SUMMARY DESCRIPTION OF THE PROJECT (To be completed in English)

Environmental problem targeted

In recent years water resources are increasingly affected by multiple environmental criticalities and risks, historically linked to their quality and quantity following meteorological/climatic conditions and human activities. Environmental, hydrogeological and climatic problems have progressively affected the qualitative and quantitative issues. Concerning the climate, it is estimated that, due to the reduction of rain/snowfall and of the warming (expecially in summer), the water availability for the human consumption will drop sharply. Conversely, the meteorological issues related to intense-extreme precipitation events can lead to short term water excess that cannot be absorbed by the soil or conveyed by the drainage systems, inducing flooding and landslide events. These phenomena affect particularly the small drainage basins and the anthropic communities located on the hilly-coastal areas (Italian coast and the Apennines piedmont). These issues might also be connected to highly anthropically modified drainage lines and river systems and to obsolescent aqueducts, urban drainage, and sewage systems, which represent a further pressure factor. The progressive reduction and changes in rainfall amount/regime is accompanied by heavy rainfall and local storms. The combination of heavy rainfall events, high vulnerability to geomorphological hazards (floods, landslides) have caused, and could cause further, significant changes in the risk distribution. This combination could induce severe damage to highly valuable urban, rural, and coastal areas, where the anthropic communities, more or less aware, have permanently installed houses, infrastructures and activities.The main pressure factors that have produced the loss of naturalness and environmental/landscape deterioration, especially the smaller coastal drainage basins, are:

1) water pollution,

2) the reduction of natural vegetation supplanted by too aggressive and water-demanding agriculture,

3) geomorphological hazards, increased by the abandonment of the practices of correct regulation of rain and irrigation waters as well as

4) the diffusion of water-transported waste, abandoned along the waterways and spread the sea mouth and on the seashore.

Small coastal drainage basins are more vulnerable to environmental pressures than the larger ones and the consequences of their degradation can occur acutely with the unsuitability of the waters for bathing, the presence of waste in the sea or seashore or even with the simple loss of specific awards, such as the FEE's Blue Flag, which results in loss of image and damage to the local economy. The described problems can become more relevant in presence of *Natura 2000 Network Sites,* affecting the local conservation and nature protection programs, or in sites with critical issues due to specific unsustainable uses, such as polluted aquifers by nitrates from the chemical fertilization of crops/soils. The minor coastal-hilly drainage basins of the Abruzzo Region (piedmont of the Apennines chain, Central Italy), in particular in the "*Costa dei Trabocchi*" area (Chieti Province), have been severely affected by all these problems in recent decades. Specifically, this area includes the drainage basins of Feltrino, Fontanelli-Valle Grande and other small streams of the *Frentana* coast. Here, several actions took place but until now systematic actions and solutions to restore a satisfactory environmental status were not implemented.

Project objectives

The **first general objective** is the improvement of the quality of the waters and of the purification system. It is divided into specific objectives: 1) reduce the organic load in surface waters;

2) avoid overload for purifiers;

3) identify any untreated discharges;

4) increase the organic substance in the soil;

5) stimulate the correct use of the soil, improving its fertility and structure and reducing the impact of synthetic chemicals;

6) create and manage an environmental education center on water.

The **second general objective** concerns the improvement of waste management, and in particular:

1) prevention and contrast of abandonment of waste along the watercourses;

2) innovative sea-waste collection actions;

3) construction of a plant for the recovery of polystyrene packaging;

4) remediation of a polluted site by phytoremediation;

5) incentives for organic fertilization of agricultural soils;

6) involvement of the population in the collection of beached waste.

The **third general objective** is the adaptation to climate change and the mitigation of the water-related risks (due to heavy rainfall, flooding, and landslides), including:

1) water-saving and efficiency of the water system towards the sustainable use of water resources;

2) increase of the system's resilience to hydrogeological instability through the reduction of the water flow speed and consequent erosion (using naturalistic engineering techniques);

3) mitigation of the risk related to flooding-landslide hazard, through a local gauges network and a threshold-based local warning system integrating the forecast-based regional alert system (Allarmeteo);

4) improvement of water regulations;

5) contrast and mitigation of forest fires.

The **fourh general objective** concerns the promotion of sustainable agriculture, in particular:

1) increasing the sustainability of local agricultural businesses (contributing to their diversification towards multifunctionality);

2) contribute to the maintenance of ecosystem services;

3) strengthen the sense of belonging and responsibility of citizenship towards the territory;

4) increase the awareness of agricultural operators through information and awareness actions on good agrotechnical practices towards product improvement and environmental protection while preserving the landscape and biodiversity;

5) enhance the naturalistic, geological and historical-cultural heritage of the area and promote sustainable and slow tourism.

