

Enhancement of second materials arising from forest biomass pyrolysis processes in the context of a local supply chain

Riferimenti

Tipo di progetto

Gruppo Operativo

Acronimo

LIGURCHAR

Tematica

Gestione dei sottoprodotti agricoli

Objectives

Promote the development of forest supply chains for energy use of pyrogasification biomass plants and at the same time promote the conditions for the use of secondary materials deriving from these plants (Biochar from forest biomass as fertilizer), favoring the meeting between the production system and potential users (farmers and local forestry companies), contributing also to carbon sequestration and the reduction of greenhouse gases

Information

Time frame

2021 - 2022

Durata

18 months

Partners (no.)

9

Regione

Liguria

Comparto

Forestale

Localizzazione

ITC33 - Genova

Costo totale

€99.180,80

Fonte di finanziamento principale

Programma di sviluppo rurale

Programma di sviluppo rurale

2014IT06RDRP006: Italy - Rural Development

Programme (Regional) - Liguria

Parole chiave

Climate and climate change

Farming/forestry competitiveness and diversification

Fertilisation and nutrients management

Soil management / functionality

Water management

Waste, by-products and residues management

Energy management

Forestry

Sito web

<http://www.ligurchar.it>

Valorizzazione di materie seconde derivanti da processi di pirolisi di biomasse forestali in contesto di filiera locale

2/6

<https://www.innovarurale.it/pei-agri/gruppi-operativi/bancadati-go-pei/valorizzazione-di-materie-seconde-derivanti-da-processi>

Project status
ongoing

Partenariato

Role	Azienda	Address	Telephone	E-mail
Leader	Lupa Società Agricola S.R.L.	Via Ilva 4/2 16128 GENOVA GE Italy		lupa984@gmail.it
Partner	Lupa Società Semplice Agricola	Via Ilva 4/2 16128 GENOVA GE Italy		giovanni.pattarini90@gmail.com
Partner	CNR - Istituto per la BioEconomia - IBE	VIA MADONNA DEL PIANO 10 50019 SESTO FIORENTINO FI Italy	0553033711	francesca.martelli@cnr.it
Partner	ICHAR - Associazione Italiana Biochar	VIA BORGO SAN LORENZO 26 50125 FIRENZE FI Italy	0553033711	segreteria@ichar.org
Partner	Opera diocesana madonna dei bambini - villaggio del ragazzo	PIAZZA N. S. DELL'ORTO 7 16043 CHIAVARI GE Italy	0185375024	villaggio@villaggio.org
Partner	Verderam di Valerio Sanguineti	CORSO GENOVA 83/29 16033 LAVAGNA GE Italy		info@verderam.com
Partner	Marubbio Aldo	LOCALITA' PARETO 7/A 16049 SANTO STEFANO D'AVETO GE Italy		aldo_mar@hotmail.it
Partner	Azienda agricola Tomato de Ma' di Armenante Pietro	VIA PONTE DELLA MADDALENA 16033 LAVAGNA GE Italy		pietro91armenante@gmail.com

Role	Azienda	Address	Telephone	E-mail
Partner	Azienda agricola Fenocchietto Danilo	VIA DON MICHELE CORDEVIOLA 37 16030 COGORNO GE Italy		danilo.fenocchietto@libero.it

Pratiche abstract

Description

STUDY LOCAL FOREST COMPREHENSORY FOR THE SUPPLY OF BIOMASS FOR PYROGASIFICATION PLANTS AND FOR THE PRODUCTION OF BIOCHAR - In the Ligurian forestry chains, low-quality wood has no possibility of economic locations; its use as forest biomass for energy purposes is a point of innovation in Liguria, for an economic enhancement of these productions, with a replicable model.

The timber procurement plan for the cogeneration plant, based on a local supply chain in the Sturla and Aveto Valleys, will require timely operational phases and consequent documents:

- precise definition of the area;
- individuation. forest types, structures, forms of government, indicative commissions, current status, etc.
- definition of the land regime (public, private, collective ownership)
- identification of the territorial structure and infrastructures (accessibility, practicability, morphology, etc.)
- organization of local forestry and primary processing companies
- assessment of the availability of biomass and wood, with identification of the retractable assortments
- verification of the potential for effective withdrawal of the wood mass and evaluation of retractable assortments
- evaluation of silvicultural management techniques and intervention systems
- subdivision of the territory into homogeneous subdivision units and sized for the regular supply of biomass
- drafting of the plan of silvicultural interventions for biomass withdrawal
- drafting of a plan of the infrastructural interventions necessary for silvicultural operations, according to the logging and biomass transport techniques

Description

"METHOD OF ORGANIZATION OF THE FOREST SUPPLY CHAIN FOR PYROGASIFICATION PLANTS - The process of supplying wood to the pyrogasification plant must go through the establishment of a local supply chain process with specific qualitative and quantitative characteristics, in which they must be involved, with the coordination and organization of the lead company, the actors operating in the forestry sector and / or the entities and private individuals who own forest areas.

