

# Growing energy crops on contaminated land for biofuels and soil remediation

*GOLD - Bridging the gap between phytoremediation solutions on growing energy crops on contaminated lands and clean biofuel production, is a research and innovation action funded by the European Union Horizon 2020 Programme.*

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### 1. Field Trials - Summer 2022

The first update is that the first year of crop field trials has now come to the end with harvesting taking place in October 2022.

In the mean-time all field trials went well with some photos and videos presented below:



Figures 1-2-3:  
Photos of field trials in July and August 2022: Hemp, Sorghum, and Miscanthus

Almost a year has passed since the last GOLD Newsletter was published, and so much has happened!

### AUA

This study site, based in the southern part of mainland Greece, is a historic mining and metallurgical site with long-term multi-metal contamination. The biomass crops included hemp, miscanthus, and sorghum.

**CRES & M.E.TE S.A**

This study site is based in the north of Greece, where previous lignite mining activities have contaminated the soils.

Plowing and harrowing had been applied before the



Figure 4 and 5:  
Photos of Sorghum in July 2022

field was established; the field had many stones and pieces of marl. A basic fertilization (12-12-17) had been applied a week from first sowing. Sorghum, Switchgrass, and Miscanthus were trialed here.



**UNIBO**

The University of Bologna spent some time finding and preparing an appropriate site for the field studies, as such this year the trial field crops were slightly smaller in scale than anticipated.

The entire area has been subject for a long time to discharge and deposition of wastes of various origins (i.e. improvised warehouses, small crafts, and processing of raw materials, industrial waste, and residues generated by World War II). Nickel, lead, copper, zinc, and tin concentrations exceed the maximum the thresholds permitted by Italian law in rural areas.

