Use of dredged sediments for creating innovative growing media and technosols for plant nursery and soil rehabilitation «LIFE AGRISED»

PROJECT LOCATION: Italy (Pistoia and Milano) and Czech Republic (Kunovice)

BUDGET INFO:

Total amount: € 1,742,401

% EC Co-funding: 59,94 %

DURATION: Start: 01/10/2018 - End: 30/09/2021

PROJECT'S IMPLEMENTORS:

Coordinating Beneficiary: AGRIVIVAI

Associated Beneficiary(ies): EPS, GORINI, ISECNR, MCM, UNIFI

OBJECTIVES & SCOPE

The LIFE AGRISED project aims at demonstrate the suitability of remediated sediments used with no intervention or co-composted with green waste to produce innovative technosoils for reclamation of degraded land and brownfields and innovative growing media for plant nursery

Objective 1 Sediments reclaimed with a co-composting process
Objective 2 Transferability and replicability of remediated sediment use
Objective 3 Overcoming current legislative and technical reasons for the reuse of remediated sediments
Objective 4 Awareness and support plant nursery and soil sectors providing cost-effective solutions
Objective 5 Stakeholders involvement

OBJECTIVES & SCOPE

AGRISED Key words

1. MARKET
2. POLICY LINK
3. REPLICABILITY
4. ENVIRONMENT

EXPECTED RESULTS

The main result of the AGRISED project is the set up of a protocol to optimize an 'environmental friendly' commercial substrate obtained with remediated marine sediment for replacing the current peat-based substrates.
The specific technical results will be:
- the 100% evaluation of the suitability of the sediments for the nursery production of food/non food species (laurel, olive and citrus);
- the 100% evaluation of growth and commercial quality of non food crops (calla lily, protea and laurel)
- the 100% characterisation from the morphological, biochemical and sensorial point of view of 1 basil, 2 blueberry and 1 woodland strawberry cultivars grown in container on treated sediment-based substrates;
- the 100% evaluation of the suitability of food crops in relation to heavy metals and other pollutants also of organic origin;

EXPECTED RESULTS

- the 100% improvement of the knowledge on the treated sediments and their influence on plant growth and fruit quality;
- the 100% evaluation of the suitability of treated sediments to be converted into a marketable product and also face the normative and legal issues related to the use of dredged remediated sediment as substrate in agriculture;
- waste management: amount (%) of reduction of the use of peat and its substitution with treated sediments (10-20% of substitution are expected). We have considered the dredged sediment as a waste, although this specific type of waste was not listed in the Life Project Specific Indicators Excel document.
- reduction of CO2 emission (kg) due to the substitution of peat by treated sediments (expected to be about 80-90% less)
- a marketable product

EXPECTED RESULTS

- Technical Guideline
- 2 Technical training courses
- 4 project workshops
- Dissemination results (detailed in the specific presentation)

EXPECTED IMPACTS, at 3 years replication scale

Indicator		Estimated Impact	
		absolute value	%
Reduction of greenhouse gas emission (GHG)	CO_2	0,0120 tons/year	21
Reduction of dangerous substances	hydrocarbon in polluted sediments	206 kg/ year	8
Waste Management and reduction	Recycling of dredged sediments and green wastes	1780 tons / year	100
Reduced resource consumption	peat and coir based substrates	1685 tons / year	100
Sustainable land use and agriculture	Soil Surface improved	56 ha	100
Improved Nature, Species and Biodiversity	Preservation of the habitat of the peat bogs	0,294ha	100
Market uptake	Jobs created (direct/indirect)	300	16
	N. of replication/transfer	13	
	Expected revenues	€ 128,850	15
Communication	Number of individuals reached	200,000	100
Awarness activities	Technical informative course	16	100
	Workshop	11	100
	Manual	5	100

POLICY IMPLICATIONS

1) LIFE Thematic priorities for Resource Efficiency: the circular economy that AGRISED proposes eliminates the problem of polluted sediment management transforming it into a valuable technosol through the co-composting with pruning residues.

