contract Actions in Relation to Environmental Components and Indicators

In the course of the participatory process that characterised the 7 Wetland Area Contracts, the programme's aims were deepened and translated into specific objectives, achievable through a mosaic of coordinated actions identified in the various Action Programmes.

In particular, the objectives have been declined through five environmental components or indicators to which the actions will have to respond from time to time: a. biodiversity; b. water quality; c. ecosystem services; d. level of protection; e. other (**Table 1**). A horizontal comparison of the actions associated with each environmental indicator is proposed here: after each summary description, a number of actions are described, purely by way of example, to specify how the main survey themes have been punctually addressed by the various Wetland Contracts. It should come as no surprise that many actions overlap and the margins between one indicator and another are often very thin. Neither should the heterogeneity of the solutions be surprising, since the environments under study are very different in terms of morphology, size, and ecosystem function.

Table 1. Number of actions per environmental component. The sum indicates the total number of actions relating to a specific component or indicator. Note that a single action may relate to more than one environmental component.

Environmental components	**Number of actions**							**TOT.**
	LV	ML	OR	SR	RP	DN	VM	
a. Biodiversity	9	6	3	13	8	13	-	**40**
b. Water quality	8	11	1	11	6	5	-	**37**
c. Ecosystem services	8	4	4	7	6	6	-	**29**
d. Protection level	7	4	1	7	14	13	2	**35**
e. Other	15	18	1	7	0	0	2	**43**

a. *Biodiversity*

The most common actions shared by partners include the observation and restoration of wetlands, the implementation of available data to monitor local biodiversity, and the regulation of water flow into and out of the wetland. In almost all wetland contracts, actions aimed at protecting, restoring and monitoring biodiversity have been accompanied by environmental education and awareness-raising activities.

There are also several ways in which the various Contracts address the issue of Biodiversity. The ML Contract promoted the shared implementation of the Management Plan for the defence of the

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local habitat by raising awareness among boaters and other users. The reduction of anthropic disturbance, also through the use of a trail network compatible with protected areas, is in fact considered essential to the restoration of important habitats for birdlife. Other Contracts are aligned with these actions, such as the OR Contract, which has evaluated river restoration through the remodelling of the floodplain near the mouth, as well as the construction of islands connected to the riverbed in order to safeguard the coexistence of the animal and plant species that make up its ecosystem. In addition to the floodplain cleaning activities, which included the elimination of invasive exotic plant and animal species, the SR Contract proposed the elaboration of a specialised study for the analysis of coastal erosion processes that could support the restoration of wetlands and collector ditches. The same Contract envisaged the creation of tree belts along the paths, useful for a more pleasant enjoyment of the area but also for the recovery of the ancient agrarian landscape. Similar research activities were central to the RP Contract. Also in this case, it was important to deal with the edges of the wetland, in order to observe the evolution of morphological characters and flows in relation to biological diversity. The VL Contract, on the other hand, proposed activities to protect the lagoon's innermost sandbanks and marshes from erosion, also through the continuation of European projects such as LIFE VIMINE for the protection of sandbanks. Some of the actions committed to this are the enhancement of nature trails to increase knowledge of amphibian areas in sustainable tourism circuits, and the establishment of an oasis in Campalto to protect ecosystems and their biodiversity. In addition to these operations of a practical nature are coordination initiatives between research groups, aimed at the participatory definition of a statute of places in the northern Venetian lagoon.