For the purposes of innovation planning, the following activities must be carried out:

- Initial activities of presentation and sharing of the project to local stakeholders, with the aim of creating local animation processes
- activation of agreements (memoranda of understanding, conventions) with public bodies, to be formalized eg. with Conventions aimed at the maintenance of wooded areas along the roads and waterways
- activation of agreements with public bodies that own forest areas, for the planning of timber harvesting interventions, also in execution of level III planning tools (forest management and settlement plans)
- involvement of private owners through the stipulation of contracts for the purchase of timber, which can be programmed over time
- search for any forestry companies operating on the territory of the supply chain, with the creation of partnerships for the entire procurement process, and / or parts of it (transport, logging, infrastructure construction)
- creation of a technical structure to support supply chain processes and their planning and organization, in order to create supply continuity

Description

"CHARACTERIZATION OF THE BIOCHAR and PRODUCTION SITES FOR THE PURPOSE OF REGISTRATION IN THE "" REGISTER OF MANUFACTURERS OF FERTILIZERS "" and REGISTRATION OF THE PRODUCT IN THE "" FERTILIZERS AND AMENDANTS REGISTER ""- Pursuant to Legislative Decree 75/2010, the procedure for The recognition and registration in the register of fertilizers of the manufacturers, and the registration of the product in the Register of Fertilizers and Amenders "" ". It requires administrative obligations of the manufacturer, as a producer of fertilizers and on the product. This process is innovative, for biochar as a fertilizer product, in the Liguria Region, it must be carried out with specific tests and analyzes on biochar and the verification of compliance with all the elements currently required by the legislation on fertilizers.

The chemical and physical values of biochar are dependent on the pyrolysis process with an effect on its value in agronomic terms or carbon sequestration. Both the process (pyrolysis or gasification) and its parameters (temperature) are important in determining the properties of the product: as the pyrolysis temperature increases, the yield of the solid product (biochar) decreases and the production of syngas for energy increases. .

The Biochar Analysis to be carried out, with repetitions, (Legislative Decree 75/10 - annex 2).

Chemical-biological parameters

- C tot biological origin, Salinity (electrical conductivity) mS / m, pH (H₂O), Humidity%, Ash%, H / C (molar) ≤ 0.7
- Phytotoxicity test, Contaminants (Pb, Cd Ni, Zn, Cu, Hg, Cr); PAH mg / kg
- PCB mg / kg ss and Dioxin ng / kg
- Particle size% s.s., N tot% ss; Ktot% ss; Ptot% ss

The biochar will also be evaluated on Reg UE 1009/2019 (effective from 07/22)."

Description

"EVALUATION TESTS OF THE AMMENDING AND FERTILIZING EFFECT OF BIOCHAR IN THE LIGURIAN HORTICULTURAL CONTEXT - The effectiveness and problems of using a fertilizing product in the field (in the specific case of biochar, an innovative activity for the Liguria Region) must also be studied directly in field, in order to evaluate both the positive and possibly negative effects, which can condition its use and obviate this with modifications of the formulations or modifications to the production techniques of biochar.

It is therefore necessary that the biochar is evaluated in its effectiveness against the most common crops of the territory to which it can be adapted as a product, also in relation to the times imposed by the call for the conclusion of the project activities:

Horticultural sector: evaluation tests of the efficacy of biochar fertilizer from forest biomasses with the creation of randomized and repeated test / demonstration fields in batches, according to the following expected application scheme:

- Comparison (normal conduction)
- Biochar application
- Biochar + compost application
- Application of biochar (+ compost) and reduction of normal fertilizer inputs
- Application of activated biochar with natural antagonists of soil pathogenic fungi
- Application of activated biochar with natural antagonists of soil pathogenic nematodes

Tests will be carried out both during the 2021 and 2022 production seasons, also evaluating the residual effects of biochar on successive crops

We will determine the vegetative-productive-phytoiatric results and the potential savings in terms of fertilizer and water resources, in addition to the effects on the soil"

Description

"EVALUATION TESTS OF THE AMENDING AND FERTILIZING EFFECT OF BIOCHAR IN OLIVE GROWING AND LIGURIAN FOREST CONTEXT - The effectiveness and problems of using a fertilizer product in the field (specifically biochar, an innovative activity for the Liguria Region) must also be tested in the field , in order to evaluate both the positive and negative effects and the conditions of optimal application, according to the conditions in use and to remedy this by modifying the formulations or variations in the production techniques.

It is necessary that the biochar is evaluated in its effectiveness on the most common crops of the territory to which it can be adapted, also in relation to the time limits imposed by the call for the conclusion of the project. In the olive and forest sector (degraded soils), therefore, application tests of the biochar fertilizer from forest biomass will be carried out to evaluate both the nutritional effects, but in particular soil improvers, such as effects of physical and biological improvement of the soil.

