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1. SPECIFIC SITE ELEMENTS

1.1 SITE FRAMING

1. Project Code	23-130
2. Location of the Intervention:	Nation: ITALY Region: CALABRIA City and Province: VIBO VALENTIA – VIBO VALENTIA Street address and number: LOC. NOFRO Cadastral data – VIBO VALENTIA – F 8 – P 61-62-137-139 Geo-located location: 38° 38’ 52,566”N 16° 7’ 59,342”E
3. Useful surface area of the project (Ha,00):	1,00
4. Possible expansion area of the project (Ha,00):	0,00

1.2 PROPERTY AND RIGHTS

5. Responsible for site management (Conductor)	Last name and first name: Piperno Michele

6. Does the Conductor also own the land?	☒ YES - ☐ NO

7. Land ownership title	See **Annex 01** “Cultivation Contract”

8. In case the Conductor is NOT also the owner of the land, indicate the title for the use of the land subject to the intervention.	**See Annex 04** All.Q 8.1-1 "Communication and involvement of interested parties”

9. Will the Project Developer also be the Owner of the future Carbon Credit title that will be created?	☒ YES - ☐ NO

10. If NO to the previous question, indicate who will be the Owner of the Carbon Credits that will be created.	Company Name: CF/VAT: Registered office: Phone: Email:

11. Document evidencing the right to the carbon offset certificate created by the Project	Contract of cultivation and delivery of products from plantations made with selected giant bamboo mother plants “ONLYMOSO” between BambooPro Srl and “Michele Piperno” Undersigned on 25/05/2022 **(Annex 01)**

12. Conductor's Rules	The Conductor signs the Cultivation Contract which contains references to the DAF (**see Annex 01).**

13. Developer's Rules	Bamboopro subscribes to the following rules as a reference for the development and management of the project and communications with the Registry: • UNI/PdR 156:2024 (**Annex 03a**); • Formalized Agronomic Specification (DAF) (**Annex 03b**); • All.Q 8.1-1 FC Project management (**Annex 03c**); • Pro.Q 8.1 Project Approval Management (**Annex 03d**); • Ist.Q 8.1-1 Project application filling rules (**Annex 03e**); • All.Q 8.1-4 Monitoring Plan-Report (**Annex 12bis).**

1.3 STAKEHOLDER INVOLVEMENT AND CONSULTATION

14. Identification of stakeholders

The Site is 1 hectare in size, is located in an agricultural context, and the intervention, a tree crop, is neither new nor different from the usual and customary use of the site and surrounding areas. The site is not located in areas with special alleys or protections (see Sec. 2.2 point 23 below), but lies on an area of agricultural use.
The area of influence of the Project Intervention is therefore considered by evaluating the following aspects:

- visual impact: indifferent compared to the destination of the site (agricultural);
- legal distances from boundaries: cultivation is maintained at a distance of 3 meters from the boundary with third-party land, legal distance provided for tall trees;
- dust and noise emission from processing: the cultivation of bamboo involves minimal agricultural activities of only plant/weed management, much less than annual crops (in which the land is tilled several times each year), therefore there will be a reduction in dust and noise emissions.

Use of resources:

- irrigation water use: not different from or less than other tree or arable crops (e.g. orchard, corn, soybean);
- fertilizer use: equal to or less than other tree or arable crops;
- pesticide use: no phytosanitary treatments are carried out as bamboo does not suffer from fungal diseases or pest attacks.

The perimeter of the crop itself is therefore considered as the area of influence of the intervention.

That said, it is considered that the Parties involved in the project activities consist of the Conductor alone.

There are no obstacles in involving the stakeholders identified as being part of the local community, of working age, and without relevant language or cultural barriers.

15. Communication, consultation and involvement activities

People involved are:
Mr. Michele Piperno – Conductor of the crop.

At the time of the start of the Project, on 25/05/2022 a meeting was held between the Conductor and Mr Antonino Iaropoli (technician consultant see point 1.4) to provide explanations and details of the bamboo plantation intervention and to sign the Cultivation and Delivery Contract.
The document Attachment All.Q 8.1-1 "Communication and involvement of interested parties" (**Annex 04**) was recently sent by email which covers the following topics:

- Activities of the intervention including technical/agronomic aspects;
- expected environmental benefits;
- expected risks/disadvantages;
- Compliance with the "No net harm" principle
- Regulatory compliance of the Intervention and the Project;
- environmental compatibility;
- Use of non-renewable resources (e.g., fossil fuels);
- Use of natural resources (e.g., water);
- use of chemicals substances (e.g., treatments);
- on-site validation/verification processes.

The Conductor replied that he understood the document and had no suggestions or proposals.

Opinions, suggestions, observations provided:
Mr. Michele Piperno considers theyselves interested in the environmental issues and the possibility of finally adequate economic revenue for a crop. Other than that, he did not make any observations or doubts about the arguments discussed (**Annex 04**).

16. Actions taken following the consultation

No action had to be taken as there were no suggestions.

17. Complaint management

The methods of communication and reporting to the Project have been defined and communicated to the Parties concerned through the delivery of the document All.Q 8.1-2 "Conductor's Rules," also in relation to the handling of Complaints.

18. Public consultation

This section will be updated after the 30-day public consultation phase.