b. Water quality

A number of recurring actions can be noted that relate in particular to the hydromorphological rebalancing of the wetland, the monitoring and care of the drainage network, the analysis of the hydrological state, the cleaning of the water to ensure a hospitable environment for the local flora and fauna, as well as a high degree of environmental healthiness. The VL Contract, in particular, proposed initiatives for the morphological rebalancing of the northern lagoon of Venice and maintenance interventions for the vivification of the 'dead lagoon' in order to favour the healthiness of the lagoon ecosystem. In this regard, the reactivation of the hydraulic eaves connection, the restoration of vivification canals, initiatives for the integrated management of the drainage network of the lagoon watershed, and the hydraulic-environmental requalification of a portion of the minor reticulum in the Municipality of Cavallino-Treporti have been envisaged. The ML Contract has proposed to integrate the geomorphological study of the Marano lagoon with the characterisation and sedimentological and geochemical analysis in order to define homogeneous areas of intervention that can serve as a pre-characterisation for the reconstruction of the salt marshes; while the OR Contract has proposed river restoration works through the construction of islands connected to the riverbed. The SR Contract, on the other hand, provided for the restoration of the northern part of the collector ditch and neighbouring ditches, the realisation of wastewater reuse systems, as well as water quality control of the local sewage treatment plant in addition to more extensive measures for the conservation of the existing marine SIC. Concerning the awareness-raising activities shared by several Contracts, water quality (related to beach and marine litter and to discharges within wetlands) is mainly mentioned (ML, SR). For ML, communication and awareness-raising on the effects of discharges in tributaries and on the effects in the lagoon, is mainly aimed at mitigating the effects of the spreading of livestock effluents (slurry/manure) and of sewage sludge in agriculture, while special attention is given to "plastic free" initiatives (ML, SR) and to the impact of exhausted oils from boats in the lagoon environment related to inland waterways (VL), a cause of heavy pollution (RP). Other awareness-raising activities include the implementation of "Good rules in the lagoon" and monitoring and reporting on the correct application of rules of conduct for the protection of the environment in the lagoon and connected rivers (ML). Connected to these initiatives is the need for integration and sharing of good practices among Contracts, in the awareness that observation must be extended to the various drainage basins of reference and therefore connected to the inland

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territories, as well as to the coastal areas (ML, VL, RP). It is worth emphasising the need, highlighted by several partners, to carry out coordinated actions to extend and integrate the influence of the Contract with adjacent areas in order to strengthen its effectiveness. This can be done both on a local scale, for example by extending the Wetland Contract and integrating it with the River Contracts of the tributaries of the catchment area, and on a supra-regional and supranational scale through contact and comparison with other Wetland Contracts of the North Adriatic coast.

c. Ecosystem service

In the case of ecosystem services, contracts also focus on coordination between the entities and actors involved. The focus is often on how territorial practices can contribute to the smooth functioning of ecosystem services. This is done, for example, through the protection and naturalistic enhancement of the gutter location, the promotion of community farming (VL), the implementation of water reuse systems (SR). In all these cases, the focus on local action and renewed community leadership have been central as they have enabled tailor-made solutions to be adopted. These include rethinking access and ways of traversing the landscape, which, if rethought, can enable the preservation of ecosystems. The promotion of slow and eco-sustainable use of the territory has in fact occupied a central place in many Contracts, which propose investing in new cycle paths (ML, VL, OR) and in internal mobility (RP) and increasing the accessibility of public spaces along the lagoon embankment (VL), creating green infrastructures to support mobility (SR) and integrating new circuits with existing ones. The reflection that combines ecosystem protection and fruition extends to the point of activating sustainable mobility coordination tables through wide area planning tools (ML, VL) that promote, for example, the ML river park system. Navigation modes, both in the lagoon and in the rivers, have also been rethought from a multi/intermodal perspective, creating a 'network of continuity' within the territory (ML). It was proposed to limit nautical traffic in terms of quantity and speed, to disseminate rules of behaviour and navigation, and to increase user awareness of this issue (VL, ML). Consistently with this projection, the tourist offer has been conceived in an eco-sustainable, integrated and organised manner: experiencing the lagoon environment means guaranteeing respect for its fully protected parts, also through "gentle" tourism, capable of integrating the environment, typical products and small-scale hospitality, and allowing the creation of new forms of economy. Use has therefore been imagined in relation to the environmental and natural enhancement of valuable areas, and commensurate with their estimated carrying capacity. For this reason, several contracts envisage the constant monitoring of ecosystem services against their partial remodelling and utilisation (ML, SR, RP). Even more, in the case of Venice, these interventions were conceived within a joint adaptation plan to climate change as priorities defined in the PAESC of the 22 municipalities of the Eastern Veneto Region for the five-year period 2021-2025.

d. Protection level

The theme of protection certainly occupies a prominent place in all the contracts and concerns physical components as much as cultural aspects. Safeguarding and protecting the territorial heritage, as the projects for the 7 target areas make clear, includes natural and built landscapes but also intangible aspects of local culture, repositories of knowledge, traditions [25]. This includes actions for the restoration and maintenance of the built environment, initiatives for the hydro-morphological rebalancing of the area and for wildlife protection (VM).