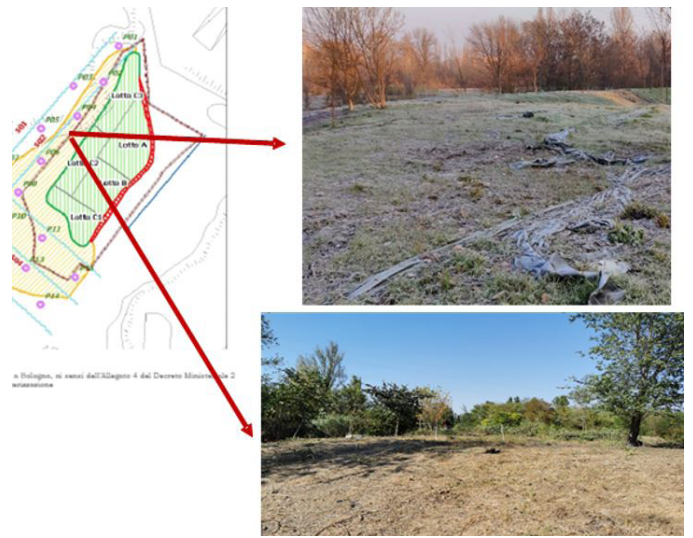


Figure 6:  
Site selection for the field trials in Bologna, Italy

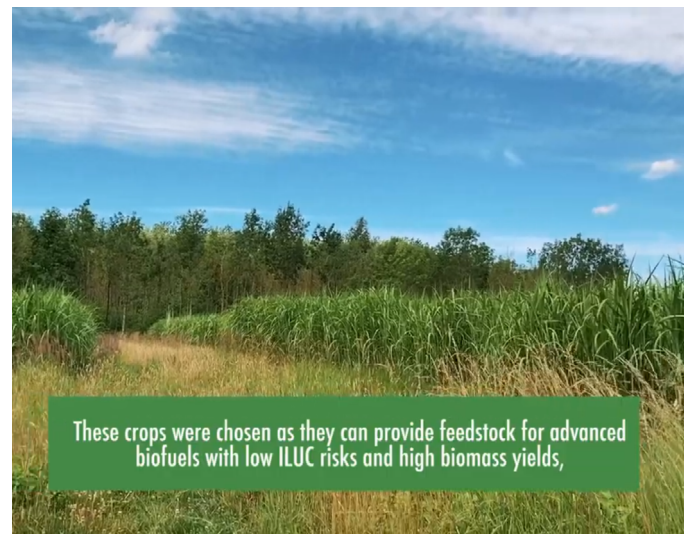
**JUNIA**

As part of the consortium meeting held in June 2022 the consortium were taken to the JUNIAs pilot site, a former metal foundry, where we were given a presentation from SUEZ who undertook the main remediation of the site between 2004 and 2006. The GOLD pilot site is located approx. 1km north of the Metaleurop site where high levels of Cd, Pb and Zn are still found in the soils. This video shows the trial crops, Miscanthus, Hemp and Sorghum, progress in June 2022.

The site visit video can be viewed here:

 [GOLD: Field trial in Lille, France](#)

Figure 7:  
GOLD video of field trials in Lille, France





## UMCS

An experimental field, located in southern Poland, is partially neighbouring with an old metalliferous waste dump, which is the main source of the metallic pollution to the surrounding areas. Despite highly exceeded Zn, Pb, Cd, and As levels, the soil is very fertile, so our sorghum, hemp and miscanthus grew very well there.



Figures 8 and 9:  
GOLD video of field trials in Lille, France

**Harvesting activities autumn 2022** - the field trials were harvested in September - October 2022, more information about these activities will follow in the upcoming months!

## 2. First in person consortium meeting

One year after the project online kick-off the consortium finally met in person, at JUNIA university, Lille, 28 - 29th June 2022. During the meeting each work package presented their research aims and progress made so far. The meeting was successful in setting up lines of communications between the work packages, as well as setting up a shared working area for the project.

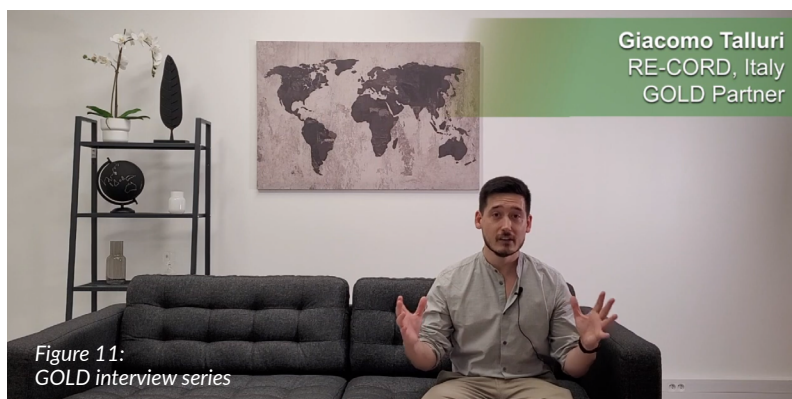


Figure 10:  
Gold Consortium, Lille, June 2022.  
Credit: Maurizio Cocchi.

During the M12 consortium meeting, GOLD partners were given the opportunity to introduce themselves and their work package. In this short interview series we hear from:

- **Efthimia Alexopoulou**, CRES, the Project Coordinator, in which she introduces the project and how she came up with the project acronym GOLD.
- **Eleni Papazoglou**, AUA, WP1 Leader, who tells us about the importance of this project for the environment and renewable fuels.
- **Giacomo Talluri**, RE-CORD, who introduces project partner RE-CORD and its role in Project GOLD.
- **Marcel Dossow**, TUM, WP2 leader, who introduces project partner TUM and its role in the project.
- **Stavroula Zafeiropoulou**, ME.T.E. S.A, the only commercial partner in the project, who tells us about the importance of this project not only for the environment but for the local community in the area of these disused mines.

The interview series can be seen [here](#).



