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Novel Biotechnological Solutions in Climate Change Mitigation
2024-1-EL01-KA220-HED-000251373

LT TA Organisation and Evaluation Report



1. Activity Overview

- **Project Title**

Novel Biotechnological Solutions in Climate Change Mitigation (BIOSHIELD)

- **Activity Type**

WP4 - Online LTТА Pre-Piloting Training

- **Leading Organisation**

University of Maribor (UM)

- **Target Group**

Proposed: 50 students (10 per partner) and 5 lecturers (1 per partner)

In the LTТА activity 89 students participated in total, including the ones who attended at least 1 day. Out of 89, 19 students attended the LTТА regularly for 5 days, 50 students attended the LTТА for at least 4 days, and 68 students participated in the LTТА at least for 3 days. The partnership agreed to consider at least 3 days of participation as eligible for certificate issuance, though it was indicated in the project proposal 70% attendance whose rate mathematically requires 3.5 days of participation. However, all the LTТА training was recorded and video records were shared with the students to follow the training delivery in case they couldn't participate. So, 3 days of participation was deemed eligible.

- **Methodology**

Online learning, lectures, case studies, and group presentations over 5 days. Student Evaluations through satisfaction survey including open ended questions that will be used in replacement of student diaries.

- **Process**

The first day, Prof. Yiannis Kourkoutas made an opening speech. Prof. Kemal Melih Şahin introduced the activity and Assoc. Prof. Hudson Ashrafi gave a lecture about Climate Change and Disasters' Effect on Agricultural Productivity, Blueberry as a Case Study. Then question and answer session followed and students asked their questions.

The second day started under the moderatorship of Prof. Yiannis Kourkoutas and Assist. Prof. Dunja Samec introduced Dr. Erna Karalija (University of Sarajevo) to give a lecture about Phytoremediation. After the lecture, Q&A session continued.

The third day, Assist. Prof. Vasiliki Kachrimanidou gave a lecture about Industrial biotechnology, followed by the Q&A session. The fourth day, Assoc. Prof. Silva Grobelnik Mlakar gave a lecture about Microbial Biotechnology in soil-plant systems, followed by the Q&A session.

The final day of the LTТА, the student groups from partner universities presented innovative applications in biotechnology to mitigate the climate crisis.

[Hackathon Programme](#)

2. Student Satisfaction Survey Analysis

A. Participant Demographics and Focus Areas - Democritus University of Thrace

The following table summarises the distribution of participants across academic years and their primary biotechnological focus areas as defined in the training questionnaire. Although the total number of participants was 11, responses were collected from 10 participants.

Table 1: Participant Profile Summary

Category	Metric	Total (N=11)	Percentage (%)
Academic Year	1st Year		
	2nd Year		
	3rd Year	6	60
	4th Year	4	40
	Graduate (MSc or PhD)		
LTTA Focus Area	Climate Change Mitigation	2	20
	Mitigation of Disaster Effects		
	Plant Biotechnology	3	30
	Microbial Biotechnology in Soil-Plant Systems	2	20
	Industrial Biotechnology	3	30
	Other		

B. Statistical Analysis of Participant Feedback

This section presents the mean scores for quantitative feedback based on the 1-5 agreement scale (1 = Strongly Disagree, 5 = Strongly Agree).

Table 2: Feedback on Training Effectiveness and Career Aspirations

Survey Question	Mean Score (1-5)	Achievement % (Agree - 4 /Strongly Agree - 5)
Preparedness: Training made me feel more prepared for the actual pilot course.	4	50
Entrepreneurship: Considering starting a biotech startup or initiative.	3	60
Industry Preference: Prefer to work in biotech industry (public/private).	5	40
Satisfaction: Overall LTTA organisation met expectations.	4/5	40/40

C. Learning Attainments and Theoretical Insights

This section summarises the "Key Learning Attainments" reported by students, focusing on new concepts encountered during the 5-day session.

- **New Concepts Learned:**

Students reported learning about several new biotechnological concepts related to climate change mitigation and sustainable agriculture. They gained a better understanding of plant-microbe interactions, rhizosphere engineering, and how soil microorganisms can support plant resilience under climate stress. Participants also learned about biotechnology applications in crop cultivation, such as blueberry production, and became familiar with international biotechnology projects and the use of biological and chemical compounds in agricultural and environmental solutions. Overall, the training helped them understand how biotechnology can be used to improve soil health, enhance plant stability, and address the challenges posed by climate change.

- **Most Inspiring Aspect:**

Students found it particularly inspiring to learn about the wide range of biotechnological solutions that can be applied to address climate change, while remaining environmentally sustainable. Many participants were impressed by approaches that utilize natural systems, such as plant microbiomes and soil microorganisms, to strengthen plant resilience without causing additional harm to ecosystems. Others highlighted the potential of biotechnology to support the circular economy, for example by converting industrial by-products, such as CO₂ into valuable materials. Students were also inspired by the detailed understanding of molecular and enzymatic interactions and how these can be optimized to benefit the environment and agriculture. Finally, the Hackathon was frequently mentioned as the most inspiring activity, as it demonstrated how collaboration, communication, and scientific knowledge can generate innovative solutions to real-world environmental challenges.