Specifically, the ML Contract provided for actions to safeguard lagoon dynamics and ecological connections. The same Contract also acted to preserve the morphology of protected areas and barrier islands, the reconstruction of tidal flats and salt marshes. Similarly, the VL Contract proposed to protect the landscape from a naturalistic point of view by recognising its fragility, including through an integrated approach based on the protection of salt marshes from erosion. In addition, importance was given to the built heritage, through cultural and environmental enhancement and protection projects, or to cultural aspects, including the tradition of craftsmanship, lagoon fishing and local gastronomy. The cultural richness of the wetlands and related communities was also recognised within the RP Contract, which proposed the valorisation of the cultural heritage and to increase the

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possibilities for sustainable management. This includes the identification and assessment of the state of the historical and cultural heritage in relation to protection and restoration actions, and the resolution of problems of ownership, squatting and other illegal activities that may put pressure on the Palud Reserve.

Actions related to sustainable property management, monitoring and surveillance in cooperation between organisations and associations proved to be central in all the Contracts (SR, OR, VL, ML, RP, VM, DN). The synergy between subjects, the constant exchange for the transmission and sharing of information concerning a shared asset, are in fact characteristic elements of the governance model proposed by the Wetlands Contract.

e. Other

This group is the most heterogeneous because it includes actions that do not strictly relate to individual environmental components but, in many cases, are transversal. Of all of them, governance actions represent the largest group. These include negotiating tables, agreements, opportunities to thicken the network of partners and initiatives to support the actions promoted by the Contract. This component is particularly significant because it highlights the need for legislative and regulatory support for the actions promoted [28] the involvement of local actors and their assumption of responsibility only make sense if they are adequately supported by institutions. We will see later on, specifically, the role of governance actions within the different Wetland Contracts.

4.3. Indicators Types of Actions and Governance Process

The actions were then subdivided according to type (**Table 2, Table 3**). Complementary to the previous description, this division makes clear the different ways in which the initiatives proposed by the Contracts have been given concrete form. These can be Concrete Actions, i.e. existing or planned physical projects, Monitoring and Survey activities, Studies and Projects, Communication and Education Actions, and finally Governance Activities.

Table 2. Main types of actions.

Actions	**Number of actions**							**TOT**
	LV	ML	OR	SR	RP	DN	VM	
Concrete Actions	14	11	4	5	5	27	-	66
Monitoring Activities and Surveys	25	1	3	2	4	5	1	41
Studies and Projects	39	2	3	2	2	1	-	49
Communication and Education Actions	37	9	2	1	4	41	3	97
Governance Activities	24	3	4	4	2	2	1	40

Concrete Actions mostly concern the redevelopment of river basins, the preservation of lagoon morphologies, and the implementation of protection measures, so they are the ones most easily referable to the environmental indicators expressed by the European Community. They range from the follow-up of European projects aimed at restoring salt marshes, to very specific measures pursued by individual municipalities to combat climate change and restore the hydraulic functions of the landscape. As far as financial resources are concerned, it can be noted that the largest sum is earmarked for Concrete Actions (for a total of 7,235,433 euro). This figure confirms the operational nature of the Contract, one of whose main purposes is to propose the implementation of small concrete projects in the short to medium term (2-3 years). In the case of CREW, a slight slippage applies to this time horizon due to the limitations imposed by the pandemic, which have affected the way activities are conducted. For this reason, the proposed actions tend to stretch towards a total