Olive and forestry sector evaluation tests of the efficacy of biochar fertilizer from forest biomass with randomized and repeated test / demonstration fields, according to the following application scheme:

- Comparison (normal conduction)
- Biochar application
- Biochar + compost application
- Application of biochar (+ compost) and reduction of normal fertilizer inputs (olive tree)

Tests will be carried out in 2021, with evaluation of the residual effects of biochar until the end of the project, determining the vegetative-productive-phytoiatric results and potential savings in terms of fertilizer and water resources, in addition to the effects on the soil"

Description

EVALUATION TESTS OF THE AMENDING AND FERTILIZING EFFECTS OF BIOCHAR IN THE NURSERY PRODUCTION OF PLANTS IN JARS (BASIL) - For the biochar from forest biomass, the application process to MiPAAF (Dec.18) for the expansion of use, as component of cultivation substrates (Legislative Decree 75/10 - Annex 4). That of pot cultivation (seedlings, flowers, nursery), of technical lands (use on ornamental greenery and restoration), as well as for substrates for roofs green is a sector of high interest for biochar, due to its characteristics (stability, high porosity, water retention and lightness), but it can also have negative effects, in particular the salinity index. It replaces components of substrates such as peat, avoiding the reduction of impacts in the use of natural resources, also coming from sensitive habitats (peat bogs).

Tests of efficacy of biochar fertilizer from forest biomass through comparative evaluation of substrates and water modulation, with contribution of biochar in the production of basil seedlings in greenhouses:

- Comparison (normal substrate)
- Substrate with biochar
- Substrate with biochar + compost (and possible reduction of fertilization)
- Substrate with biochar activated with natural pathogen antagonists

Tests will be carried out both during the 2021 production season and in 2022, with possible modifications of the substrate formulations according to the results of the previous year's tests.

We will determine the vegetative-productive-phytoiatric results and the potential savings in terms of fertilizer and water resources, as well as the possibilities of using biochar in cultivation substrates.

Description

CARBON BALANCE - Climate warming is unequivocal, as is evident from the increase in global average atmospheric and ocean temperatures, the contraction of glaciers and sea level rise. The atmospheric concentrations of CO₂, CH₄, N₂O have increased due to human activity from pre-industrial data (19th century). The report Good Practice Guidance for Land Use, Land Use Change and Forestry (Lulucf), of the IPCC (Intergovernmental Panel on Climate Change) already in 2003 sees agriculture as a means of action of mitigation and adaptation to climate change, and in particular, it highlights the practices of fixing C in the soil, which is a dynamic reserve of C (carbon sink) capable of retaining considerable quantities of C in organic form (> 1500 Gt, 3 times higher than in the atmosphere). In agricultural soils the stock of C_{Org} is now lower than the potential capacity, due to the management of soils in industrial agriculture (average loss between 30 and 40 t / ha of C) . Hence the potential role of agriculture in soil management and increase of the C stock in them, also functional to the mitigation of climate change.

The use of fertilizer biochar in soils can therefore contribute to the increase of the C stock in soils and therefore to mitigate climate change.

During the project, the Carbon Balance due to the fertilizer biochar applications will be evaluated, with precise sampling of the soil, repeated several times, in the various test environments. The "Carbon Stock" will then be determined, calculating how much the carbon contained in the biochar can increase the C_{Org} stored in the soil, also intended as a

fraction of stable Carbon present (C stable for more than 100 years)

Description

"WATER FOOTPRINT - The uses of biochar fertilizer from forest biomass show potential improvements on agricultural and forest soils, with marked effects on the physical and biological characteristics of the soils and on crops. Thanks to the high porosity of the biochar, the corrected soil increases water retention, thanks to a greater quantity of water available for plants (both in absolute quantity and temporal), reduces the harmful effects of drought on dry crops (especially on olive trees as it is in Liguria, as well as for the recovery of forest land or natural), and decreases water and irrigation needs (eg on vegetable crops or in nursery production), with the possibility of reducing the inputs per irrigation shift or extending the intervals between watering shifts. Biochar, due to its high properties adsorbents, it also helps to contain the leaching of nutrients, keeping them available for crops, and together, given that the irrigation and fertilization systems contribute to the costs for about 30% of the energy needed for production, biochar also allows savings in emissions. Further advantages are given by the contribution that the contribution of biochar determines on the reduction of the water saturation conditions of the soils, with the negative consequences it determines (radical asphyxiation and increase in pathologies, difficult soil workability, etc.).

During the tests and demonstrations, the Water Balance due to the fertilizer biochar applications will be evaluated, with punctual soil sampling, repeated several times, in the test environments, determining, through analyzes and pedofuctions, the effects on the water reserve of the soils."

Link utili

Titolo/Descrizione	Url	Tipologia
Sito web del progetto	http://www.ligurchar.it	Sito web