2. INTERVENTION

2.1 SITUATION PRIOR TO INTERVENTION

19. Baseline scenario

The Intervention site is an agricultural field currently used to grow annual crops for food, human or livestock production, or biomass.
The context in which it is set is the same, therefore an areable/arboreal area of agricultural economy.
The current land management implemented by farmers in the area is a traditional methodology, therefore with plowing activities and subsequent refinement steps and mechanical and chemical weeding, as well as phytosanitary treatments.
Continuous tillage, which both conventional and organic agriculture has in common, is the recognized cause of organic matter depletion in soils and subsequent sterilization, reduced biodiversity, erosion, water and groundwater pollution, flooding and hydrogeological disruption, and greenhouse gas emissions.
Soil compaction: Tillage determines the fragmentation of the macro-aggregate structure of soil compounds, the overturning of the stratigraphy by bringing deep layers to the surface, and the disruption of the porous structure, all elements that lead to soil compaction, which makes it more difficult for water and plant roots to penetrate the soil, impairing its ability to absorb water and nutrients.
Erosion and runoff: Soil compaction increases the risk of soil erosion and runoff. When the soil is compacted, it becomes more difficult for water to penetrate the soil and the ability to retain moisture is lost. As a result, during heavy rains, water may run off the soil surface instead of infiltrating, carrying away fertile soil and organic matter. This phenomenon causes soil erosion and nutrient leaching, further compromising soil fertility.
Loss of biodiversity: with tillage, natural habitats in the soil are disturbed and destroyed. This includes soil microorganisms, small invertebrates (among them earthworms) and other organisms living in the surface layers of the soil.
Hydrogeological disruption and flooding: tillage causes the loss of soil structure, with consequent compaction, and the removal of vegetation cover compromises the stability and ability of the soil to absorb and retain rainwater resulting in the creation of torrential forms of runoff which cause erosion of the land and bring enormous quantities of water into the river courses causing sudden and devastating floods.
Water pollution: with tillage and subsequent compaction, the water-soluble component (e.g., chemicals and fertilizers) and lighter particles are eroded, washed out and leached, contaminating surface and deep water resources causing water quality problems.
Greenhouse gas emissions: with soil tillage, organic matter is brought to the surface and in contact with atmospheric oxygen. This process accelerates the oxidation of organic matter and leads to an alteration of the soil's natural carbon and nitrogen cycle, resulting in the release of greenhouse gases such as carbon dioxide (CO_2) and nitrous oxide (N2O). In addition, tillage requires the use of mechanical combustion vehicles which cause the emission of CO_2 .
Reduction of the organic component (humus): in tillage, organic matter in the soil is exposed to atmospheric oxygen. This increase in oxygen accelerates the decomposition process of organic matter, thus reducing the amount of organic material available for humus formation and subsequent mineralization and sterilization of the soil.
Increased use of chemical fertilizers: tillage depletes natural soil resources, such as soil fertility, making it necessary to apply synthetic chemical

fertilizers to maintain agricultural productivity.

There is nothing to suggest that in the medium term there may be a change in approach to agriculture with epoch-making changes, such as the transition to conservative agriculture, without tillage, which requires large investments in different equipment and dubious agronomic and short-term economic issues, resulting in the creation of a strong psychological-cultural barrier.

Agricultural greenhouse gas (GHG) emissions (CO_2, CH4 and N2O) contribute about 12 % of the total anthropogenic GHG (Linquist et al. 2011), second only to the energy sector (ISPRA, 2018).

The contribution of the cereal sector represents about one-third of total emissions from the agricultural sector (ISPRA, 2018) mainly related to fertilizer use and soil tillage (Oertel et al., 2016).

From the above, the importance of the environmental impact on CO_2 emissions from the agricultural sector is clear, both in terms of intensity and breadth of the phenomenon.

The carbon baseline for conventional arable crops, is certainly negative, due to the intensity of tillage and extensive use of nitrogen fertilizers, which the literature indicates for a cereal crop between 0,43 and 0,93 ton/CO_2/hectare, and for a corn crop between 0,87 and 1,95 ton/CO_2/hectare (Linquist et al., 2012).

That said, the value calculated as follows is considered as the baseline:
(0,43+0,93)/2 = 0,68 ton/CO_2/ha (average CO_2 emissions among the least impactful arable crops);
(0,87+1,95)/2 = 1,41 ton/CO_2/hectare (average CO_2 emissions among the most impactful arable crops);
averaging the two figures
(0,68+1,41)/2 = 1,1 ton/CO_2/hectare/year - baseline value of CO_2 emission of existing crops in the project reference area

20. General description of the context of the intervention site

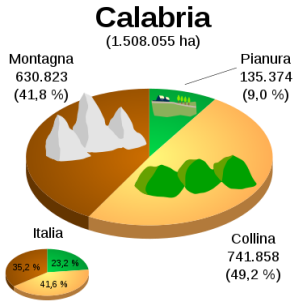
CALABRIA REGION

The Calabria Region is an Italian region with ordinary statute in southern Italy of 1.835.294 inhabitants, with Catanzaro as its capital . The only regional border is located to the north, with Basilicata , to the south-west the Strait of Messina , separates it from Sicily , and is bathed to the east by the Ionian Sea and to the west by the Tyrrhenian Sea.