### 3. Recent Events

GOLD partners have been super active over the last year presenting at conferences around the world and writing papers, here's a summary of what's been going on:

- Squaring the circle between phytoremediation and biofuel production. On Thursday 12th May 2022, at **EUBCE 2022**, three similar Horizon 2020 projects: GOLD, Phy2Climate and CERSiS, held a two hour workshop.
- Bridging the gap between phytoremediation solutions on growing energy crops on contaminated lands and clean biofuel production, was presented at the **8th European Bioremediation Conference**, in Chania, Greece, June 12 to 17, 2022, by Papazoglou, E.G., Wójcik, M., Vangronsveld, J., Oustriere, N., Mench, M., Zegada, W., Alexopoulou, E. 2022.

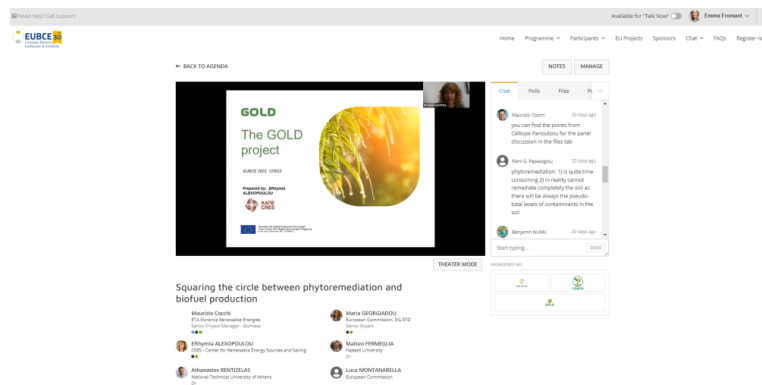


Figure 12:  
GOLD at EUBCE 2022

- An abstract was submitted to the **51th Convegno Nazionale SIA. "Agricoltura e alimentazione nel 2050"** in Padova, 19 - 21 settembre 2022. Potential Of Biostimulants To Increase Sorghum Bicolor Biomass Production And Phytoremediation Efficiency. Written by Pietro Peroni, Walter Zegada-Lizarazu, Andrea Monti.



- **AGROTICA 2022**, in Thessaloniki, 20 to 23th of October 2022. Where CRES had a stand with posters and leaflets with all projects running by CRES, as well as a workshop where D. Kotoula, E.G Papazoglou (2022) presented "Cultivation of fibre crops in polluted soils and utilization of the produced biomass".
- Presentation of Optimization of phytomanagement strategies on soils contaminated with metals (Cd, Pb, Zn) to provide biomass for clean biofuel production - Lessons from a pot trial, by Felix Ofori-Agyemang, Christophe Waterlot, Michel Mench, Nadège Oustriere, at the **21st International Conference - Exhibition of Soils, Sediments and Water (INTERSOL)**, Lyon. 21st June 2022.