Actions and means involved

A - Preparatory actions

Appointment of Project Leader, Project Manager and Scientific Manager

Implementation of the project portal on web and social media

Planning and start of the participatory process

Acquisition and elaboration of relevant environmental data expecially on water and waste management

Inventory of the natural, geological and landscape heritage

Acquisition and elaboration of topographical, hydrographical, geological, geomorphological data and their integration/armonization/mapping for the implementation of actions for the geomorphological risk mitigation and for the selection of sites for naturalistic engineering works

Identification and mapping of uncultivated land suitable for the spreading of wine and oil waste/wastewater

Design of the interventions for improvement of the water treatment

Planning of a network for the separation of rainwater from sewage

Preparation and approval of a regulation for riparian strips safeguard

Preparation and approval of a regulation for agronomic processes and rainwater drainage

Preparation and implementation of a regulation for the riverbed maintenance and the removal of fallen or falling trees from the riverbed (by the front owners or by people in charge)

Preparation and implementation of a single and unified building regulation for the reuse of the rainwater for compatible uses

B-Implementation actions

Construction of n. 4 phytodepuration plants for existing Imhoff tanks

Adaptation to EU Reg. 2020/741 limits of n. 1 existing activated sludge treatment plant

Experimental phytodepuration intervention onto the riverbed

Extension of a network for the separation of rainwater from sewage

State- owned acquisition of agricultural land for re-naturalization and agriculture impact reduction

Remediation of a polluted site by phytoremediation

Biochemical characterization of effluents and surface waters to detect viruses and untreated discharges

Inventory and continuous control of environmental/landscape critical issues

Extension of an existing waste recover/reuse centre

Construction of a packaging polystyrene recovery plant

Identification of waste abandonment sites, removal of abandoned waste and sites control

Plastic waste collection in seawater and on seashore

Implementation of an Early Warning System for geomorphological risk mitigation through the enlargement of an existing, threshold-based, gauges system with App mobile integrating the forecast-based regional system

Geomorphological analysis and design of activities/interventions for preventing sea mouth occlusion in minor streams

Mapping of good practices for the management of wine and oil waste/wastewater

Mapping of existing good practices in agricultural, tourism and naturalistic sector

Signing of agri-environmental agreements to reduce the use of pesticides and chemical fertilizers in vulnerable areas to agriculture derived nitrates

Management of water withdrawals in the Special Area of Conservation (SAC)

Construction and management of fire-fighting systems in the SAC

Creation of buffer strips in the SAC

Construction of small irrigation reservoirs in the SAC

C - Monitoring of the impact of implementation actions

Verification of the effectiveness of the actions of improvement of the quality of surface and waste water

Verification of the effectiveness of actions aimed at improving waste management

Verification of the effectiveness of actions for adaptation to the meteorological conditions and to the climate change

Verification of the effectiveness of actions aimed at promoting sustainable agriculture

D - Sensitization, dissemination, communication

Establishment of the Environmental Education Center and implementation of an environmental education project

Creation of a network of agricultural businesses and associations for sustainable agriculture

Realization of awareness-raising initiatives on sustainability, risks and use of the territory

Preparation, realization and printing of a geological and environmental touristic map

Realization of materials and information panels on geological heritage, habitats, species and Natura2000 network

Creation of a virtuous circle for the promotion and sale of typical products from sustainable agriculture

Implementation, management and updating of the project web portal

Implementation of the participatory process

Communication through mass media

Creation of informative material

Publication of results in technical/scientific journals, participation in congresses and workshops

Organization/realization of one dissemination congress and specific workshop for sharing results with other local/regional/national authorities affected by similar issues

Drafting and dissemination of the Layman's Report

E - Project control and management

Coordination of project actions

Project audit

Periodic monitoring meetings between partners

Scientific monitoring of the project

Creation of an international networking with other similar projects

Financial administrative reporting

Has this proposal been submitted before? Yes ☐ No ☒

If you are resubmitting this proposal, please provide the references and acronym of the previous

proposal in the form of reference acronym e.g. LIFE11 BIO/NL/001040 ACRONYM

Quantified expected results and impacts

Results (R) Impacts (I)

Water

R)Refinement of waste water from Imhoff pits and purifiers; reuse for irrigation.

