

TANIA

TreAting contamination through NanoremediAtion

Action Plan for the Region of Crete

December 2019



ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ
REGION OF CRETE

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PART I: INTRODUCTION

1.1 Project Summary

There are an estimated c.2.5 million potentially contaminated sites across Europe, of which at least 14% **require remediation**. Managing contaminated land costs around €6.5 billion per year. 42% of this comes from public budgets.

Partners from **5 regions** have identified the **potential of connecting new and future materials and clean technology to natural heritage protection**, in order to address these environmental and economic problems. Through TANIA, they support wide and effective application of nanoremediation for contaminated soil and water.

(Nano)remediation is a low-cost, safe and effective **technique to clean up pollution, improve current treatments and prevent future contamination**. Effective uptake is limited by issues concerning technological novelty (need for further Research and Innovation (R&I), lack of standardised methodologies, patenting and pilot applications, understanding) and the governance model (engaging various policy departments and multi-disciplinary stakeholders).

TANIA uses interregional exchange and participation of stakeholders from environmental and innovation fields to address these limitations. Regions are relative newcomers to the concept of (nano)remediation. They compare different experiences on techniques to treat contamination, innovation in environmental protection and governance. They improve ERDF policy instruments, thanks to Action Plans defining measures to support more and better funding for (nano)remediation, coordinate governance models and evaluation criteria and insert integration between innovation and environmental protection in their strategic focus.

Therefore TANIA aims to:

- **Create new business opportunities** for enterprises promoting (nano)remediation products and services.
- **Raise awareness** on contamination of EU natural heritage, its effects and the potential of (nano)remediation.
- **Promote long-term, sustainable regional development and competitiveness:** better environmental conditions, consequent improvements to health and increased business opportunities.

1.2 OBJECTIVES - CHALLENGES

TANIA's overall objective is to **improve treatment of the ever-growing number of contaminated sites in Europe**, by improving design and implementation of policy measures capable of supporting uptake and diffusion of (nano)remediation.

Regional policy makers are obligated to work together and with cross-disciplinary stakeholders in order to improve a policy framework that:

- ☑ Supports R&I on identification and production of ecocompatible and ecosustainable nanotechnology for treatment of contaminated soil and water;
- ☑ Defines a standardized methodology to evaluate effectiveness, economic sustainability and environmental safety and impact of (nano)remediation, within the context of National and EU regulations (e.g. REACH on packaging and labeling of chemical substances) and strategies (e.g. EU Soil Thematic Strategy);
- ☑ Supports pilot applications of nanomaterials (NM) and nanoparticles (NP) developed using safety-by-design concepts;
- ☑ Supports patenting of NMs and NP's as tools for (nano)remediation;
- ☑ Provides incentives for in-situ use of NM and NP to treat contaminated soil and water;
- ☑ Raises awareness on the process of (nano)remediation, its benefits and means of application.

1.3 REGION OF CRETE - ACTION PLAN

Each participating region in TANIA, produces its Action Plan, providing details on how the lessons learnt from the interregional cooperation will be exploited, in order to improve the policy instrument tackled, within that region.

In this regard, the Region of Crete developed its Action Plan which was drafted by the Directorate of Environment and Spatial Planning of the Region of Crete.

The development of this Action Plan has been based on the principles of:

- i. **interregional cooperation between TANIA partners:** cooperation was supported by a series of interregional learning events (TANIA Exchange Events, **TEE**), study visits, bilateral exchanges of experiences and sharing of good practices

ii. **involvement of the key Region's of Crete stakeholders** dealing with innovation and the environment. Participation was supported mainly through setting up a regional TANIA Stakeholder Group (**TSG**), which met periodically in order to guide the project. TSG was composed by:

- *academia and institutions* working on nanotechnologies and environmental protection,
- *public entities dealing with environmental monitoring and policy making on environmental issues*
- *private companies and entrepreneurs in the field of environmental technologies and remediation*

1.4 OVERVIEW OF CURRENT ENVIRONMENTAL POLICIES & LEGISLATION

The national legislation concerns, in general, the prevention of environmental damage as well as the remedial actions or plans that should be taken in case of environmental damage. Operators are obligated to adopt and apply the necessary preventive and remedial measures against environmental damage or direct threat thereof and to carry the relevant costs, regardless of the amount. In addition, the operators underlie two more duties towards the competent authorities. On one hand, they have the duty to inform them immediately about the existence of environmental damage or direct threat thereof. On the other hand, they are obliged to cooperate with the competent authority on the determination and implementation of the remedial measures.

Furthermore, the legislation framework refers to soil protection, that includes waste management, hazardous waste management and municipal waste management. Regarding soil remediation the Greek legislation specifies the administrative procedures for the remediation of contaminated sites, nevertheless still the competent authorities are not aware of all the available remediation techniques.

The Regional Waste Management Plan of Crete : Remediation of polluted areas is not addressed. Old MSW, uncontrolled disposal sites are going to be rehabilitated by conventional methods. The Regional Waste Management Plan is designed by the regional authorities, approved by the Regional Council and ratified by the Ministry of Environment. However, the competence for the approval of case-specific remediation actions in polluted sites belongs to the Decentralised Administration of Crete, while the rehabilitation of old, illegal MSW disposal sites is a responsibility of Municipalities.

A. NATIONAL POLICY INSTRUMENTS

The National Sectoral Operational Programme “Transport, Environment and Sustainable Development 2014 - 2020” co-financed by the Cohesion Fund, the European Regional Development fund and National resources. Beneficiaries are Ministries, Decentralized Administrations, Regional Governments, Municipalities, Public Companies of Water Management and Waste Management Associations. In priority Axis 4 “Soil protection and Waste Management”, the Special Target 28 is funding the remediation of contaminated sites.

B. REGIONAL POLICY INSTRUMENTS

The Region of Crete participates in TANIA project to improve the running **Regional Operational Program “Crete 2014-2020”** and in particular Axis 1 “Reinforcement of competitiveness, innovation and entrepreneurship” and Axis 2 “Sustainable development with environmental upgrade and climate change adaptations” and the **related Regional Smart Specialization Strategy**.

The **Regional Operational Program “Crete 2014-2020”** aims to boost economic development and create job opportunities in Crete. It contributes to achieving the Europe 2020 targets for smart, sustainable and inclusive growth. It should create jobs and help SMEs to become more competitive and innovation driven.

The basic instrument the **Regional Operational Program “Crete 2014-2020”** – Axis 1 – is the Regional Smart Specialization Strategy (RIS Crete), that seeks to use scientific knowledge and innovation to enhance innovative entrepreneurial activities; those linked to green technologies and waste management pertain to target activities. As far as the knowledge complex is concerned, the RIS Crete seeks to encourage the development of start-ups, which will be based on scientific work and the scientific potential of Crete’s institutions, to attract investments which seek cooperation with the important research groups of Crete and make use of research infrastructures.

At the same time the ROP through Axis 2 addresses the improvement of infrastructure of urban waste water treatment, the improvement of urban environment by revitalizing and decontaminating degraded areas (including areas to be reconstructed), as well as reducing air pollution and promoting measures to reduce noise. Strengthening of local entrepreneurship (production of new materials) is among the guiding principles for selection criteria of actions.