General information

Calabria, the tip of the *Italian boot* , is made up of a peninsula jutting out into the Mediterranean . For this reason, the region has a coastal development of 788.92 km , along which rocky stretches, headlands, cliffs and sandy coasts alternate.

The Calabrian territory is largely occupied by mountain ranges (Pollino , Sila , Catena Costiera , Serre and Aspromonte), which constitute the central backbone of the region. Therefore, only a small part of the regional surface is occupied by plains;



Climate

The Calabrian climate is Mediterranean . The Ionian coast is drier and arid than the Tyrrhenian one, which has a milder climate. Generally, temperatures along the coasts never drop below 10°C and never rise above 40°C, with peaks of 42-44°C in the summer months. Along the Apennines and in the internal areas, from Pollino , to Sila up to Aspromonte , the climate is Apennine mountain (cold continental) with cold and snowy winters, summer is warm and there is no shortage of thunderstorms. Worth noting is the interesting daily temperature range in winter in the Crati valley , where heavy snowfall can occur even at low altitudes.

Economy

Calabria is one of the poorest Italian regions, despite the high rate of hidden economy making the actual wealth of the Region unquantifiable. The presence of one of the main criminal organizations, the remoteness of the markets and the chronic lack of infrastructure makes the Calabrian economic fabric considerably fragile and too tied to economic variations in the economic situation.

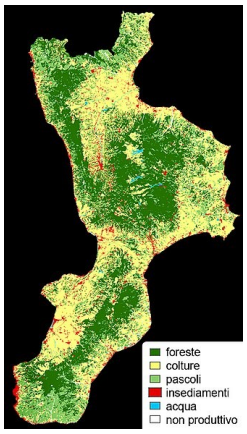
Various areas of the region base much of their economy on summer tourism, especially along the Ionian coast of Catanzaro, in the Tyrrhenian area of Reggio and in the Tyrrhenian area of Cosenza, on the entire coastal side of

the province of Vibo Valentia. Winter tourism in Sila is fairly well developed, despite its potential.

Economical macro-sector

In the primary sector, agriculture is developed above all in the cultivation of olive trees, vines and citrus fruits .

Calabria produces about a quarter of the national citrus fruit production; in particular, around 62% of the total production of clementines is concentrated in the region , and almost all of the production of bergamot and cedar (98% of the total).



The tertiary sector is highly developed in Catanzaro , while Lamezia Terme and Cosenza are important shopping centers . The main Calabrian tourist resource is the sea, with a coastline of 780 kilometers overlooking the Tyrrhenian , Ionian and Strait of Messina seas . The limited industrial development and the absence of large cities in most of the territory have allowed the maritime environment to be preserved in many cases.

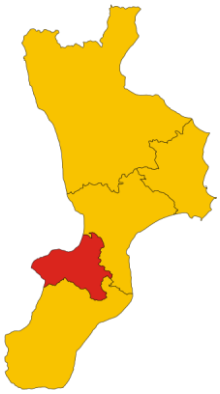
Environment

The different climatic conditions of the region also favor different vegetation from area to area. From sea level up to 600 meters the Mediterranean scrub predominates with olive trees , holm oaks and other plants typical of the Mediterranean climate. From 700 meters up to 1000 meters (level of the low Apennine mountains), however, transitional vegetation grows: chestnut trees and other oaks dominate. From 1000 meters upwards (mountain level), the species typical of the mountain climate dominate, consisting of beech , silver fir and laricio pine.

Province of Vibo Valentia (VV)

The province of Vibo Valentia is an Italian province of Calabria with 150,066 inhabitants. It covers an area of 1,139 km² and includes 50 municipalities.

Overlooking the Tyrrhenian Sea to the west, it borders the province of Catanzaro to the north-east and the metropolitan city of Reggio Calabria to the south-east.



Territory

The territory of the province of Vibo Valentia extends from the Tyrrhenian Sea to the Serre mountains. The physical-orographic system of the coastal territory is made up of terraces, located at different altitudes, where small local settlement systems are located, of a distinctly rural character, and slopes steeply sloping towards the sea.
Climate
The climate of the Province of Vibo Valentia presents heterogeneous characteristics. Along the coasts you have a Mediterranean climate. Winter in this area is very mild. Summers are very hot and sunny. The average annual temperature in this area is 17-18 °C. From 150 m above sea level to 600 m there is a Tyrrhenian Mediterranean climate with a slightly more evident continentality compared to the coastal strip. Winter is not very cold and very rainy. Temperatures can reach freezing and even drop below with the arrival of cold spells. Snow is a very rare event up to 400 meters. Summer is hot and dry. In this second band there is an average annual temperature between 13-16 °C. From 600 to 1000 meters you have a Apennine type climate. Winter is relatively cold and there are often frosts at night. There is an average of two or three snow events per year, which can also be very significant. Summer is hot, with temperatures almost never above 30°C. The average annual temperature of this third band is between 12-10 °C. Finally, from 1000 meters up to the summit areas there is an Apennine mountain type climate with cold, humid, rainy and snowy winters. Summer is cool.The average annual temperature in this area is around 8 °C.