I)Chemical/microbiological improvement of surface/coastal waters, maintenance of the minimum vital flow, water production of min 100mc/h for irrigation and recovery of soil basic nutrients

R)Reduction of nitrogen/phosphorus compounds in river waters

I)Improvement of the chemical quality of river water

R)Reduction of the impact on purifiers due to white-black waters mixing

I)Improvement of purifiers' functionality and river/coastal waters quality reducing energy costs

R)Reduction/avoidance of periodic obstructions of river mouths due to sea storms

I)Reduction/removal of water swamping along the beaches, and its unhealthy consequences

R)Increased knowledge of the environmental status of unmonitored water bodies

I)Identification of bacteria/viruses dangerous to health and of uncleaned discharges

R)Creation of natural filters to protect the hydrographic network in agricultural areas

I)Retention/degradation of pesticides and fertilizers before flowing into stream waters

R)Restoration of irrigation water reserves for the biodiversity conservation

I)Numerical and specific increase in aquatic and hydrophilic fauna/flora

Waste

R)Remediation of a polluted site on the Feltrino stream banks

I)Elimination of pollutants in surface and underground waters

R)Improvement of the level of cleanliness, healthiness, hygiene and usability of coasts/beaches

I)Reduction/elimination of hazards/risks for injuries/pathologies for tourists and marine fauna

R)Recovery of reusable bulky waste

I)Reduction of waste abandonment, stable employment of local workforce

R)Correct disposal of packaging used for the fish transport/sale

I)Reduction/elimination of polystyrene from the environment and the coast/sea with benefit for marine fauna

R)Recovery of microplastics present in sea water

I)Reduction of sea microplastics with benefit for the health of local communities and marine fauna

R)Improvement of water management for irrigation in a *Natura 2000 network* site

I)Elimination of unsustainable water withdrawals for aquatic life in the ZSC

Climate

R)Creation of an EWS for flood-landslide-rainstorm-sea storm

I)Reduction of the risk for flood-landslides-sea storm; mitigation of the effects of meteorological events; adaptation to meteorological conditions and climate change

R)Improvement of the local Civil Protection communication system, increase of civil protection level for inhabitants

I)Effective protection of the communities exposed to the geomorphological events and related emergencies

Agriculture

R)Contrast/mitigation of biodiversity loss, pollution from agriculture and climate change

I)Soil recovery for the development of biological/ecological mechanisms in river basins

R)Alliance of partners with local producers and environmental authorities for fighting water pollution

I)Reduction of nitrate concentration below the legal limits in groundwater in areas vulnerable to nitrates of agricultural origin

Sustainability of the Project Results

At the end of the project, coordination between partners will be guaranteed in various ways. The Feltrino River Contract, of which almost all partners are part , will continue its activity, keeping the Directive Council active. The connection with the Municipalities of Rocca San Giovanni and Fossacesia will be maintained by SASI SpA, manager of the integrated water service of both municipalities, as well as those of Feltrino. The management of the purification infrastructures, as they have been implemented thanks to the project, will be continued by SASI SpA as part of its role as the purification service manager. SASI itself will continue to monitor water quality in water bodies and for environmental parameters not taken into consideration by the Regional Environmental Agency. All activities related to the SAC IT7140106 will be continued by the municipalities of Rocca San Giovanni and San Vito Chietino, with ordinary funds provided by the Abruzzo Region. All activities related to climate adaptation and civil protection from meteorological and hydrogeological events will be continued by the Municipalities within their institutional tasks, in consultation with the Abruzzo Region as part of its civil protection program. The activities relating to waste management will be maintained by EcoLan SpA, waste manager service throughout the project territory. The scientific coordination will be continued by the University of Chieti Pescara as part of its Third Mission.

The results of the project will be used to disseminate the principles and design actions within other catchment areas of the same partners and related local communities, developing the progressive extension of the new environmental awareness gained thanks to the project. The results of the project will also be brought to the attention of governmental, territorial and local bodies, such as the competent Ministries, the Abruzzo Region and the Province of Chieti, so that the actions of the project can be replicated on the national territory. The transfer of the project results will be disseminated to transnational stakeholders and to the international scientific community, thanks to the actions foreseen in the project section D - Sensitization, dissemination, communication. At the end of the project, the costs for the management and maintenance of the interventions carried out will be included in the budgets of the respective partners.

The proposal addresses the following project topic(s)

- Implementation of flood and/or drought risk management actions by applying at least one of the following:

  - Nature-based solutions consisting in natural water retention measures that increase infiltration and storage of water and remove pollutants through natural or "natural-like" processes including re-