(Nano)remediation sector and its current situation is presented in the following SWOT analysis:

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Concentration of an internationally acclaimed educational and research potential • Highly skilled scientific institutions and personnel • Emerging research sector • Regional research on nanoparticles • A number of environmental technologies enterprises operating in the Region • Good coherency with the OP Axis 1 and the Smart Specialisation strategy "RIS3 Crete". 	<ul style="list-style-type: none"> • Remediation business sector does not exist • Not enough available data exist on contaminated sites • (Nano)remediation is a new and innovative method • Lack of knowledge/competency among major stakeholders • No funding opportunities available specifying on remediation
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • New sector for research and entrepreneurs • Available research of local academia and institutions may be adjusted to (nano)remediation • The RIS3 Strategy recognizes weaknesses in the regional system of production, dissemination and use of innovation • The end of the programming period and reallocation of funds 	<ul style="list-style-type: none"> • Diversion of funding opportunities • Limited need for remediation technologies • R&I sector not cooperating with entrepreneurs of remediation

Part II Overview of Actions

2.1 Policy Needs

TANIA aims to “improving regional policies for supporting the uptake and the awareness on innovative solution for environmental remediation based on nano and advanced materials”. In this context, the Region of Crete stakeholders particularly identified 3 main policy needs:

Policy Needs	Type of Policy Improvement	Short description
01 Strengthening the Remediation business sector in Crete	01 New Projects and 02 Modified Support measures	<p>The (nano)remediation sector in Crete is not developed, even though significant research is carried out by research institutes and there is a strong presence of Environmental Technologies SMEs. At the same time, the need for environmental remediation has not been identified through regional policy instruments as it was not highlighted as a need when they were drafted. It is therefore vital for the strengthening of the sector to achieve partnerships for the generation of (nano)remediation projects and support their development through modified support measures.</p> <p>Partnerships of SME's and Research and Educational bodies on remediation and/or innovative topics creates potential beneficiaries on specific calls and could also lead to new calls and therefore projects. This could also provide the MA with the advantage of ensuring the results of a specific call. Modified support measures such as the digital hub will enhance cooperation in the sector and raise awareness both in the public and private sector</p>
02 Increase the pilot scale projects in Crete	01 New Projects and 02 Modified Support measures	<p>The (nano)remediation sector in Crete is not developed. Without successful pilot studies to exhibit the effectiveness and safety of the technology, (nano)remediation will always be considered as 'immature' and not as an 'emerging' or 'available' technique to be used in commercial applications. The Region of Crete is trying to encourage the generation of new pilot projects through modified support measures (ie digital tools, review of RIS3) where networking of research & SMEs will be achieved and mature proposals will be proposed in the review of policy instruments to include the (nano)remediation sector. As such knowledge and awareness in (nano)remediation will be raised and new</p>

			projects will be generated.
03	Implementing an integrated approach for Data Collection	01 New Projects and 02 Modified Support measures	Lack of available data on contaminated sites, strategic knowledge/competency and available information among major stakeholders, such as public authorities, policy makers, research bodies and enterprises, is a factor limiting current regional policies to focus on the remediation sector. The implementation of support measures such as a dynamic integrated database (nano)remediation tool is expected to cover the knowledge gap in an a coordinated attempt to collect available data and methodologies (eg TUC, ADEME) and ultimately lead to new calls and boost the remediation sector.

2.2 Summary of Actions envisaged

Envisaged actions were drafted according to a set of broad guiding principles:

- **Stakeholder inputs and policy needs** - The actions aim at tackling TANIA challenges and needs identified during the regional TSG meetings organised during the Phase 1.
- **Interregional learning process** - The actions aim at drawing on the lessons learnt from the several TANIA Exchange Events (TEE) and activities carried out. Several TEE were also attended by stakeholders, such as research organization and environmental institutions.
- **Policy instrument improvement** - The actions focus on achieving improvements in the specific policy instrument(s) selected for the Region of Crete within TANIA.
- **Feasibility** - A number of actions (2) was defined and their scope was controlled, in order to increase the likelihood of their implementation in most activities, without compromising the purpose of the Action Plan and of the TANIA mission.

The TANIA Action Plan for the Region of Crete consists of two actions, all closely linked within the regional policy framework and the context of the Regional Smart Specialisation

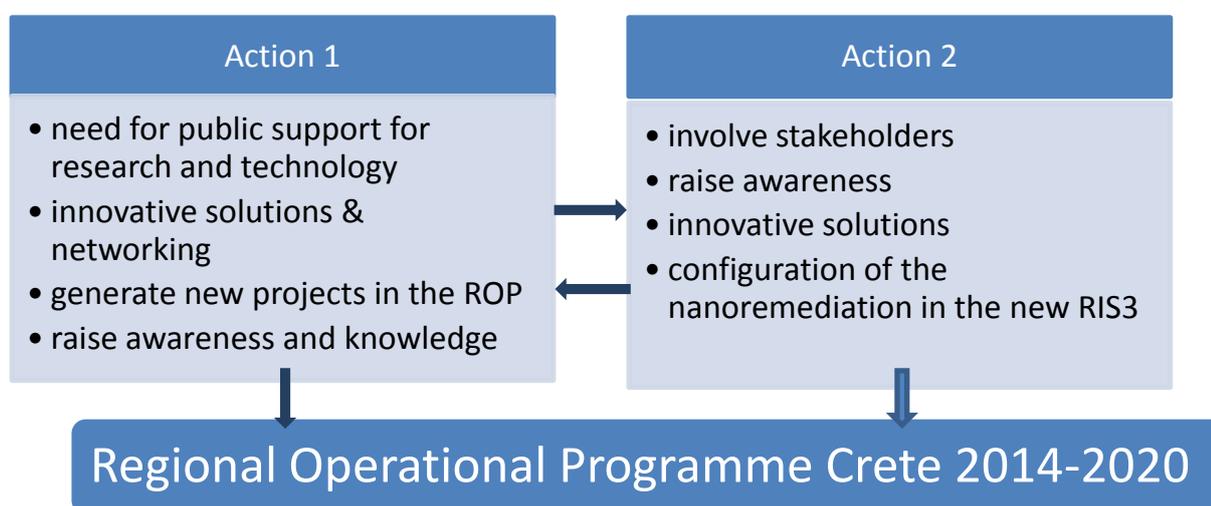
Action 1: NEW DIGITAL TOOLS TO STRENGTHEN COOPERATION AND KNOWLEDGE AMONG BENEFICIARIES OF THE ERDF ROP IN (NANO)REMEDIATION

The action focuses on a) the establishment of a Digital tool as a means of public support for Research and Technology. Networking of R&D & SMEs will lead to innovative solutions and ultimately new projects beneficiaries of Crete OP 2014-2020, and b) an interactive remediation tool implemented by the competent authority for remediation, for the diffusion of knowledge and practical implementation of (nano)remediation

Action 2: REVIEW OF REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION INCOPERATING (NANO)REMIEDIATION

The action proposes the incorporation of the (nano)remediation sector in the upcoming review of RIS3 that is subject to the Crete OP 2014-2020. The enhancement of the remediation sector in Crete provides solutions to innovation and networking needs of RIS3.

A Graphic representation of the work plan described, and the interrelations of the actions envisaged is presented in the following:



Part III TANIA Action Plan

General Information

Project	TreAting contamination through Nanoremediation – TANIA
Partner organisation	Region of Crete
Other partner organisations involved (if relevant)	
Country	Greece
NUTS2 region	Kriti
Contact person	Katerina Vavadaki
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Policy Context

The Action Plan aims to impact:	
Investment for Growth and Jobs programme	YES / NO
European Territorial Cooperation programme	YES / NO
Other regional development policy instrument	YES / NO
Name of the Policy Instrument(s) addressed:	
<p>1) The Regional Operational Program "Crete OP 2014-2020" Axis 1 "Reinforcement of competitiveness, innovation and entrepreneurship" and Axis 2 "Sustainable development with environmental upgrade and climate change adaptations"</p> <p>2) The Regional Research and Innovation Strategies for Smart Specialisation "RIS3 Crete" The RIS3 Crete is subjected to the ROP (Regional Operational Program "Crete OP 2014-2020") and thus any change in the RIS has a direct impact on the ROP.</p>	
Further details on the policy context:	
<i>(Please insert an introductory paragraph, highlighting regional socio-economical</i>	

characteristics and data, environmental context, details related to the policy instrument)

The aim of the Regional Operational Program "Crete OP 2014-2020" is to create the conditions for the reorientation of the local economy, the exit from the financial crisis and the integration into the path of intelligent, sustainable and without exclusions growth. Two of its main Priority Axes focus on (a) enhancing the competitiveness, innovation and entrepreneurship of Crete and (b) sustainable development by upgrading the environment and addressing the impact of climate change on Crete. That is by orienting the regional policies towards innovative environmental technologies and enhancing Research & Innovation institutes and Businesses (R&I&B) cooperation towards the knowledge economy. Although these priorities are in line with the enhancement of the Environmental (nano)remediation sector, they are not explicitly referenced to remediation.

The implementation of the Regional Smart Specialization Strategy "RIS3 Crete" is pursued in selected traditional sectors, i.e. agri-food and tourism, where the Region has strong comparative advantages, as well as emerging sectors. The emerging sectors that were added where the ones that investments have been made, business are developing, many young scientists have been trained and a considerable know-how has been accumulated. Economic activities that incorporate the aforementioned developmental features are located in the environment - energy sectors, as well as in the knowledge complex, supported by international and reputable Crete's Research and Academic Institutes, which place Crete in a particularly strong position in the direction of the development of the Knowledge Economy.