Municipality of Vibo Valentia (VV)

Vibo Valentia is an Italian municipality of 31,003 inhabitants ,capital of the province of the same name in Calabria. The town hall stands in 476 m above sea level but the municipality reaches 567 meters above sea level in the highest part and is located above sea level in the Marina area.

21. Specific description of the site area in terms of ecosystem and environment before the intervention

The site subject to intervention is agricultural land, previously used for arable agricultural purposes.
The bordering areas are always agricultural land used for arable or arboreal crops.
The site is inserted in an agricultural territorial context (large area examined of 1 km) intended for arable, arboreal and livestock breeding use.
The land is all exploited for agricultural purposes.

22. Description of the socio-economic conditions of the stakeholders (who will benefit from the intervention) prior to the intervention

Mr. Piperno Michele has been a farmer for generations, and as such he knows the difficulties of agriculture, the uncertainties that dominate it, and the meager returns from it. Agriculture is a sector that lives/survives only thanks to European Community contributions, and despite this, margins are still low and subject to all the uncertainties of weather/climate conditions, which have become increasingly extreme in recent years. Energy increases have led to significant increases in production costs, both in reference to traction diesel fuel, increases in fertilizer and phytosanitary treatments, and general increases in machinery and equipment, squeezing profit margins even more.

The following is the Abstract of the Study for the AGRI Committee - "The challenge of land abandonment after 2020 and possible mitigation measures" - Promoted by the European Parliament:
"• About 30 % of agricultural areas in the EU (approximately 56 million hectares) are subject to at least a moderate risk of land abandonment. The phenomenon of farmland abandonment in the EU-27 could extend to 5 million hectares by 2030, or 2,9 % of the Utilized Agricultural Area (173 million hectares).
• Land abandonment is a local phenomenon determined by a complex of causes including biophysical, agricultural, structural, market, regional, institutional and political factors. Management problems and structural adjustment are the main factors affecting this process.
• Current land abandonment trends will be exacerbated by external factors (climate change, globalization, health crises). Key policy tools that can minimize the impact of land abandonment factors include improving conditions for farmers, appropriate support for areas under natural constraints, silvicultural and environmental measures as well as support for rural communities."

That said, it is more evident than ever that agriculture needs support even beyond the current forms of public aid.

23. Maps for spatial framing of the site, highlighting possible sensitive situations (e.g., Protected Areas, etc.)

See **Annex 06** (Site image on Calabria Region parks and protected areas cartography).
No relevant situation is found.

24. Photos of the site prior to interventions

The Conductor declared in the Communication and involvement of interested parties form (**Annex 4**) that the previous crops present and replaced by the intervention's bamboo plantation were made up of arable crops, such as cereals, protein crops and oilseeds. See **Annex 05** (image of the Site before the intervention), which highlights its arable agricultural vocation.

2.2 INTERVENTION AND POST-INTERVENTION SITUATION

25. Intervention to be carried out
The intervention consists of establishing a giant bamboo plantation, of the Phyllostachys edulis variety, from potted nursery plants, which allows for easier and safer rooting and reduced risk of crop failure. The stages of the intervention are outlined below: Preparation of the land with subsoiling or plowing and subsequent thinning; Creation of mounds in the ground; Creation of the external containment ditch/creation of the crop perimeter and its ripping (which prevents trespassing); Preparation of irrigation system and laying of dripline; Cover with mulch cloth (made of biodegradable material); Transplanting potted seedlings; Beginning of cultivation with phases of: Periodic irrigation and fertilization; Minimal surface tillage to contain weeds (for the first 2-3 years of the crop's life); Thinning (for 3 years from the 3rd to the 5th year); Harvesting the canes or not. End of Project Life. Maintenance of the crop (harvesting of canes and shoots) Decommissioning of the crop - Eradication of the plantation.

26. Supply of plants

The plants were supplied by a nursery specializing in bamboo plant production (OnlyMoso Nurseries), and this allowed us to have several advantages:

- high quality of the plants;
- sufficient availability and certainty of plant delivery;
- greater assurance of crop success;
- known and controlled level of development;
- uniformity of development within the crop itself.

The planting was done with 1200 plants/ha.
Attached as **Annex 07** is the purchase invoice for the plants.

OnlyMoso Nurseries possess the requirements defined in UNI/PdR 156 in Paragraph 5.1, whose demonstration of which is contained in **Annex 02.**

27. Management of the intervention

The operational management aspects of the intervention are regulated by the requirements contained in UNI/PdR 156 “Guidelines for the establishment of giant bamboo (Phyllostachys edulis) plantations for CO_2 absorption” and the Formalized Agronomic Specification (DAF), which must be adhered to by those operating in the Project.
The Conductor shall subscribe to the “Conductor's Rules” All.Q 8.1-2, which summarizes all applicable requirements of the two documents above **(see Annex 08a e Annex 8b).**
See also “Project references” above.

28. Technical-agronomic interventions

The agronomic aspects of the intervention are regulated by the references contained in the Formalized Agronomic Specification (DAF) to which reference is made (see **Annex 3b**).
The Conductor subscribes to the “Conductor Rules” All.Q 8.1-2, which summarizes the applicable requirements of the DAF (see **Annex 08a e Annex 8b**).