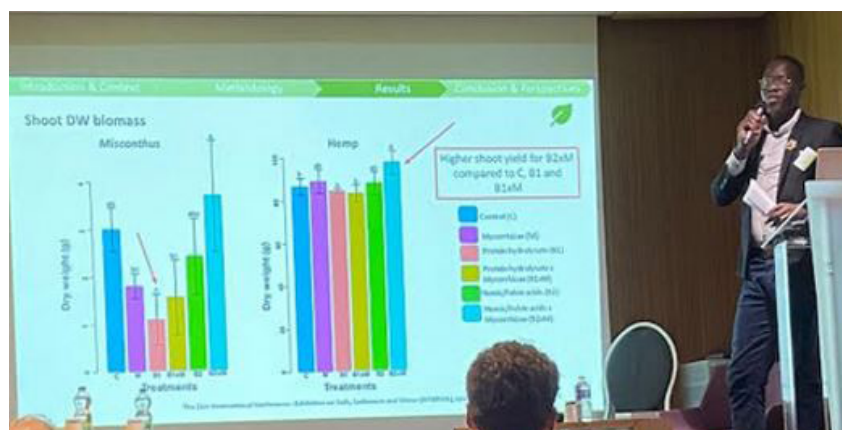


Figure 13:  
Felix Ofori-Agyemang presenting GOLD at INTERSOL 2022

- **Canadian Chemical Engineering Conference 2022** - 23-26 October. "Fischer–Tropsch Synthesis over a bimetallic catalyst cobalt-iron supported on hydroxyapatite in a GLS slurry reactor configuration". Oral presentation by Sabrina Karakache, Université de Sherbrooke.
- The 51st national conference of the **Italian Society of Agronomy (SIA)**, in Padua on 19-21 September 2022. "Potential Of Biostimulants To Increase Sorghum Bicolor Biomass Production And Phytoremediation Efficiency" presented by Pietro Peroni, Walter Zegada-Lizarazu, Rossella Mastroberardino, Andrea Monti.
- „Konopie przemysłowe (Cannabis sativa L.) – roślina o dużym potencjale użytkowym" (Industrial hemp (Cannabis sativa L.) – a plant with high exploitation potential), III Ogólnopolska Konferencja Naukowa "Perspektywy wykorzystania roślin w nauce i przemyśle", 18.11.2021 – oral presentation (in Polish)
- „Wpływ biostymulantów na wzrost roślin i ich odporność na czynniki stresowe" (Effect of biostimulants on plant growth and resistance to stress factors), Ogólnopolska Konferencja Młodych Naukowców nt. „Nowe wyzwania dla polskiej nauki", CREATIVETIME, Kraków, 4.11.2021 – oral presentation (in Polish)
- „Wykorzystanie roślin energetycznych do rekultywacji terenów skażonych metalami ciężkimi" (Use of energy crops for the remediation of areas contaminated by heavy metals), Ogólnopolska Konferencja Młodych Naukowców nt. „Nowe wyzwania dla polskiej nauki", CREATIVETIME, Kraków, 4.11.2021 – oral presentation (in Polish)
- „Effect of biostimulants on growth and metal accumulation of Miscanthus x giganteus", 1st PhD Student's Conference at the University of Life Sciences in Lublin, Poland: „Environment-Plant-Animal-Product", 26.04.2022 – poster presentation (in English)
- „Wpływ biostymulantów na wzrost i akumulację metali w Miscanthus x giganteus" (Effect of biostimulants on growth and metal accumulation of Miscanthus x giganteus), 59 Congress of the Polish Botanical Society, Warsaw, 27.06-01.07.2022 – poster presentation (in Polish)

- “Budowanie mostu między fitoremediacją opartą na uprawie roślin energetycznych na zanieczyszczonych terenach, a produkcją czystego biopaliwa (projekt GOLD) – badania wstępne nad wpływem biostymulantów na wzrost roślin i akumulację metali” (Bridging the gap between phytoremediation solutions on growing energy crops on contaminated lands and clean biofuel production (the GOLD project) – preliminary studies on the effects of biostimulants on plant growth and metal accumulation), 59 Congress of the Polish Botanical Society, Warsaw, 27.06-01.07.2022 – oral presentation (in Polish).



Figure 14:  
Prof. Małgorzata Wójcik, UMCS, presenting GOLD

- Sebastian Fendt; Leuter, Philipp; Dossow, Marcel; Spliethoff, Hartmut (2022): 3rd Generation Biorefinery - Production of basic chemicals by utilization of biogenic residues via entrained flow gasification with coupled gas fermentation. Key Technologies in the Bioeconomy A **Global Bioeconomy Alliance Conference** September 27th to September 29th, 2022 Straubing, Germany
- Marcel Dossow, Philipp Leuter, Hartmut Spliethoff, Sebastian Fendt (2022): Decontamination of polluted soils: a gas fermentation model for SynFuel production and techno-economic estimation. DECHEMA - **(Bio)Process Engineering - a Key to Sustainable Development. ProcessNet (Bio)Process Engineering – a Key to Sustainable Development**, Aachen (14.09.22), Germany

**PROJECT PARTNERS**



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