The implementation of the "RIS3 Crete" into the ROP "Crete OP 2014-2020" applies a new model, both to the way public administration operates, which now tackles business more efficiently and designs development policies on a more systematic basis, and at the same time reinforces trends for more targeted investments that lead to a differentiation rather than simply reproducing the same productive model.

At the same time, it continues to implement the policy of cooperation that has been adopted in recent years between the Region of Crete, academic and research institutions and private initiative bodies. A key objective of this cooperation remains the support of new highly innovative and specialized activities capable of diversifying the island's productive base.

Details of the Actions Envisaged

ACTION 1 - NEW DIGITAL TOOLS TO STRENGTHEN COOPERATION AND KNOWLEDGE AMONG BENEFICIARIES OF THE ERDF ROP IN (NANO)REMEDIATION

The Region of Crete (RoC) takes part in the TANIA Project to improve its **Regional Operational Programme (ROP 2014-2020)** - particularly several measures of **Axis 1 "Reinforcement of competitiveness, innovation and entrepreneurship"** and **Axis 2 "Sustainable development with environmental upgrade and climate change adaptations"**- and its related **Regional Smart Specialisation Strategy (RIS3)**, which represents the main technical annex to the ROP and sets the technological priorities on which to invest ERDF funds in research, development and innovation.

Nevertheless, all ROP measures must be developed **in accordance with** the priorities and technological roadmaps set out in **the Regional Smart Specialisation Strategy (RIS3)**. This means that each call, as well as measure or action, funded by ROP ERDF must be addressed to at least one RIS3 priority.

RIS3 represents the regional strategy document for innovation and research where the Regional Authority identifies investment priorities and technological domains for regional policies and structural fund programming. More specifically, the strategy in the environmental complex seeks to use scientific knowledge, innovation and ICT's to tackle major environmental problems and challenges for Crete and to enhance innovative entrepreneurial activities. Nonetheless the focus is not on environmental remediation but mainly on Waste management through innovative applications for prevention, processing and reuse of materials. On the other hand, the knowledge sector seeks to encourage the development of start-ups which will be based on scientific work and the scientific potential of Crete's institutions, to attract investments which seek cooperation with the important research groups of Crete and make use of research infrastructures.

The (nano)remediation sector in Crete is not developed despite the fact that significant research is carried out by research institutes and there is a strong presence of Environmental Technologies SMEs. At the same time the need for environmental remediation has not been identified through regional policy instruments as it was not highlighted as a need when RIS3 was revised. The focus on actions was based on an *Entrepreneurial Discovery Process for New Projects* as a consultation methodology (this Process was submitted through TANIA, as one of RoC's Good Practices). During this consultation process proposals of research institutes as well as SMEs of the Region were submitted. The proposals were assessed and grouped into categories. A series of networking meetings followed to help proposals improve and improve their feasibility. The action through the creation of **a networking Digital Hub for (nano)remedial**

entrepreneurs aims to upscale the procedure for the implementation of the “RIS3 Crete” into the ROP “Crete OP 2014-2020” by applying a new more efficient model to the way public administration operates, focused on the (nano)remediation sector.

At the same time knowledge on (nano)remediation must be broadened and improved as a support measure for the enhancement of the sector. At the moment, there is **no database of contaminated sites or (nano)remediation techniques publically available**. The Region of Crete capitalizing on the: (a) convention with the French Environment & Energy Agency (ADEME) for the use of data available in their national remediation tool, namely selecDEPOL, (b) the provided by the Technical University of Crete (TUC) remediation methodology, (c) the national project of mapping of contaminated lands by the Ministry of Environment, and (d) the TANIA exchange of experience and good practices, proposes the **development of an interactive remediation tool** that will offer practical knowledge on contamination sites and innovative techniques or methodologies for treating contamination and serve as a scientific basic tool for determining remedial measures of licensing procedures. The tool will thus support both public administration and research institutes and enterprises of the hub to improve their knowledge on (nano)remediation and boost the generation of new projects.

Policy Need (Number / Brief Title)	Typology of Policy Improvement
1. Strengthening the Remediation business sector in Crete.	01 New Projects and 02 Modified Support measures
2. Implementing an integrated approach for Data Collection	01 New Projects and 02 Modified Support measures
3. Increase the pilot scale projects in Crete	01 New Projects and 02 Modified Support measures

According to the main policy needs identified by the Region of Crete, Action 1 focuses on Strengthening the Remediation business sector in Crete. The establishment of cooperation between the research and entrepreneurial community using modified support measures focusing on networking and knowledge exchange will support the development of the sector and new projects will be generated.

Additionally, the Action 1 addresses another major policy need that of Implementing an integrated approach for Data Collection. Although legislation for remediation of sites is established, data of polluted sites and approved methodologies are not readily available to competent authorities and entrepreneurs of the sector. Modified support measures for an integrated approach for Data Collection will address knowledge gap problems and generate new environmental remediation measures and projects.

The current action will have a positive effect, for pilot scale projects as well. The established R&I and SMEs cooperation and the increase of knowledge in the sector will be generated, and pilot scaling for the application of innovative technologies will be enhanced.

Overall Topic and Description of the proposed Policy Improvement

Overall Topic (c.200 characters)

This Action focuses on developing the policy means for an enhancement of the environmental (nano) remediation sector in the Region of Crete via strengthening cooperation and knowledge among beneficiaries of the EDRF ROP. The policy needs that have been identified include 1. strengthening the remediation business sector in Crete, 2. increase the pilot scale projects in Crete and 3. implementing an integrated approach for Data Collection.

The policy improvement will be achieved by creating necessary support tools to promote new projects and modify support measures i.e.

- (a) a digital Hub, acting as a point of facilitated access for the public sector, enterprises and research bodies.

Through modified support measures, such as this central digital hub, the cooperation of the business and the Research Sector can be enhanced. Partnerships of SMEs and Research and Educational bodies on remediation and/or innovative topics creates potential beneficiaries on specific calls and could also lead to new calls and therefore projects. This could also provide the Managing Authority of the EDRF ROP with the advantage of ensuring the results of a specific call.

- (b) and an interactive remediation tool, implemented either by the competent authority or by being included in the GIS database of the Region of Crete, for the diffusion of knowledge and practical implementation of (nano)remediation.

The implementation of support measures such as the remediation tool is expected to boost environmental remediation by influencing current regional policies that have not included the sector until now, due to lack of competency and knowledge.

The aforementioned tools will help innovative environmental technologies to mature and enhance the cooperation of R&I&B towards the (nano)remediation sector. The Digital Hub will manage to network remediation academia and research institutes with SME's, enabling their corporation into developing new pilot projects mature for ROP funding. The remediation tool will provide background data and methodologies for the implementation

of remediation in Crete. Additionally, as both tools will be operated and promoted by the Region of Crete, highlight the sector as a priority sector for the Region. As a result, beneficiaries of ROP EDRF will be capable to prepare proposals for funding (new projects).

Specific Description (c.1500 characters)

The environmental / (nano)remedial business sector is not significantly developed in the Region of Crete. Nonetheless within the Region there is a significant number of Research & Innovation Institutes that have an elevated educational and research potential on the sector with innovative remediation (nano)technologies that could be employed. .

At the same time though, the lack of available data on contaminated sites, strategic knowledge/competency and available information among major stakeholders, such as public authorities, policy makers, research bodies and enterprises, is a factor limiting current regional policies to focus on the remediation sector.

Therefore, it is considered vital to create new digital tools to support the (nano)remediation sector by networking R&I&B and strengthen knowledge / competence on emerging technologies amongst relevant stakeholders.

The proposed action is to develop "New Digital Tools to strengthen cooperation and knowledge among beneficiaries of the ERDF ROP", providing thus new instruments to favour the cooperation of regional stakeholders and boost the remediation sector. Specifically, the action aims to encourage cooperation and networking of regional remediation stakeholders in order to build up funding opportunities and pilot scale projects, as well as offer practical knowledge on contaminated sites and innovative techniques or methodologies for treating contamination.

The creation of a digital Hub, will be an asset for promoting (nano)remediation advances and R&I&B cooperation within the Region, based on a directory of contact details of TANIA stakeholders and organizations. The establishment of an "Interactive Remediation Tool" comprising contaminated sites, (nano)remediation techniques and methodologies for treating contamination will improve the lack of knowledge gap and at the same time promote entrepreneurship as an innovation proposed by public authorities and policy makers.