The Conductor defines its own Fertilization Plan (type and amount of fertilizer used) in the “Conductor's Rules.”

Compliance with the DAF is a fundamental requirement for the Project's conformity and the validity of the CO_2 removal calculated ex-ante through the Calculation Methodology.

Bamboo is not a plant prone to plant diseases or pests, therefore treatments are commonly not required.

In case there is a need, its use is allowed only under the guidance of a licensed technician who must draw up a treatment plan in which the following are prescribed: active ingredient, dosage and frequency of application.
The Technician must follow the crop until the problem is resolved in order to monitor the effectiveness of the treatment and the state of the crop, limiting treatments to the minimum necessary. A record of these interventions is left in the specific logbook.

The Conductor is equipped with appropriate qualification for phytosanitary treatments (license) and suitable equipment, calibrated and gauged according to legal frequency, and Personal Protective Equipment suitable for the treatments used.

29. Situation of the site after the intervention

The intervention consists of planting land, previously used as arable land, with giant bamboo Phyllostachys edulis plants.
The site will therefore become a bamboo forest over time.

2.3 EXPECTED BENEFITS

30. CO_2 reduction

The first advantage consists in the reduction of emissions into the atmosphere determined by the replacement of the crops grown before the introduction of the Intervention. Referring to what has already been indicated previously, replacing an arable crop with a crop with a negative net balance allows a reduction in CO_2 emissions equal to an estimated 0,7 ton/CO_2/ha.
Bamboo cultivation, on the other hand, allows for permanent and very efficient net sequestration of CO_2.
Employing the calculation methodology of UNI/PdR 156, the amount of CO_2 captured by the Intervention was calculated ex-ante (**Annex 3a**). As the Intervention has already started, planting was carried out in 2018, the ex-post calculation of captured CO_2 was also carried out through a Monitoring campaign carried out on 13/01/2024 and whose results are in **Annex 12bis**.

31. Socio-economic benefits

As mentioned in the previous point “Description of the socio-economic conditions of the stakeholders prior to the intervention” the agricultural economy based on arable crops is a subsistence activity, with very small profit margins and subject to numerous and increasingly frequent weather-climate and crop health contingencies.

The cultivation of bamboo for the purpose of CO2 capture allows the Conductor to obtain an immediate and secure economic return **(see Annex 3a)** Cultivation and Consignment Contract), which compared with the revenues obtained from traditional arable crops, with values highly variable from year to year and uncertain due to possible crop losses, ranging from €200 to €350 per hectare up to a maximum of €700 for irrigated crops, constitutes an important income supplement.

Another advantage is the lower amount of effort to be devoted to the crop in terms of machine use and fuel consumption, thanks to the reduction of mechanical tillage to zero when the plantation is fully developed. Given the significant increase in the cost of diesel fuel and machinery, reducing their use becomes a significant economic advantage considering precisely that the cost of tilling one hectare of arable land is now between € 1,000 and € 1,500 per hectare.

It is believed that the local community is indifferent to the project and is not benefited by it (as not even disadvantaged - see specific next point)

32. Benefits to the environment and ecosystem

There is a vast literature testifying to the environmental benefits of bamboo in protecting and restoring the environment through many aspects, from CO_2 absorption, water saving, soil regeneration, high efficiency organic matter production, etc.
Bamboo has a very high growth rate (up to one meter per day) and therefore has a high ability to transform natural inorganic elements into organic matter, thus water, nutrients, and CO_2, into woody biomass, consisting of culms (canes) and rhizomes (roots), as well as the ability to accumulate CO_2 in the surrounding soil. It is a stoloniferous plant that has the ability to generate culms and reproduce from the same initial strain for 80-100 years.

For a detailed discussion of the environmental benefits of bamboo, the Technical Paper “Ecosystem Services From Bamboo Forests” 2022 INBAR (International Bamboo and Rattan Organization) is attached.

The main environmental benefits involved are listed below.
Capture CO_2 more efficiently and extensively than other plant forms;
Soil water preservation and purification;
Regeneration of organic matter in soil and re-fertilization;
Prevention of nutrient leaching from soil;
Consolidation of soils, with prevention of erosion and landslides;
Production of woody materials for multiple uses;
Food production;
Bio-habitat creation and biodiversity (above and below ground).

2.4 EXPECTED DISADVANTAGES

33. Direct and indirect consequent to the implementation of the interventions

Disadvantages associated with the implementation of the project, compared to the baseline situation.

The only consideration regarding any disadvantages of the Intervention concerns the aspect of the potential and presumed invasiveness of bamboo.

In this regard, it should be noted that the species Phyllostachys edulis is a variety with very large rhizomes and this results in its slow propagation, preventing the rhizome from projecting out of the ground (e.g., to pass ditches), once exposed to the sun it dries up, and does not produce seeds until the end of its vegetative life, which can last as long as 60 and up to 100 years.

That being said, it is noted that in the DAF there is a procedure for creating and maintaining a ditch perimeter to the crop to prevent rhizome propagation or alternatively a constant ripping of the perimeter to break up and flush the rhizomes out of the soil resulting in desiccation. The application of these management practices allows the containment of the crop within the project boundary and is subject to periodic verification by monitoring.