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duration of 5 or even 6 years. The Concrete Actions are complemented by Monitoring and Survey activities, which are mainly concerned with monitoring environmental indicators of biodiversity, water quality, and ecosystem services. The aim is to ensure the protection of wetlands and to regulate the impact of those activities and practices that take place in them, including fishing, hunting, agriculture, but also mobility. Censuses, data collection campaigns, in-depth studies are some examples useful to observe trends and thus to orient possible actions. Studies and Projects move in this same direction. Their actions include future and ongoing projects for the protection and promotion of the territory. The census of latent potentials and opportunities, the mapping of coastal routes, in-depth studies on productivity and competitiveness factors of traditional activities are some examples belonging to this group. The activities do not necessarily have an operational impact, but aim to increase the material available for understanding the area. At the same time, all partners proposed environmental education and awareness-raising activities aimed at a broad spectrum of users: citizens, policy-makers, students, sector experts, tourists, local guides. Communication and Education actions included the activation of thematic tables on the topic, consultancy activities, as well as the identification of local heritages to be protected (both built and cultural), the organisation of periodic events (festivals) and extensive dissemination activities. Of all the actions, those of communication and awareness-raising represent, along with those of governance, one of the main needs that emerged from the various contracts. Among the different types of actions, it is important to emphasise the large majority of Communication and Education Actions. This is due to three reasons in particular. The first is that, in view of the numerous actors involved and the widespread difficulty of finding funds, it was easier for the partners to deal with actions requiring a smaller budget. The second is that these same actions usually involve rapid implementation and provide an opportunity to immediately evaluate results. In the context of a project with a duration of 2-3 years, it was important to count activities that could be initiated quickly. Finally, all projects identified dissemination and awareness-raising activities as one of the cornerstones for more general environmental protection and preservation actions. Communication and education actions would, in this sense, be an essential prerequisite for ensuring the involvement of local communities and key stakeholders.

Finally, the Governance Activities constitute perhaps the most relevant group from the point of view of outcomes, respectively the objectives of the Interreg Project. They are worth reflecting on in depth.

Table 3. Involvement of public and private actors by type of action. July 2021. The budgets are only indicative and do not include the contribution of Comunità Riviera Friulana. The scheme provides for a certain discretion on the "personnel" item, since the allocated funds will depend on existing contracts and will be discussed on a case-by-case basis. In some cases, budget items are incomplete because they depend on the type of interventions that will be discussed and approved during the Laguna Assembly.

Actions	Private Subject	Public Subject	Total budget (euro)
Concrete Actions	63	180	7.235.433
Monitoring Activities and Surveys	45	100	940.333
Studies and Projects	68	123	1.122.567
Communication and Education	109	225	930.999
Governance Activities	78	142	332.000

4.4. Governance Activities

Within the broader framework of the Interreg-CREW Project, the governance activities aim at the definition and activation of an inclusive model of land management and transformation, which includes, in the continuation of the Project activities, the presence and consultation of institutional

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and non-institutional stakeholders [32, 33]. Among the proposed activities there are in fact the activation of workshops, permanent tables and discussion groups aimed at debating in a horizontal way relevant issues related to the protection of wetlands and the promotion of local economies. Subjects are thus created to support the evaluation and monitoring of the territory over time, but also to give continuity to previously approved plans, as well as to support some specific legislative provisions with an inclusive perspective of communities [34].

The OR Contract envisages, for instance, the configuration of a governing body that constitutes a decision-making hub for the area, capable of providing vision and expertise to local initiatives. Its activities can rely on an up-to-date and accessible database for projects in the Ofanto cluster, both tangible and intangible. This highlights the close relationship between governance activities and monitoring and survey actions and the importance of these being resources that are always accessible to all. Similarly, the ML Contract proposes the creation of a steering committee for the sharing and transfer of knowledge related to the CREW experience. This entity will supervise and coordinate the River Contracts present on the regional territory and contribute to the definition of the governance model for the continuation of activities after the conclusion of the Interreg Project. The RS Contract also envisages interaction between institutions and the formation of a negotiating table involving the area's managing and owning subjects. In addition to the interaction between institutional subjects, there is also the interaction with the Basin Assembly, which is foreseen for an interregional extension of the Contract for the Tronto River. The Basin Assembly has the task of contributing to the construction of knowledge, the identification of problems, the definition of possible solutions and the approval of choices. Its contribution, alongside that of the institutional bodies, is central in the process of mutual learning and representation promoted by the latest generation of Wetland Contracts. These, more than in previous years, aim at a more extended concept of agency beyond direct institutional action, and which wants to account for the reasons of minor subjects but also of objects (or 'differently animated' subjects, such as flora or fauna). In this sense, the nascent Wetland Contracts want to intercept more explicitly the places of all stakeholders, considered for the complex system of relations that binds them to a particular geographical, economic or social environment [35].