New Digital Tools will strengthen cooperation and knowledge among ERDF ROP stakeholders (R&I&B (nano)remediation institutions. Partnerships will emerge and therefore potential beneficiaries on (nano)remediation specific calls to be launched will be nurtured. Such action will generate new calls and related projects (such as pilot scale projects), as well trigger an overall policy improvement.

Background

(please describe how you came to identify this proposed Policy Improvement. Please highlight regional/national input, but also mention if you can cite any lessons learnt from the

TANIA project – solutions transfer / other input)

Regional / National input, including input from TANIA Stakeholder Groups (c.1500-2000 characters)

The Region of Crete is involved in the TANIA project with a multidisciplinary stakeholder group of Public Bodies, academic and research institutes, technical advisors and local SMEs of the environmental – remediation sector. These stakeholders engaged in interregional and regional exchange events that set the scene for the Region's policy improvements by merging expertise into identifying practical policy solutions to the (nano)remediation sector.

The main Regional / National input from the TANIA Stakeholder Groups was the identification of the challenges encountered by comprehending current situation on the regional (Nano)remediation sector and the needed activities to be taken towards the policy improvement in this subject. The needs identified were (a) the lack of integrated data about (nano)remediation and (b) the lack of SMEs and R&I (Research & Innovation) institutions cooperation in (nano)remediation.

More specifically, a series of meetings with the competent authority of RIS3 Crete and the stakeholders of TANIA were held (representative meetings are the 22/11/2018 meeting with competent authorities for RIS3, and 7/3/2019 BE in Tuscany). These stakeholders expressed their interest on the environmental remediation sector as an emerging field of innovative entrepreneurship. At the same time, they identified the need for R&I&B cooperation as necessity to promote the sector. The idea of creating a dynamic central hub in the Region of Crete that would promote innovation and entrepreneurial discovery was proposed. This Digital Hub is planned to be considered as a part of the Digital Governance Structure, that is it will be part of the Region's web-enabled products and services.

Moreover, the Directorate of Environmental and Spatial Planning of the Decentralised Administration (which is the competent authority for remediation of contaminated sites and a stakeholder of the project), expressed a profound interest on implementing a database of contaminated sites, (nano)remediation techniques and SMEs and R&I institutions, that could be used as a scientific basic tool for determining the remedial measures. .

Finally, Research Institutes and SMEs working on nanotechnologies and environmental remediation methods, provided input on their work on the sectors. They also expressed the difficulties they encounter (a) on achieving strategic partnerships and networking within the Region of Crete, (b) securing funding and (c) the lack of a clear policy supporting environmental remediation measures (ie 4th stakeholder workshop in Heraklion 18-12-

2018).

Transfer of TANIA Solutions (c.1500-2000 characters)

Transfer of solutions for the Digital HUB

The initial idea for the creation of the HUB was born by "GISFI experimental platform GP". The Region of Crete inspired by the establishment of a multidisciplinary and strong consortium of industrial partners, companies and administrative institutions aiming at sustainable management of degraded areas. Given that remediation sector in Crete is not developed the idea that a connection of R&I&B sector as a prerequisite was born. Subsequently the GP of the "Regional Platform Industry 4.0" seemed capable to address this lack of networking and cooperation.

The "Regional Platform Industry 4.0" and more specifically "Cantieri 4.0" application from the partners in Tuscany, addresses fully this policy need due to the fact that it enhances the knowledge and competency among enterprises, policy makers, public authorities and thus can boost the remediation business sector and be used as a guidance for the implementation of this action. A bilateral exchange in Tuscany (7-3-2019) helped the Region of Crete in understanding why this Good Practice is a significant tool for the enhancement of the remediation sector in Crete. The strategy for the implementation of the Regional platform "Cantieri 4.0" can be employed by the Region of Crete to develop an integrated tool for implementing RIS3 Crete and thus to promote pilot scale projects in Greece. The staff exchange was significantly helpful since the meeting with the owner of the solution, gave them the opportunity to understand the procedures step by step, so that RIS3 can apply a similar solution, as described above, within the Region of Crete. This solution was sequentially presented to the RIS3-Crete Director and to the Director of the Managing Authority and they agreed on the necessity of this solution.

Additionally this good practice is in line with the solution proposed in TANIA by the Region of Crete, Environmental Entrepreneurial Discovery Process(EEDP). The EEDP was the consultation process followed in the previous review of RIS3 (2017) where the entrepreneur's proposals and outcomes of the process led to the formulation of new priorities and actions in RIS3. As such the HUB may serve the "Environmental Entrepreneurial Discovery Process" by networking R&I&B to present innovative proposals in the new /reformed RIS3 (that is subject to the ROP) and thus introduce (nano)remediation in the regional policy.

Finally, the Region of Crete was impressed by the GP "SOLIA – soil research center" that tightens the cooperation between research institutes and especially with R&D (Research & Development) oriented companies by offering its facilities for research and educational services. This GP gives the long-term impetus to capitalize on the digital hub and create the physical infrastructure for teaching, research activities and meeting point for actors of the sector.

Transfer of solutions for the Interactive Remediation Tool

At the beginning of the TANIA project, the **SISBON (Information system of the territorial areas interested by environmental recovering)** GP, inspired the Region of Crete for the **possibility of creating an interactive remediation tool, that can assist the competent authority for remediation in Crete**. Nonetheless, the proposal of GRAND-EST Region in France for the digital database **selecDEPOL** (<http://www.selecdepol.fr/>) within TANIA- initially discussed in the 5th TANIA exchange event in Heraklion (14-5-2019) and presented on a bilateral exchange in France on July - fitted better the regional needs on the interactive remediation tool.

SISBON Information system of the territorial areas interested by environmental recovering GP was additionally examined regarding **its goal on making all procedures “transparent”**. This GP is also in line with the Region’s policies and thus data of contaminated sites once registered will be handled as open data.

“GISFI experimental platform” good practice of an on-the-site experimental station, could on the long term be a feature of the interactive database that could feed real time data on the results of the proposed remediation techniques.

Finally, the regional good practice presented by the **“TUC methodology for remediation of uncontrolled contaminated sites from industrial and toxic wastes”** could also be incorporated in the interactive database as all data available can be uploaded on the tool.

Methods of remediation presented in other good practices such as **“Dry cleaner’s site nanoremediation”** and **“Utilization of nanomaterials for decontamination of air and wastewater by Solar photocatalysis”** and their remediation methods, could also be fed on the remediation tool. The first practice and the method can be sited as a paradigm of the sustainability effect and the second as a standardized methodology for nanoremediation of air and wastewater. **“LORVER strategy: giving value to abandoned resources and brownfields”** is based on a toolbox of soil and water treatment technologies. This toolbox could also be sited in the interactive remediation tool.

The Good Practice of the **Päijät-Häme Region: “Guidelines on sustainable risk management of contaminated soils”** describes step by step how remediation processes can be planned and carried out following sustainability principles. In the long term, the development of a corresponding to **Päijät-Häme** remediation guide, can be the expected “next step” of the tool’s successful implementation.

Other input from TANIA project (c.1500-2000 characters)

The significant research on the **“TUC methodology for remediation of uncontrolled contaminated sites from industrial and toxic wastes”** that was presented to the TANIA project came to answer the Competent’s Authority for remediation of contaminated sites, lack of data problems. Therefore, stakeholders’ engagement at a regional level gave significant input, as the Technical University of Crete is offering the “TUC study”, which comprises a plethora of data on remediation of soils and water, for the development of the

database.

The remediation methodology study of TUC was developed in the frames of a national project of mapping contaminated areas in Greece carried out by the Ministry of Environment. The project was realized by "**Pilot Scaling the TUC Methodology**". This project was presented by the Managing Authority of the Operational Programme Transport Infrastructure, Environment and Sustainable Development, OP TIESD at a workshop in Chania (9/5/2019). The project comprises a database of contaminated sites in Greece. This knowledge and data on contaminated areas that became available through the project will serve as the means to highlight the importance of (nano)remediation in the Region and thus influence Regional Policies.

Work plan within TANIA Phase 1 – ELABORATION of the Action

Activities already undertaken at interregional and regional level in Phase 1

This section summarises what inserted in the previous tab of the same name. In the present version, it is to be described what activities were carried out to elaborate the Action preparation between Semester 4 and 6.