With regard to seed production, the project has a maximum duration of 30 years, which is less than the assumed flowering age of 60-100 years, and in any case the planting is constantly monitored about the development of early flowering by the Conductor and verifications by the Developer and VVB during periodic Monitoring activities. If flowering plants are detected these are promptly cut and the seeds present collected, from the plant and possibly also from the ground, and disposed of as waste.

There is also a clause in the "Conductor's Rules" whereby in the event of abandonment of the plantation, the Conductor undertakes to uproot the crop and the Developer to report the presence of the bamboo grove to the competent authorities about the danger of potential invasiveness of the crop.

34. Release of CO_2

For the planting of the crop, with the related soil preparation and subsequent crop management, CO_2 emissions are created which are quantified and considered in the general carbon offset calculation.
Compared to the baseline carbon losses, bamboo cultivation still determines a net reduction in carbon loss from the soil.
See next item "Project carbon budget statement" for details.

35. Consumption of non-renewable resources

WATER
Although water is a renewable resource, given the scarcity of water in recent years, it is regarded as a precious resource.
The bamboo grove needs irrigation in the first years of planting, which is necessary for rooting and good establishment for proper and rapid development of the crop in accordance with the CO_2 calculation methodology. Consumption is estimated to be between 1.000 and 2.000 m^3/y, for the first 3-4 years.
The use of water in this phase is however compensated by the reduction in evaporation of water from the soil which occurs thanks to the shading of the leaves, the mulching and the retention carried out by the rhizomes of the plant itself. Therefore, the water distributed, among other things with a high-efficiency drip system, is released and maintained in the soil allowing the creation of the moisture that contributes to the organic processes of proliferation of microbial flora and microfauna necessary to create and maintain soil vitality.

ELECTRIC ENERGY
The only electricity consumption is related to the use of the pump for water distribution in the irrigation system.
Electricity consumption is expected to be about 1.100 kwh/year, calculated through the consumption of 8 KWh/day for 6 months for all years of the project.

FOSSIL FUELS
Mechanical combustion vehicles are used for the pre-planting soil preparation operations and for the containment activities of wild herbs (see Annex 13 for details of consumption relating to the activities carried out).

36. Increase in road traffic/movement of people
The intervention does not lead to a significant increase in vehicular traffic considering the fact that a reduction occurs, compared to the baseline, at least in the first 5 years as no product collection is carried out. Then, once a year, a small tractor (about 15 hp) handles the harvest within the plantation and a transport vehicle, truck type, comes to the plantation to load.

37. Abandonment
The implementation of the Project does not lead to the abandonment of activities relevant to the maintenance of ecosystems, social or environmental, on the contrary, as mentioned above the creation of a bamboo plantation allows the establishment of natural ecosystems and positive phenomena for the environment.

38. Waste production
The following waste production is expected: Plastic (recyclable) pots of the bamboo plants (No. 1.200) each weighing about 40 g, determine the overall production of 48 kg of recyclable plastic. The Conductor has opted to use both granular and liquid fertilizer therefore: Each plastic bag of granular fertilizers weighs approximately 100 g for a use of 500 kg/year, divided by 25 kg per bag, this makes 20 bags, i.e. 2 kg of recoverable plastic per year. Each 30 liter plastic container of liquid fertilizers weighs approximately 4 kg for a use of 150 liters/year of fertilizer, divided by 30 liters per tank makes 5 tanks/year, i.e. 20 kg of recoverable plastic/year. The bamboo canes produced are tied together for shipping using polyethylene tape of negligible weight. The waste produced is deposited so that it does not get lost while awaiting delivery to the collector, an entity licensed to recover plastic waste. The waste is classified with appropriate EER code according to the case and is transported with Waste Identification Form (FIR). With reference to the baseline situation, in which every agricultural year waste is produced relating to: • Seed packs (paper); • Fertilizer packages (plastic); • Pesticide treatment packages (plastic). The Intervention's waste production over the life of the Project is expected to be lower than the baseline because, beyond the initial production due to plant pots, the Intervention's waste production is minimal.

2.5 OBSTACLES

39. At the implementation of the intervention
The main obstacle to the implementation of the Intervention was overcome at the time when the conductor agreed to participate in the Project. In fact, the novelty of the crop and the insecurity of agronomic success, the investment to be made, the lack of certainty of where the crop's products would go in the

market, and the absence of sales quotations discouraged many farmers from joining the Project.
The Conductor believed in it and regarding the obstacles:
Financial: passed as the investment has already been made;
Legal/regulatory: no obstacles are seen since the Intervention is a permitted crop on a site used for agricultural production;
Technical: the crop is well successful and therefore technical aspects are also no longer an obstacle;
Agronomic: as above;
Cognitive: as above;
Cultural: as above.
No further particular obstacles to the implementation and continuation of the Project are seen.

2.6 RISKS AND MITIGATIONS

40. Reversal

Risk of crop loss that would result in reduced CO_2 absorption capacity:
Floods/flooding/landslides: not significant
Fire: not significant
Theft: not significant
Crop failure: being ex-post activities, the degree of crop development is evaluated - at the current state the crop results:

- >5, sufficiently developed

That said, the assessed risk of reversal is considered to be: Low.

For these reasons, we believe that it is not necessary to implement mitigation activities in addition to the 17% buffer.