In this regard, the VL Contract envisages the activation of a workshop for the definition of a local statute of places, including human, animal and plant stakeholders. Other alliances include the activation of a permanent coordination table, the creation of a public/private research group, the start-up of a council for sustainable mobility in the Eastern Veneto Region and for sustainable tourism, the foundation of a working group for the agri-environmental and tourist enhancement of the area between the northern lagoon of Venice and the old Piave River. These examples show how the scales at which governance is rethought are multiple: from regional coordination to specific intervention [36]. The role of private subjects and associations, of non-institutional and minor subjects, is here central and finds in its choral nature an opportunity for encounter and debate. In spite of the imbalance highlighted by the data (in the 7 target areas, the total number of stakeholders is 1,133, 363 private and 770 public), it is important to emphasise that private stakeholders, although fewer in number, proved to be fundamental to the implementation process of the contracts (**Table 3**). In particular, local associations and organisations have enriched the process with notions and knowledge that the public side alone (Ministry, Regions, Provinces, Municipalities, other Territorial Institutions, Universities, schools) struggles to fully report. In this regard, the Territorial Institutions that led the Contracts of the Croatian partners (Natura Histrica, Natura Jadera and the Dubrovnik-Neretva County Public Authority for the Management of Protected Natural Areas) had to modify their typically top-down management model, envisaging the inclusion of the specific competences of other actors within a governance process that respected specificities and autonomies through a flexible approach. This action is important because it allows the transfer of knowledge between parties and the taking over of the territory by actors of different sizes. More and more, in fact, minor actors are being recognised as having knowledge, including technical knowledge, which is no longer the prerogative of institutional actors alone, and which is complementary to skills linked to attendance, daily practices and local knowledge.

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In all cases, it has been a matter of imagining extended and horizontal interactions, capable of coordinating interventions at different scales for the protection of the environment, the protection of water resources, the valorisation of the territory and the prevention of hydrogeological risk, uniting skills and optimising resources.

5. Conclusions

The present and future impacts of Wetlands Contracts are related to the strength of the built up network that stakeholders bonded, as well as to the capability of actors to take advocacy on the use and management of the territory. Among the impacts encountered during the CREW project it has been recognised:

Positive impacts:

- increased awareness of stakeholders on environmental issues;
- actions that can put in place immediately in order to face the climate change impact;
- strengthening of social and community networks;
- increased success potential for ongoing and planned projects;
- building a critical mass for new projects and funding;
- improvement of living conditions;
- care of the territory also by those who live there, and not only by those who govern it;
- recognition of human beings as part of an ecosystem;

Limits and future challenges

- lack of voluntary participation in the implementation of the action programme;
- internal contrasts among stakeholders, public/private bodies, organizations;
- insecurity about everyone taking responsibility and accountability for their commitments;
- effective implementation of projects and initiatives;
- access to forms of fundraising;
- difficulties in enlarging the stakeholders' map;
- future changes in territorial governance and local politics;
- vulnerability related to possible external/global events (climatic, wars, economic, sanitary)

The parallel process of development and construction of the Wetland Contracts has been particularly useful for every partner, as the unfolding of similar participatory processes help partners in achieving every step and make possible the constant exchange of experiences.

It was found that the Croatian partners had more difficulty in activating the process of discussing management plans with the wider community than the Italian partners. The spatial management plans related to environmental policies were designed in a very institutionalized 'top down' manner. Participation in the contracts was an opportunity to consult another section of society, not just institutional stakeholders. In Croatia, a situation of conflict between the entity that manages the property and other actors that use and exploit the areas (hunters, fishermen, tourists) was more evident than in Italy. On the contrary, in Italy we found very fragmented contexts, overlapping many different entities governing at different scales. Here, Wetland Contracts have tried to get everyone around the table, including above all the local community.

The sanitary conditions related to pandemic forced partners in searching for an innovative, common methodology able to adapt to the limits imposed by Covid-19 control measures. The physical distance obliged partners to find ways to involve communities and to bring on participatory processes that are usually conducted in presence. To do so, a number of on-line and remote activities have been put in place and partners shared suggestions and solutions in order to not interrupt the participation or lose participants and stakeholders. Those difficulties made the relations and linkages between partners even stronger and made possible the recognition of shared values and common principles. The impossibility of setting face-to-face meetings between partners was remedied by organizing frequent, very operational online update meetings. This allowed the partners to really work in parallel, which led to the identification of very similar social, economic and environmental values in the development of contracts. At the same time, this anomalous condition meant that the

principles of construction and implementation of the contracts followed similar paths, albeit with differences determined by the different territorial contexts.