In the description, please indicate if activities were regional or interregional.

Over the first semesters work plan focused on actions development phase. The Region of Crete engaged in interregional and regional exchanges to set the Scene for the region's (nano)remediation concept. Practical policy solutions were mainly identified during Semester 3.

DIGITAL HUB

During TEE5 (TANIA Exchange Event, 14-5-2019) in Heraklion the ITC (Information Technology & Communications) consultant of the Region of Crete expressed an interest on deepening knowledge for the Region in the TANIA solution 'Regional Platform Industry 4.0 – Digital Innovation Hub. Following this meeting, a meeting with representatives from the Directorate of Development Planning responsible for RIS3 was held in Crete (22/5/2019). They confirmed their interest on TANIA solution 'Regional Platform Industry 4.0 – Digital Innovation Hub' and a bilateral exchange in the Region of Tuscany was held to deepen their knowledge on the Platform. A regional discussion was sequentially organized and the solution was assessed on the grounds of suitability and the expectations from the bilateral exchange in Tuscany. The GP "Cantieri 4.0 Platform" of the Tuscany Region that is an already operational tool of the 'Regional Platform Industry 4.0 – Digital Innovation Hub' was found to cover the regional needs. The feedback from the BE was very valuable for the

directorate of Developing Planning towards understanding the procedures step by step and the information system that supports the platform, so that RIS3 can apply a similar solution. In this exchange, the Region's ITC consultant was involved.

As a result, the Directorate of Development Planning responsible for RIS3 engagement has decided upon the implementation of a Digital Hub for RIS3Crete which will include (nano)remediation advances and cooperation of relevant stakeholders within the region.

INTERACTIVE REMEDIATION TOOL

A meeting between the Directorate of Environment & Spatial Planning and the Directorate of Environmental and Spatial Planning of Decentralised Administration (the competent authority for remediation of contaminated sites) followed in Heraklion (12-3-2019). During TEE5 (TANIA Exchange Event, 14-5-2019) in Heraklion stakeholders from the Directorate of Environmental and Spatial Planning and the Region's ITC technical consultant, expressed an interest on deepening their knowledge on the good practice of the Grand-East region. After a thorough discussion concerning the TANIA solutions, the of Environmental and Spatial Planning expressed a profound interest, and thus a bilateral exchange between the Region of Crete and the Grand-Est region in FRANCE was organized. A bilateral exchange was organized in ADEME Paris with the participation of representatives of the Directorate Environment and Spatial Planning of Decentralised Administration and the solution was analyzed. Following the exchange in Paris, BRGM and ADEME, as the owners of the SelecDEPOL tool, gave their tentative agreement to provide an access at the Region of Crete in order to transfer and implement in Crete an initiative inspired by the "SelecDEPOL" tool (9-7-2019).

Additionally a Skype meeting (2-5-2019) with representatives from the Technical University of Crete for the arrangements of the Workshop in Chania on Region of Crete's GP "**TUC methodology for remediation of uncontrolled contaminated sites from industrial and toxic wastes**" with the partners from GRAND-EST Region and the potential of offering 'TUC study', which comprise a plethora of data on remediation of soils and water for the development of their e-database. Finally, a meeting with the Region's ITC technical consultant was held to discuss about the basic requirements for the E-database development as a scientific tool for determining the remedial measures and contaminated sites and specifically to examine if such a database could be implemented in the Region (26-6-2019).

Work plan within TANIA Phase 2 – IMPLEMENTATION of the Action

Please list and describe the precise activities that will be undertaken in Phase 2, in order to

implement your Action Plan.

Activities planned at interregional and regional level in Phase 2 (January 2020 – December 2021)

REGIONAL - In this second draft you should focus on regional activities to be carried out in Year 4 / 5. Please indicate when you expect to undertake these activities. Please insert planned activities and describe their input to assessing feasibility.

The implementation of the Action is to be carried out mainly at regional level. Interregional activities can be foreseen only when particularly relevant.

Please note that these refer to very practical activities, e.g. fix meeting with person responsible for regional call, organise stakeholder workshop, analyse relevant documentation, etc.

Add as many lines as necessary.

Activity / Description	Timing (month/year or specific date where possible)
<p>Digital tools will be developed to enhance the remediation sector. Specifically:</p> <ul style="list-style-type: none"> • A digital hub for the networking of entrepreneurs with the R&I sector will be established, acting as a point of facilitated access to fit the public sector, enterprises and research bodies that will promote cooperation between stakeholders for funding through the revised RIS3 Crete or other funding resources. The activity is in line with the Region’s plans towards a Digital Governance Structure. • An interactive remediation tool will be established that will offer practical knowledge on contamination sites and innovative techniques or methodologies for treating contamination and serve as a scientific basic tool for determining remedial measures of licensing procedures. <p>The digital hub will be coordinated by the Directorate of Development Planning of the Region of Crete. The Directorate of Environment & Spatial Planning will take up actions to support the development of the remediation tool that will be implemented either by the competent authority or it will be included in the GIS database of the Region of Crete. .</p>	<p>January 2020 –December 2021</p>

<p>Task 1.1: Data Collection / Mapping</p> <p>An extensive research on local and regional stakeholders will be carried out (mapping all academic and research institutes, as well SMEs of the environmental remediation sector, their contact details and exact field of activity) in order to set the grounds for the establishment and feasibility of the R&I&B networking and the network that will support the testing and feeding of the database with regional data and methodologies. Additionally available data of contaminated sites and remediation methodologies used will be collected.</p> <p>The Directorate of Environment and Spatial Planning will uptake the task.</p>	<p>January 2020- May 2020</p>
<p>Task 1.2: Technical studies for digital tools</p> <p>The two digital tools' technical specifications will be developed by studying the specifications of the Cantieri 4.0 Platform and SelecDEPOL customizing them to the specific needs of the region and requirements of the Directorate of Development Planning.</p>	<p>February 2020 – June 2020</p>
<p>Task 1.3: Establishment of an informal network of research stakeholders</p> <p>The task primary involves the tentative agreement between the Region of Crete and the owners of selecDEPOL in order to transfer and implement its data. Sequentially an invitation to stakeholders will be sent to build the network by the Directorate of Environmental and Spatial Planning. Replies to the invitations will indicate their participation in the network.</p> <p>The establishment of the network early in the project will ensure the stakeholders intention to provide the remediation tool with data and proposed remediation methodologies that will ensure the implementation of the tool. The same stakeholders are to be the representatives of the research and academia sector of the digital hub and thus this action ensures that the hub will be operational.</p>	<p>May 2020 – June 2020</p>
<p>Task 1.4: Submission of funding proposal for the development of the digital Hub</p> <p>The Directorate of Development Planning will submit a</p>	<p>June 2020 – September 2020</p>

<p>funding proposal for development of the Digital Hub subsidized by regional funds. The proposal will entail the policy objectives, stakeholders involved, technical features of the tools and the estimated budget.</p>	
<p>Task 1.5: Development of a functional digital hub platform</p> <p>At this stage the development and operational testing of the platform will be performed by the IT team that will be subcontracted the development of the platform. The Directorate of Development Planning will monitor the progress</p>	<p>September 2020 – January 2021</p>
<p>Task 1.6: R&I registration – beta testing of the digital hub</p> <p>A number of R&I institutes will register on the platform during the beta-testing stage. This task is critical for further implementation and dissemination actions targeting SMEs, so that the hub will be ready to host networking activities. The Directorate of Environment and Spatial Planning will support the Directorate of Development Planning by providing contacts of R&I institutes on the (nano)remediation or other innovative technologies, and thus managing to develop a fully functional platform.</p>	<p>January 2021 – March 2021</p>
<p>Task 1.7: Remediation Interactive Tool establishment</p> <p>The task includes the design and customization of the platform and uploading of the translated SelecDEPOL data as well as other available data and proposed methodologies (eg TUC, Ministry of Environment). The contractor of the task will take up all necessary actions.</p>	<p>September 2020 – March 2021</p>
<p>Task 1.8: Dissemination Actions</p> <p>Dissemination Actions will follow as soon as the tools will be functional. Dissemination actions will be uptaken mainly by the two Directorate responsible for the development of the digital tools with the support of the Directorate of Environment & Spatial Planning. The tasks that will be undertaken may include a press release a promotional event, person- to – person meetings, e-mails and telephone contacts.</p>	<p>April 2021 – December 2021</p>
<p>Task 1.9: Establishment of Stakeholder Network of</p>	<p>April 2021 – August 2021</p>