2) EU Thematic Strategy for Soil Protection

3) EU Water Framework Directive (2000/60/CE) which faces the problem of community policies about sediment management

4) EU Biodiversity Strategy to 2020 and on Habitat Directive (92/43/EEC)

5) EU Strategy on Adaptation to Climate Change by increasing the resilience of soil ecosystem.

CONTINUATION (REPLICATION, TRANSFER, MARKET UPTAKE)

Application of LIFE AGRISED in Italy and Czech Republic will confirm that this model is transferable and replicable

1) sediments as economic resource: a unit cost savings of 30-40 €/m3 will be surely obtained, that corresponds to a 40-57% saving compared to landfilling disposal
2) a 10% substitution of peat and coir based products market, thanks to the diffusion of LIFE AGRISED growing media
3) monitoring of the soils and the plant nursery amended or created during the project
4) technical assistance to technicians and practitioners
5) replication in other European sites
6) training courses , workshops and LIFE AGRISED guidelines
7) project website, articles and dissemination material
8) network with H2020 and LIFE projects
9) search of funds for further implementation

TIMETABLE

Action		2018				2019				2020				2021			
Action numbe	Name of the action	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A. Preparatory actions (if needed)																	
A.1	Review of the EU and national regulations on the use of sediments for plant nursery and soil rehabilitation and of the analytical protocols				■												
B. Implementation actions (obligatory)																	
B.1	Analysis and characterization of dredged sediments and green waste				■	■											
B.2	Sediment and green waste co-composting and analysis of the process						■	■									
B.3	Use of composted sediments as a substrate for plant nursing								■	■	■	■	■	■			
B.4	Use of dredged sediments and composted sediments as components for preparing reconstituted soils						■	■	■	■	■	■	■	■			
B.5	Training courses, workshops and guidelines for project replicability and transferability												■	■	■	■	
B.6	AGRISED Business Plan													■	■	■	
C. Monitoring of the impact of the project actions (obligatory)																	
C.1	Monitoring and validation of composted sediments					■	■										
C.2	Monitoring and validation composted sediments as growing media for professional plant nursery									■	■	■	■	■	■		
C.3	Monitoring and validation of dewatered and composted sediments for soil reconstitution							■	■	■	■	■	■	■	■		
C.4	Monitoring of socio-economic impact of the project and LCA												■	■	■	■	
C.5	Performance indicators monitoring									■				■		■	

ACTIONS

ACTION A.1

Review of the EU and national regulations on the use of sediments for plant nursery and soil rehabilitation and of the analytical protocols
AGRIVIVAI, ISECNR and UNIFI

A1.1 - A review of the EU and Italian and Czech Republic regulations/laws regarding the transport and use of dredged sediment based substrates for plant nursery and soil rehabilitation being in force at the date of the project beginning;

A1.2 - An update (if advisable, and in relation to the findings of the previous task) of the list of the analysis to be performed on substrates. soil and products.

A1.3 - Defining a common protocol for the analysis (sampling, extraction, quali- and quantification, etc.).

ACTIONS

ACTION A.1

Review of the EU and national regulations on the use of sediments for plant nursery and of the analytical protocols AGRIVIVAI, ISECNR and UNIFI

The A.1 Expected results are:

- starting AGRISED project based on the existing regulations and with the operational and useful toolkits for all partners,

Deliverable

Overview of national and EU legislation	A 1	31/12/2018

ACTIONS

ACTION B.1

Analysis and characterization of dredged sediments and green waste

ISECNR and all partners

ISECNR will analyze the sediments dredged by Navicelli canal from a physical, chemical, and biochemical point of view, prior to its use as component of the reconstituted soils and optimize the co-composting process. ISECNR will determine the sediment texture, pH and electrical conductivity values, concentrations of C, H, N, S, heavy metals and organic pollutants. UniFi will perform eco-toxicological tests for assessing the phytotoxicity, zootoxicity, algal toxicity and microbial toxicity.