Of course, the conditions imposed by this last year and a half have not only produced unexpected positive results. Strict limits have conditioned processes and results, preventing all initial ambitions from being fulfilled. Above all, from a practical point of view, many activities could not take place, such as meetings with communities, surveys, workshops with stakeholders, and this strongly conditioned not only the participatory process, but also the expected results. Sharing these difficulties, however, allowed the partners to rely on a support network and helped them to adapt their expectations and ambitions to the new conditions that were occurring.

Beyond the results obtained in terms of the construction of the various contracts, the whole development process has been fundamental in consolidating and broadening the knowledge of the different territories examined. This knowledge was developed in a collaborative way not only within the single target areas, with the stakeholders and the local communities, but also transversally among the various partners. by dealing with similar territories, in fact, it was possible to integrate technical-scientific and practical-local knowledge and to build a complete and useful knowledge for the purposes of environmental protection and innovative forms of territorial governance. This knowledge-building process has also enabled the partners to take a common position, including a political one, in terms of sustainable forms of economic development and land use.

To conclude, it is important to point out the impact of cross-border exchange has on the parallel processes of Wetland Contracts [37]. The continuous exchange between the partners' experiences, in fact, has primarily strengthened cross-border relations, not only in terms of sharing methodologies and Contract development strategies, but also in terms of mutual support and help in the most delicate phases of Contract development. These strengthened and consolidated relationships will be crucial in the next phase of implementation of both the Contracts and the Action programmes. It will be important to maintain and cultivate these cross-border relationships to ensure continuity in the objectives of both the CREW project and the individual participatory processes carried out.

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Maria Giulia Cantaluppi, PhD in Urban Planning and public policy for the territory Iuav of Venice (2019), is researcher at Iuav University of Venice. She graduated in Conservation of Cultural Heritage at the University of Genoa (2005), with a Master in New Exhibition Formats (2006), obtained at the Elisaba University in Barcelona, in collaboration with the CCCB and MACBA cultural centres. A founding member of the cultural association temporiuso (2009) in Milan, she deals with the temporary reuse of abandoned spaces and participatory planning of large urban areas undergoing transformation in different contests (Belgium, Brasil, Greece, Italy, Kosovo, Slovenia, Spain, UK). Thanks to the experience gained through the coordination of European projects in Brussels (2009-20212) and the PhD Thesis entitled "New depopulation inhabitants. Projects, practices and policies starting from the case of the upper Oltrepo Pavese ", she obtained the collaboration, since 2020, to the Interreg Project CREW (Coordinated Wetland management in Italy-Croatia cross border region).

Marta De Marchi, PhD in Urbanism at University Iuav of Venice (2018), is researcher and adjunct professor at Iuav. She graduated in Landscape Architecture at Iuav (2011), with a master thesis on the territory of Po river delta, an area characterised by primary production facing deep environmental changes. After graduating she worked as an architect in professional design studios and, in parallel, carried out the research activity within Latitude (since 2012), an Italian-Belgian non-profit association engaged in urban research and design, of which she is still a senior member. Her research interests concern the spatial implications of food systems, in territorial contexts with low density urbanisation, which she developed at Iuav (Venice, Italy), Cardiff University (Cardiff, Wales), ULB (Brussels, Belgium). Currently, within two projects funded by the European Community (Interreg CREW and H2020 Cities2030), she is recomposing her interests, food and coastal wetlands, in the context of the Venice Lagoon.

Michela Pace is a senior researcher and adjunct professor at Iuav University of Venice, PhD in Urbanism at Iuav (2019). She took part in several research projects with and for local communities, investigating the role of memory, tradition and heritage in relation to territorial transformations and practices. She investigated the challenges related to valorisation processes through shared planning activities, local community involvement and participatory governance. To do this, she conducted numerous research projects with national and international research groups enhancing the comparison between disciplines (in particular at Iuav, Venice; PoliMI, Milan; PoliTO, Turin; UHasselt, Hasselt; UEL and AA, London, Tongji University, Shanghai). She has also collaborated with a wide range of partners including local communities and schools, municipalities, policy-makers, non-governmental associations, foundations and private clients in Italy, the UK and China. She is a member of CityLab Cluster (Iuav, Venice) and The Production of Heritage research group (UEL, London).

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