<p>Interest</p> <p>At this stage SMEs of the remediation sector will register their data on the hub allowing the platform to become operational for the (nano)remediation sector.</p>	
<p>Task 1.10: Organization - support of B2B (Business to Business) & R2B (Research to Business) events</p> <p>The Directorate of Development Planning will organize regional events to support networking activities of the HUB.</p>	<p>September 2021 – December 2021</p>

Gantt chart



Monitoring tools

The following monitoring tools will be used to follow the progress of the above-mentioned tasks in accordance to each tasks' expected completion date.

timeline	Monitoring
Sem 7:	Organization of meetings with stakeholders (Involvement in technical studies preparation)
Sem 8:	Organization of meetings with the funding authority (Funding resources available: European or regional)
Sem 9:	Organization of meetings with the digital tools' development company Organization of events (Digital tools operation)
Sem 10:	Organization of events (Monitoring the No of businesses and R&I institutes registered)

Milestones	
ACTIVITY 1	ESTABLISHMENT OF A DIGITAL HUB
March 2021	The Digital HUB is operational
September 2021 Task 1.8	Established Network of Interest
ACTIVITY 2	ESTABLISHMENT OF AN INTERACTIVE REMEDIATION TOOL
June 2020 Task 1.2	Proposal to the Directorate of Environmental and Spatial Planning of Decentralized Administration

Stakeholders involved	
<i>(please indicate the organisations in the region who will be involved in checking the feasibility of the policy improvement and explain their role – add as many lines as necessary)</i>	
Name of Organisation / person (where possible)	Role in Action Plan (c.200 characters)
Directorate of Development Planning / Head of the Directorate	The Directorate will uptake all activities necessary to establish and successfully operate the digital hub. The Directorate is actively involved in the policy improvement as they are responsible for the RIS3 planning and engagement
Directorate of Environment and Spatial Planning/ Head of the Directorate	The Directorate will offer support on the promotion and implementation of the digital tools and monitor the action plan.
Directorate of Environment and Spatial Planning of the Decentralised Administration /Head of the Directorate	The Directorate as the competent authority for licensing remediation measures at contaminated sites can support the environmental and scientific need for a policy change and thus support the remediation interactive tool towards the policy improvement.
Technical University of Crete / Prof. Gidakos	Utilization of the "TUC study" in the remediation tool



Other research institutes	Register in the HUB
Environmental and Remediation SMEs	Register in the HUB
IT experts	Digital hub

Risk and Contingency Plans

(please describe what you see as the main potential risks related to this Policy Improvement and eventual contingency plans – add as many lines as necessary)

Description of Risk	Level of probability (High, Medium, Low)	Description of Contingency Plan
Very different needs of SMEs in terms of research institutes' offered technologies	Low	A preliminary analysis of the needs of SMEs has taken place. In case matching within the hub is unsuccessful, additional dissemination efforts will take place.
The participation of registered users in the hub is low	Medium	There will be extensive dissemination activities and personal contacts carefully designed to clearly present the benefit for services delivered via R&I&B networking and increase motivation.
No clear policy relevance of the R&I&B interconnection	Low	Tasks are designed to service the tools and to strengthen cooperation of ROP beneficiaries.
The Decentralized Administration may not be able to secure the implementation of the proposal.	Low	Resources from the European Union and private investment for the transferability of the knowledge.
Failure to secure funding resources	Medium	Own resources of the region

		will be used in the case that funding is not secured.
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Costs and funding sources

Costs	Funding Sources
ESTABLISHMENT OF A DIGITAL TOOLS = 85,000€	In kind resources & Regional funding (ie Crete ROP or unallocated funds due to the end of the programming period)
Task 1.1: Data Collection / Mapping = 5,000€	In kind resources & Regional funding
Task 1.2: Technical studies for digital tools= 10,000€	In kind resources & Regional funding
Task 1.3: Establishment of an informal network of research stakeholders that will help feed the remediation tool = 2,500€	In kind resources
Task 1.4: Submission of funding proposals for the development of the digital tools = 4,000€	In kind resources
Task 1.5: Development of a functional digital hub platform = 25,000€	Regional funding
Task 1.6: R&I registration – beta testing of the digital hub = 5,000€	Regional funding
Task 1.7: Remediation Interactive Tool establishment = 25,000€	In kind resources & Regional funding
Task 1.8: Dissemination activities = 2,500€	In kind resources & Regional funding
Task 1.9: Establishment of Stakeholder Network of Interest = 1,000€	In kind resources
Task 1.10: Organization - support B2B & R2B events = 5.000€	In kind resources & Regional funding

Monitoring

Please describe the monitoring tools and indicators that you expect to use in Phase 2 to ensure that your Action Plan is implemented correctly

Self-defined Performance Indicators

This indicator was already inserted in the Application Form, but can be changed. Please confirm or modify them according to the attempted policy improvement.

If you wish to change to indicator, a justification will have to be provided to the JS.

Indicator ¹	Target	Means of Verification
Number of business receiving support (nanoremediation)	1	This ROP common output indicator for Crete Region) clearly defines self-performance of the action plan. Measurement: Number of (nano)remediation businesses.
Number of business cooperating with research institutes ((nano)remediation)	1	

Output Indicators

(Please insert the indicators demonstrating the proceeding of the policy improvement. Note that these refer to quantifiable elements, e.g. number of meetings organised, number of stakeholders involved, number of official documents released, amount of funds influenced, etc.)

Indicator	Target	Means of Verification
Number of Research Institutions registered in the hub	5	Google analytics of the platform
Concept Note	1	Number of concepts notes submitted

¹ The indicator Nature and biodiversity: habitats surface receiving aid to gain better conservation status = 20 Hectares is not mentioned in the action plan. The ROP indicator focuses on Natura 2000 habitats where urban / chemical pollution is scarce and needs for the remediation of 20 hectares have not been documented. Also, pilot technologies cannot easily be applied to nature sensitive areas, as relative to nature preservation areas legislation is strict. Therefore, the proposed indicator may not be practically measured. Additionally, the timeline for the implementation of the Action Plan cannot practically produce measurable results for the habitats.

submitted for the establishment of the remediation tool		
Organization of promotional events	1	Number of events organized Meeting agenda
Press Releases on the digital tools	1	Number of published press releases on the hub
Number of businesses informed for digital tools (e-mail, phone contact, personal contact)	50	Businesses inventory including type and details of contact
Number of businesses that registered data in the hub	20	Google analytics of the platform
Number of B2B – R2B events	1	Number of events organized Participation list

Territorial Impact

(This tab is NOT mandatory, please insert a description of the effects of the AP implementation in terms of benefits for beneficiaries, policy instrument goals, territorial gains, etc., in the medium/long-term perspective)

Through this action the sector of nanoscience and remediation separately or combined will be strengthened and promoted at the regional level. This action will satisfy ROP goals for excellence in research and innovation and economic differentiation in Crete.

Ultimately Crete will become a centre of innovation and strengthen its international position in the remediation sector, succeeding at the same time in its environmental protection goals.

Details of the Actions Envisaged

ACTION 2 - REVIEW OF REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION INCORPORATING (NANO)REMEDIATION

The Region of Crete takes part in the TANIA Project to improve its **Regional Operational Programme (ROP 2014-2020)** - particularly several measures of **Axis 1 “Reinforcement of competitiveness, innovation and entrepreneurship”** and **Axis 2 “Sustainable development with environmental upgrade and climate change adaptations”** - and its related **Regional Smart Specialisation Strategy (RIS3)**, which represents the main technical annex to the ROP and sets the technological priorities on which to invest ERDF funds in research, development and innovation.

All ROP measures must be developed **in accordance with** the priorities and technological roadmaps set out in **the Regional Smart Specialisation Strategy (RIS3)**. This means that each call, as well as measure or action, funded by ROP ERDF must be addressed to at least one RIS3 priority.

Therefore, the proposal for the revision of RIS3 to introduce (nano)remediation in the Region’s Policy will achieve the required policy improvement. The revision of RIS3 is anyway eminent as the Region of Crete is reaching the end of the current programming period and additionally a reallocation of available funds is expected.