Full agronomical characterization of the dredged sediments and of the various materials to be used in the soil reconstitution process (m.c.m. Ecosistemi)

ACTIONS

ACTION B.1

Analysis and characterization of dredged sediments and green waste

ISECNR and all partners

Expected results:

- management of 20 m3 of river sediments dredged by the Navicelli S.P.A.
- collection of green waste
- chemical, physical, biological characterization of dredged and dewatered sediments
- characterization of the technical properties of the materials used for the soil reconstitution process
- Definition of the technical specifications of the co-composting process to be performed on the sediments

Deliverable

Report and on green waste and sediment characterization	B 1	31/03/2019

ACTIONS

ACTION C.1

Monitoring and validation of composted sediments
ISECNR and UNIFI

The CNR-ISE and UniFi beneficiaries will analyze the treated sediments from a physical, chemical and biochemical point of view. The sediment samples will be also collected and sent to the UniFi beneficiary for eco-toxicological and microbiological analyses.

Expected results

- Monitoring of the composting process
- Sediment-based growing media preparation
- Validation of reclaimed sediment

Deliverable

Report on analysis and full characterization of treated sediments	C 1	30/06/2019

ACTIONS

ACTION B.2

Sediment and green waste co-composting and analysis of the process

UNIFI

Expected results:

- treatment of 10 m3 of dredged river sediments;
- optimal compost maturation
- suitable compos properties achieved

ACTIONS

ACTION B.3

Use of composted sediments as a substrate for plant nursing AGRIVIVAI and EPS

Expected results:

- Two important ornamental plant species grown in nursery farms under real market conditions
- Definition of the hydraulic characteristics, physical, chemical and biological fertility of the sediment-based growing media and reconstituted soil
- production of laurustinus and Fraser photinia in container using composted sediments
- production of laurustinus and Fraser photinia in lysimeters using reconstituted soil

ACTIONS

ACTION B.4

Use of dredged sediments and composted sediments as components for preparing reconstituted soils

MCM

Expected results:

- Analysis of the degraded soil and sediments completed
- Soil reconstitution started
- Demonstration trials in pot and lysimeters completed
- Analysis of reconstituted soils completed

ACTIONS

ACTION B.5

Training courses, workshops and guidelines for project replicability and transferability

AGRIVIVAI and all the partners

Expected results:

- 2 Technical training courses
- 4 project workshops
- Technical Guidelines

ACTION B.6

AGRISED Business Plan

AGRIVIVAI and all the partners

Expected results:

- AGRISED Business Plan

ACTIONS

ACTION C.2

Monitoring and validation composted sediments as growing media for professional plant nursery

AGRIVIVAI, UNIFI and EPS

Expected results:

- Evaluation of the technical performance of sediment-based growing media for optimal plant growth
- Assessing the optimal proportion of sediment:green waste ratio for various ornamental plants
- Validation of the use of composted sediments for professional plant nursing

ACTIONS

ACTION C.3

Monitoring and validation of dewatered and composted sediments for soil reconstitution

MCM, UNIFI and ISECNR

Expected results:

- Definition of the optimal dose of bulked sediments and composted sediment ratio for soil reconsitution
- Validation of the use of bulked sediments and composted sediments for soil reconstitution

ACTIONS

ACTION C.4

Monitoring of socio-economic impact of the project and LCA

AGRIVIVAI and all the partners

Expected results:

- socio-economic impact of the project
- LCA document with the elaboration and analysis of project data in terms of technical and environmental impact of the project process

ACTIONS

ACTION C.5
Performance indicators monitoring
AGRIVIVAI and all the partners

This monitoring activities consists of measuring the efficiency of the performance indicators defined in the attached AGRISED project specific indicators excel document, in order to fulfil the environmental and social viability of the AGRISED process.

The group of indicators will be revised in each of the projects coordination meetings in order to check any irregularities.

Subaction C.5.1 KPI Webtool

All partners will monitor and measure during all the project duration the AGRISED performance indicators in order to support the coordinating beneficiary AGRIVIVAI in updating and reporting the KPI Webtool upon throughout the project implementation.