41. Environmental risks

- Risk assessment in relation to any negative environmental impacts as a result of the Intervention.
- Pollution (Air, Soil, Water): the intervention does not lead to an increase, rather a decrease, in pollution for the reasons well argued above. Insignificant risk.
- Use of non-renewable resources/energy: diesel fuel is used for the operation of several endothermic engine powered machines - the Intervention is much less impactful than the baseline and in any case the calculations made (see point 48) result in a production of 140,4 tons of CO_2 for the duration of the entire project. Very low risk.
- Waste production: low risk-based on the above results in a plastic waste production, totaly recycled, for the entire project duration of 660 kg (see par. 38). Considering that an average European citizen produces about 188 kilograms of plastic/year, equivalent to 5640 kg in 30 years, the quantities produced by the project are really small compared to the benefits.
- Introduction of a potentially invasive species such as bamboo: medium risk. Mitigation actions implemented are shown in point 33 above.
- Biodiversity reduction: the intervention leads to the replacement of one monoculture with another monoculture, while the bamboo plantation creates a stable forest that allows the establishment of considerable hypogean and epigeal biodiversity. Zero risk.
- Ecosystems: the Intervention creates a new stable ecosystem where there was

previously an intensive annual crop. Negligible risk.
- Climate change: the Intervention net of emissions, reductions and absorptions results in a net reduction in the amount of CO_2 in the atmosphere, as demonstrated by calculations (in point 48), leading to a positive factor toward climate change reduction. Low risk
- The "No Net Harm" principle is widely respected for environmental aspects, as the beneficial effects far outweigh the negative ones.

42. Socio-economic risks

The intervention presents no socio-economic risks, but is a relevant and secure contribution to the farmer's economy (see point 31), in the context of an agricultural economy characterized by low income and many uncertainties.
No other local stakeholders are involved in the project.

The principle of "No Net Harm" is widely respected for the socio-economic aspects, as it has only beneficial aspects, of economic yield and reduction of labor to be devoted to cultivation (see point 31).

43. Financial risks

The intervention presents a financial risk as the initial investment of the system is of a certain importance and is totally borne by the Conductor.
The Conductor does not provide information about the source of financing (whether personal or through a credit institution). Having no data about the source of the financing, it is not possible to assess its sustainability.
Common sense suggests that given the amount, which is not low but also not disproportionate, and that the Conductor has already covered it, as it has already been seven years since the planting began, the financial risk is considered to be low.

Mitigation of the financial aspect is implemented through the provision of CO_2 financing as benefit sharing of the Environmental Project.

44. Natural risks
Natural risks that would lead to a reduction in CO_2 absorption capacity: Floods/inundations: The Conductor declares in the "Communication and Involvement of Interested Parties form" that as far as they can remember he has never had problems with flooding. Furthermore, from consulting the regional cartography, the site appears not to be in an area at risk of flooding. Low risk. Landslides: From consulting the regional cartography, the site appears not to be in hydrogeological risk area (RME area). Low risk. Fire: bamboo wood in its green state is difficult to flammable as it is very humid (contains at least 40% water) and does not have dry bark that can be attacked by flames. For this reason, even any fire in the substrate of dry leaves is unlikely to spread to the stems. Furthermore, bamboo is a highly resilient plant and after a fire it re-emits new shoots and reconstitutes itself entirely within one growing season. From consulting the regional cartography, the site appears not to be in an area at risk of fire. Low risk. Infestations/diseases: bamboo is naturally resistant to pathogens/infestants and does not suffer from particular vulnerability to fungal diseases. Non-existent risk No mitigation activities are expected to be implemented.

2.7 METHODOLOGY AND CALCULATIONS

45. Applied methodology for calculating the amount of CO_2 absorbed

UNI/PdR 156 Chapter 6 and Appendix B, with the customizations to the Project below. Soil lithology, i.e., presence of lithic component in the growing medium, which negatively affects the CO_2 capture capacity of the SOCnet (soil) component, was calculated by direct sampling at the intervention site and carried out according to the methodology in All.Q 8.1-6. The percentage of lithic component was evaluated on the sample, which was found to be 0% (see **Annex 09**). The quantity of CO_2 compensated is indicated in point 48 below.

46. Method of calculating the tons of CO_2 reduced/removed	☒ Ex-ante ☐ Ex-post

47. Project Duration	Years: 30

48. Project carbon budget statement (All progect long)	
CO_2eq absorbed by bamboo cultivation (tons per hectare)	**7.917,6**
CO2 emissions avoided due to the replacement of the previous crop (baseline)	**1,1**
CO_2eq emission due to use of fossil fuels (tons per hectare)	**-23,4**
CO_2eq emission due to irrigation (tons per hectare)	**-14,2**
CO_2eq emission due to supply and use of fertilizers (tons per hectare)	**-43,1**
Bamboo plant supply	**-4,8**
Net contribution of the CO_2eq reduction (tons per hectare)	**7.833,2**

Intervention area (hectare)	**1,0**
Net contribution of the CO_2eq reduction of the Intervention (1 hectare) (in tons)	**7.833,2**
-2% Prudential rounding	**-156,7**
-17% Buffer provision	**-1.331,6**
Net contribution of the CO_2eq reduction of the Intervention (1 hectare) (in tons)	**6.344,9**

(*) a value with a + sign indicates CO_2 reduction a - sign indicates CO_2 production.