Policy Need (<i>Number / Brief Title</i>)	Typology of Policy Improvement
1. Strengthening the Remediation business sector in Crete.	01 New Projects and 02 Modified Support measures
2. Increase the pilot scale projects in Crete	01 New Projects and 02 Modified Support measures

This action in accordance to the main policy needs identified by the Region of Crete focuses on Strengthening the Remediation business sector in Crete. The Review of the RIS3 Crete to include the (nano)remediation sector is vital for the sector, as all ROP measures must be developed **in accordance with** it.

The action will also have a secondary positive effect, for pilot scale projects that will be generated once RIS3 will explicitly mention environmental remediation.

Overall Topic and Description of the proposed Policy Improvement

(please provide a brief summary of the proposed Policy Improvement that this Action refers to)

Overall Topic (c.200 characters)

The aim of this action is to introduce innovative environmental (nano)remediation in the review of the RIS3. The policy improvement proposed were the need to implement new projects in Crete and modify support measures.

The policy improvement will be achieved by proposing the inclusion of (nano)remediation in the upcoming review of the RIS3 Crete that is subjected to the Regional Operational Program "Crete OP 2014-2020".

Specific Description (c.1500 characters)

The Region of Crete participates in TANIA project to improve the running Regional Operational Program "Crete 2014-2020" and in particular Axis 1 "Reinforcement of competitiveness, innovation and entrepreneurship" and Axis 2 "Sustainable development with environmental upgrade and climate change adaptations" and the related RIS3 Crete.

Although there is some coherence with the ROP Axis 1 and the "RIS3 Crete", remediation of contaminated sites (i.e. pollution of water and soil) is not explicitly referenced in Investment Priority 6.e, "Take action to improve the urban environment, regenerate cities, revitalize and disinfect degraded environmental areas" of the ROP. The reference made is too generic.

The RIS3 Strategy (March 2015) recognizes several weaknesses in the regional system of production, dissemination and use of innovation. Some of these weaknesses are namely: (a) small number of knowledge-intensive businesses, (b) lack of innovation culture in business attitudes, (c) limited cooperation between businesses and research institutions and thus, (d) low networking level between the entrepreneurial world and knowledge institutions.

This action addresses the weaknesses in the regional production system identified by the competent authority of RIS3. (Nano)remediation techniques are innovative environmental actions that can be implemented in the Region as research institutes already work on the sector. This action proposes the insertion of (nano)remediation sector in the upcoming review of the RIS3 and thus enhance the local policy and production system.

The update process of RIS3 is planned to start early 2020 and conclude by the end 2021. The review will follow the procedure that was conducted for the implementation of RIS3Crete, that is the innovative procedure "Entrepreneurial Discovery Process (EDP)" (concluded 2017). In the environmental sector, an Innovation Platform for the Environment

was set up including a working group on “Energy Saving and Water Cycle”, in order to reveal specializations on thematic priorities of RIS3 Crete unknown until then. Through the EDP process novel technologies for sewage remediation emerged as a priority. During the technical meetings a lot of effort was made to enhance research and business cooperation, highlighting the benefits from such a partnership. A successful campaign on RIS3 Crete led to proposals/ideas, followed by a series of technical meetings with SMEs, academic and R&I bodies. The consultation was coordinated by specialized thematic experts who helped the participants interact with each other and evaluated the ideas.

As such the (nano)remediation sector is to be introduced in the environmental sector and a relevant working group will process novel technologies. The goal is to include (nano)remediation in the priorities of RIS3 in order to generate new pilot projects.

The prime difficulty that was faced during the EDP process in the implementation phase of RIS3 was the lack of comprehension between business sector and Academic & Research institutions. This difficulty is expected to be overcome in this planned review of RIS3 by the outputs of Action 1. Networking and cooperation of the research sector with SMEs is expected to be succeeded through the digital hub, as well as improved knowledge on the sector through the remediation tool.

Background

(please describe how you came to identify this proposed Policy Improvement. Please highlight regional/national input, but also mention if you can cite any lessons learnt from the TANIA project – solutions transfer / other input)

Regional / National input, including input from TANIA Stakeholder Groups (c.1500-2000 characters)

The Region of Crete is involved in the TANIA project with a multidisciplinary stakeholder group of Public Bodies, academic and research institutes, technical advisors and local SMEs of the environmental – remediation sector. These stakeholders through the interregional and regional exchange events merged their expertise and cooperated throughout the project to identify and propose policy improvements to include the (nano)remediation sector in the Region’s policy.

The main Regional / National input from the TANIA Stakeholder Groups was the identification of the challenges encountered by comprehending the current situation on the regional (Nano)remediation sector and the needed activities to be undertaken towards the policy improvement in this subject. The needs identified were the need for funding of

(nano)remediation projects in Crete.

More specifically, a series of meetings with the competent authority of RIS3 Crete (Directorate of Development Planning) and the stakeholders of TANIA were held. The Directorate of Development Planning has agreed to the proposal of including the sector of (nano)remediation in the review of RIS3 (i.e. stakeholder meeting 22/3/2019, 07/03/2019 – 08/03/2019 bilateral exchange for examining the possibility of adaptation in the Region of Crete, the GP “Cantieri 4.0” Platform of the Tuscany Region). Regional meetings held between the Directorate of Development Planning, the Directorate of Environment & Spatial Planning and the Managing Authority of the ROP Crete (that RIS3 is subjected) regarding the feasibility of the proposed action, resulted in the first commitment for the review of the regional strategy in order to include the (nano)remediation sector(stakeholder meeting 22/5/2019).

Transfer of TANIA Solutions (c.1500-2000 characters)

NANOBOND Nanotechnologies and Advanced Materials for the remediation of environmental matrices associated to dewatering, good practice inspired the Region of Crete to address the challenge of Public Support for Research and Innovation. NANOBOND set up - although it is a technical project - was determined by a wide participation and consultation process that was launched by the regional Innovation Pole for Nanotechnologies in order to identify territorial priorities, technological solutions and strategic development sectors to be included in the regional Smart Specialization Strategy 2014-2020 (RIS3). In this manner, the Region of Crete aims to support the (nano)remediation sector by proposing the revision of RIS3 Crete.

Additionally, **NANOBOND** worked as an excellent tool for exchanging and discussing with local actors for the improvements of policy instruments and making them compatible to innovation and the environment. This practice is in line with the Regional GP **“Entrepreneurial Discovery Process for New Projects”** as a consultation methodology that was used in the previous revision of RIS3. After all, the Region has chosen the implementation of “Cantieri 4.0” (Action 1) to network local actors i.e. Research & Innovation institutes with Businesses which was the tool that on Tuscany’s case triggered the revision of RIS3 in spring 2017.

Finally, **Päijät-Häme Guidelines on sustainable risk management of contaminated soils** solution, presents conclusions on the main sustainability pillars (social, economic and environmental) based on which remediation methods are evaluated. These conclusions need to be included in the Regional Policy of Crete regarding the assessment process of project remediation measures.

Other input from TANIA project (c.1500-2000 characters)

The TANIA Exchange Events and Regional Meetings gave the opportunity to stakeholders of different Directorates of the public sector and private companies to focus on innovative (nano)remediation solutions, policy instruments and EU rules. This input has led to a change of mindset in local stakeholders and in realizing the need for a Policy Review more focused on the Sector.

Work plan within TANIA Phase 1 – ELABORATION of the Action

Activities already undertaken at interregional and regional level in Phase 1

This section summarises what inserted in the previous tab of the same name. In the present version, it is to be described what activities were carried out to elaborate the Action preparation between Semester 4 and 6.

In the description, please indicate if activities were regional or interregional.

Over the first semesters, work plan focused on the actions-development phase. The Region of Crete engaged in interregional and regional exchanges to set the scene for the region's (nano)remediation concept. Practical policy solutions were mainly identified during Semester 3.

Over Semesters 5 & 6 a series of meetings between the Directorate of Environment and Directorate of Development Planning (RIS3 competent authority) have agreed that there is a need for the (nano)remediation sector to be integrated in the upcoming revision of RIS3. Additionally, a series of meeting with the Managing Authority (MA) of ROP Crete regarding the feasibility of the proposed Actions, have resulted at a first commitment that (nano)remediation sector will be considered to be included in the update of RIS3 Crete.

Work plan within TANIA Phase 2 – IMPLEMENTATION of the Action

Please list and describe the precise activities that will be undertaken in Phase 2, in order to implement your Action Plan.

Activities planned at interregional and regional level in Phase 2 (January 2020 – December 2021)

Activity / Description	Timing (month/year or specific date where possible)
2: REVIEW OF REGIONAL RESEARCH AND INNOVATION	January 2020 - December

<p>STRATEGIES FOR SMART SPECIALISATION WITH MORE FOCUS ON (NANO)REMEDICATION</p> <p><i>The action plans the review of the Regional Research and Innovation Strategy for Smart Specialisation. The competent authority of RIS3 Crete and stakeholder of TANIA, i.e. the Directorate of Development Planning will coordinate the task.</i></p>	<p>2020</p>
<p>Task 2.1 Proposal for the inclusion of (nano)remediation in the new - revised RIS</p> <p><i>A proposal will be presented to the Managing Authority of ROP to review RIS3 in the direction of environmental (nano)remediation. The proposal will be submitted along with the TANIA action plan, presenting the current situation of the sector, relative Technology Readiness Levels (TRLs) of regional academic and research institutes, findings from TANIA projects and emerging needs for innovation in environmental remediation.</i></p> <p><i>The actions needed to be done for the drafting and finalization of the proposal (i.e. surveys, interviews, info from chambers for SMEs) will be assessed during this task.</i></p> <p><i>The proposal will be drawn by the Directorate of the Environment & Spatial Planning.</i></p>	<p>January 2020- February 2020</p>
<p>Task 2.2: Validation of the proposal by the Managing Authority</p> <p><i>The proposal will be validated by ROP Crete Managing Authority.</i></p>	<p>January 2020- March 2020</p>
<p>Task 2.3: Consultation on the formulation of the new RIS and the integration of (nano) remediation through the "Innovation Platform for the Environment and Energy"</p> <p><i>The Directorate of Development Planning will be running the Consultation on the formulation of the new RIS. The task includes consultations and all preparatory to the consultation</i></p>	<p>January 2020 – October2021</p>

actions.	
<p>Task 2.4: Organization of a Participatory Meeting on the (nano) remediation sector and the environment</p> <p><i>The Directorate of Development Planning will organise a participatory meeting to support consultation on the formulation of the new RIS.</i></p>	July 2021 – October 2021
<p>Tasks 2.5: Configuring Actions in the new RIS3</p> <p><i>Preliminary results of the Consultations will be available for the Configuration of the new RIS3. The Directorate of Development Planning will be running the task.</i></p>	August 2021 –December 2021

Gantt chart

	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
ACTIVITY 2																								
Task 2.1																								
Task 2.2																								
Task 2.3																								
Task 2.4																								
Task 2.5																								

Monitoring tools

The following monitoring tools will be used to follow the progress of the above-mentioned tasks in accordance to each tasks' expected completion date.

Timeline	Monitoring
Sem 7, 8, 9:	Meetings with the Authority responsible for RIS3 Crete (progress of the process)
Sem 10:	Organization of events (monitoring of No of businesses and R&I institutes registered)

Milestones	
ACTIVITY 2	REVIEW OF REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION INCORPORATING



	(NANO)REMEDICATION.
April 2020 (Task 2.2)	The proposal to incorporate the (nano)remedial sector on RIS3 will have been validated by ROP Crete Managing Authority
July 2021 (Task 2.3)	Consultations will be launched

Stakeholders involved

(please indicate the organisations in the region who will be involved in checking the feasibility of the policy improvement and explain their role – add as many lines as necessary)

Name of Organisation / person (where possible)	Role in Action Plan (c.200 characters)
Directorate of Development Planning / Head of the Directorate	The review of RIS3 through consultations and participatory events.
Directorate of Environment and Spatial Planning/ Head of the Directorate	The Directorate of Environment and Spatial Planning will submit the proposal on the review of RIS3 to the ROP Crete MA
Academic & Research institutes	Take part in the Consultations and Meetings Organized
Environmental and Remediation SMEs	Take part in the Consultations and Meetings Organized
ROP Crete Managing Authority	Validation of the proposal for the inclusion of (nano)remediation in the new - revised RIS3

Risk and Contingency Plans

(please describes what you see as the main potential risks related to this Policy Improvement and eventual contingency plans – add as many lines as necessary)

Description of Risk	Level of probability (High,	Description of
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	Medium, Low)	Contingency Plan
Low communication of the sector's importance that will exclude (nano) remediation from the revision of RIS3.	Medium	Activity 2 focuses on the promotion of the sector with new and pilot scaling projects
The participation of businesses in the consultation process of RIS3 is low	Medium	There will be extensive communication activities and personal contacts carefully designed to attract stakeholders and increase motivation
The participation of businesses in the participatory events of RIS is low	Medium	There will be extensive communication activities and personal contacts carefully designed to attract stakeholders and increase motivation

Costs and funding sources

Please estimate the costs related to the implementation of each action and please describe how each action will be financed, ideally through the policy instrument(s) indicated

Add as many lines as necessary

Costs	Funding Sources
2: REVIEW OF REGIONAL RESEARCH AND INNOVATION STRATEGIES FOR SMART SPECIALISATION INCORPORATING (NANO)REMEDICATION = 56,000€	ROP ERDF / In kind resources
Task 2.1 Proposal for the inclusion of (nano) remediation in the new - revised RIS = 5,000€	In kind resources
Task 2.2: Validation of the proposal by the Managing Authority = 1,000€	In kind resources
Task 2.3: Consultation on the formulation of the new RIS and the integration of (nano)	ROP ERDF / In kind resources

remediation into the environment through the "Innovation Platform for the Environment and Energy" EDP =40,000€	
Task 2.4: Organization of a Participatory Meeting on the (nano) remediation sector and the environment = 5,000€	ROP ERDF / In kind resources
Task 2.5: Configuring Actions in the new RIS3 =5,000€	ROP ERDF / In kind resources

Monitoring

Please describe the monitoring tools and indicators that you expect to use in Phase 2 to ensure that your Action Plan is implemented correctly

Self-defined Performance Indicators

This indicator were already inserted in the Application Form, but can be changed. Please confirm or modify them according to the attempted policy improvement.

If you wish to change to indicator, a justification will have to be provided to the JS.

Indicator ²	Target	Means of Verification
1. Number of business receiving support ((nano)remediation)	1	1 Indicator is proper, BUT it is unlikely that there will be time to verify it in the light of this specific action. Probably the most suitable indicators are those proposed below 2 This ROP common output indicator for Crete Region clearly defines self-performance of the action plan. Measurement: Number of (nano)remediation businesses.
2. Number of business cooperating with research institutes ((nano)remediation)	1	

² The indicator Nature and biodiversity: habitats surface receiving aid to gain better conservation status = 20 Hectares is not mentioned in the action plan. The ROP indicator focuses on Natura 2000 habitats where urban / chemical pollution is scarce and needs for the remediation of 20 hectares have not been documented. Also, pilot technologies cannot easily be applied to nature sensitive areas, as relative to nature preservation areas legislation is strict. Therefore, the proposed indicator may not be practically measured. Additionally, the timeline for the implementation of the Action Plan cannot practically produce measurable results for the habitats.

Output Indicators

(Please insert the indicators demonstrating the proceeding of the policy improvement. Note that these refer to quantifiable elements, e.g. number of meetings organised, number of stakeholders involved, number of official documents released, amount of funds influenced, etc.)

Indicator	Target	Means of Verification
Number of companies involved in the consultation	50	Entrepreneurial Discovery Process (participation lists)
Number of participatory meetings	1	Press Release Meeting agenda

Territorial Impact

(This tab is NOT mandatory, please insert a description of the effects of the AP implementation in terms of benefits for beneficiaries, policy instrument goals, territorial gains, etc., in the medium/long-term perspective)

Through this action the sector of (nano)remediation will be strengthened and promoted at the regional level. Regional policy review is expected to introduce new technologies and improve local environment. The new RIS3, as for the Crete OP ERDF 2014-2020 applies for the entire Region of Crete. The review will influence the remaining calls of the ROP and will as a consequence favour local beneficiaries of the (nano)remediation sector (ie entrepreneurs, research and innovation institutes).

Ultimately Crete will become a centre of innovation and strengthen its international position in the remediation sector, succeeding at the same time in its environmental protection goals.

Disclaimer

This action plan only reflects the author's views. The programme authorities are not liable for any use that may be made of the information contained therein.

Date: _____

Name of the organisation(s): :

REGION OF CRETE

Signatures of the relevant organisation(s):



STAVROS ARNAOUTAKIS

REGIONAL GOVERNOR OF CRETE