For details of the calculations see **Annex 15a-b-c-d-e-f-g.**

2.8 LEAKAGE

49. Losses due to displacement of pre-project agricultural activities
For the Leakage risk analysis, the following is evaluated: the Conductor does not need pre-project cultivation for his own sustenance and can easily do without it; given the small surface area occupied by the

Intervention and the non-particular profitability of the replaced crop, the Conductor has no interest in relocating the replaced crop to areas of land external to the company and in any case in addition to its baseline scenario (see Communication form and stakeholder involvement **Annex 04**) That said, it can be stated that there is no danger of Leakage in this intervention.

2.9 ADDITIONALITY

50. Additionality is assessed through an analysis performed on the Baseline, which includes the following criteria and must be site-specific and conservative.	
Common practice	The cultivation of bamboo is not in the tradition of local agricultural practice, encountering for this reason a certain amount of closure on the part of growers reluctant to deal with a cultivation about which not much is yet known. The areas cultivated with bamboo are negligible in the national territory and there is not even a census. The economic boost of the CO_2 contribution made the intervention attractive to the plantation Conductor.
Legal-Regulatory Requests	There is no legislation in national or European legislation that makes the planting of bamboo groves mandatory. The search was carried out by accessing the European Union website https://eur-lex.europa.eu and https://www.gazzettaufficiale.it using keywords such as bambù, bamboo, bambuseto.
Investments and costs	The initial investment of the Intervention is absolutely significant and especially for the agricultural sector, which is notoriously "poor" (see business plan – Annex xx) Bamboo cultivation to date is not yet profitable, due to the absence and in any case uncertainty of market outlets for the products obtained (reeds and/or shoots). That said, the consideration about the socio-economic benefit is that the farmer would have struggled to make an initial investment, without having a certain market for the crop's products, if it were not for the CO_2 contribution that provides him with an income that covers the initial investment and the lost harvest for the first few years of raising the plantation in which the crop produces nothing.
Local habits	Bamboo cultivation is not in the tradition of local

	agriculture and therefore can be a major psychological brake on the development of the Projects. If one can say "fortunately," the agricultural sector is "poor," and thus the contribution of CO_2 is a decisive factor in the Conductor's choice to participate in the Environmental Project.

2.10 DOUBLE COUNTING

51. Exclusion of the site being used for other CO_2 offset Projects.
In order to prevent this aspect from arising, a prohibition has been contractually included with the Conductor on using the crop of the Intervention which is the subject of this Environmental Project also for other environmental purposes and projects that have CO_2 capture as their object (**Annex 01**).

2.11 RELEVANT LEGISLATION

52. Identification of regulations and policies pertaining to carbon credits and CO_2 offsets.
Italy does not have national legislation regulating carbon absorption activities through land use in agriculture. There is a proposal for a European Regulation for the "certification of carbon absorptions," which is currently still under development.

53. Legislative compliance
The relevant legislation is: • D.Lgs 81/2008 Consolidated Work Safety Act; • D.Lgs 152/2006 Consolidated Environment Act; • D.Lgs 150 del 14/08/2012 "Implementation of Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides"; • DM 22 January 2014 "Adoption of the National Action Plan for the Sustainable Use of Plant Protection Products".

54. Authorities to be considered
There are no mandatory national or European Authorities to be taken into consideration in relation to carbon credits and CO_2 offsets.

2.12 MONITORING

55. Project monitoring activities and related indicators.
Monitoring activities are implemented according to the Monitoring Plan in **Annex 12 bis** herein, which provides the indicators, frequencies, and verification methods. The aspects considered in the monitoring are as follows: - planting density - useful planting area

- breeding methodology
- plantation confinement
- irrigation
- fertilization
- weed control
- thinnings
- production cuts
- waste management
- deviations
- baseline
- risks and mitigations
- additionality
- legislation
- invasiveness
- plantation abandonment

56. Monitoring plan	The Monitoring Plan has been developed and shared with the Conductor of the Intervention (**Annex 12 bis**)

2.13 PROJECT START AND END DATE

57. Project start date	Year: 2018
58. Project end date	Year: 2048

3. ANNEXES

N	Title
Annex 1	**Cultivation contract**
Annex 2	**OnlyMoso Nurseries Requirements**
Annex 3a	**UNI/PdR 156**
Annex 3b	**DAF**
Annex 3c	**DF Project Approval**
Annex 3d	**Project Approval Management**
Annex 3e	**Project application filling rules**
Annex 4	**Communication interested parties**
Annex 5	**Image of Site before intervention**
Annex 6	**Image of Calabria Region**
Annex 7	**Purchase invoice of plants**
Annex 8a	**Conductor Rules**
Annex 8b	**Fertilization plan**
Annex 9	**Percentage of lithic component**
Annex 12 bis	**Monitoring Plan**
Annex 15a-b-c-d-e-f-g	**Calculator CO2**

4. REVIEW AND APPROVAL

For approval:	The Administrator	
Date:		Signature
Rev. N.		
Rev. N.		
Rev. N.		
Rev. N.		