- **Career Impact:**

Students reported that the LTTA broadened their perspective on potential career paths in biotechnology, particularly in the areas of agricultural biotechnology, innovation, and the circular bioeconomy. Several participants stated that the programme increased their interest in biotechnology entrepreneurship and the possibility of developing startup ideas that address climate change challenges. The training also helped students understand how scientific research can be translated into practical solutions and business opportunities. In addition, participants noted that they developed skills related to presenting ideas, pitching innovative concepts, and working in interdisciplinary teams, which increased their confidence in pursuing careers in biotechnology-related fields.

D. Identified Challenges and Obstacles

Participants were asked to identify major obstacles in the lecture topics or challenges encountered during the online activities.

- **Reported Challenges:**

Overall, students reported that there were no major obstacles during the LTTA and that the lectures were

generally well-structured and informative. However, some participants noted that the high level of specialization in certain presentations occasionally made it difficult to follow all the details or retain all the information. Others mentioned challenges related to understanding complex biotechnological concepts within a limited time frame and summarizing these ideas effectively for presentations during the hackathon. A few students also reported minor technical issues, such as unstable internet connections, as well as difficulties balancing participation in the activity with their regular academic workload and exams. Despite these challenges, participants indicated that they were able to overcome most difficulties and considered the experience valuable and rewarding.

- **Mitigation Strategy for Piloting:**

To address the challenges identified during the LTTA, the piloting phase should include additional supportive measures to enhance comprehension and participation. Providing short introductory materials or pre-lecture resources could help students better understand specialized concepts before the sessions.

E. Transversal Skills Application

In accordance with the project's goal to connect data with transversal skills, participants identified specific skills they consciously applied during the training.

Table 3: Application of Transversal Skills

Skill Identified	Frequency of Mention	Specific Examples
Entrepreneurial Thinking	2	Considering economic feasibility of biotech solutions, selecting cost-effective materials and machinery for CO ₂ -to-CaCO ₃ tiles, and applying business thinking to design practical and market-oriented products.
Critical Thinking	3	Evaluating multiple biotechnological solutions for plant resilience, analyzing how genetic modifications may affect plant health, and filtering large amounts of research to identify the most relevant information for the project.
Problem-Solving	4	Developing a step-by-step implementation plan when the

		team encountered a logical bottleneck in the project, helping make the proposed biotechnological solution clearer and more realistic.
Effective Communication	3	Coordinating ideas within teams, discussing how to structure presentations, and explaining complex scientific concepts in a way that was understandable to the wider LTTA audience.
Teamwork	8	Working effectively in small groups during the hackathon, combining ideas from different members, coordinating tasks, and jointly developing and presenting a biotechnology solution.
Other 1: Innovation	2	Generating creative ideas and proposing novel biotechnological approaches to address environmental challenges during the hackathon.
Other 2: Digital / Design Skills	1	Using AI tools and graphic design techniques to develop visual concepts and structures for biotechnology-based products (e.g., CO ₂ -converting tiles).

F. Indicators of Achievement

- **Attendance Rate:** (Requirement: 70% for certification, determined at least 3 days of participation).
- **Certification:** 11

G. Conclusion and Recommendations

Assess whether the LTTA met the specific objective of enabling students to feel ready to think about how to generate creative biotech ideas for the mitigation of climate change impacts.

The LTTA successfully met its objective of preparing students to think creatively about biotechnology-based solutions for mitigating climate change impacts. Through expert lectures, interactive discussions, and the final hackathon activity, participants were exposed to a variety of scientific concepts and real-world applications related to sustainable agriculture, microbial biotechnology, and environmental innovation. The hackathon in particular encouraged students to apply their knowledge collaboratively and develop original ideas addressing climate-related challenges. Student feedback indicates that the training enhanced their understanding of how biotechnology can contribute to climate resilience and increased their confidence in generating innovative and practical solutions. Overall, the LTTA effectively supported the development of creative thinking, problem-solving, and entrepreneurial perspectives among participants in the field of biotechnology.

Report Prepared By: Prof. Yiannis Kourkoutas/DUTH

Date: 28/02/2026

Verification: [Attendance Sheets](#)
[Screenshots](#)

Appendix 1

List of 68 Qualifying Participants by University (Participated at least 3 days or more)

Democritus University of Thrace (DUTH)

1. Vasiliki Bouladaki: 5 days (Days 1, 2, 3, 4, and Hackathon)
2. Glykeria Psarra: 4 days (Days 1, 2, 3, and Hackathon)
3. Katerina Tounta (Aikaterini Paraskevi Tounta): 3 days (Days 1, 4, and Hackathon)
4. Anastasia Karvouni: 3 days (Days 1, 3, and Hackathon)
5. Aspasia Riga: 3 days (Days 1, 4, and Hackathon)
6. Spyridoula Papadopoulou: 3 days (Days 1, 2, 4, and Hackathon)
7. Georgios Gkatzamanis: (Days 1, 4 and Hackathon)
8. Antonia Ioannidou: (Days 1, 4 and Hackathon)
9. Markella Kallifatidou: (Days 3, 4 and Hackathon)
10. Georgios Sdiros: (Days 1, 4 and Hackathon)
11. Ioannis Sentementes: (Days 1, 4 and Hackathon)

Çanakkale Onsekiz Mart University (ÇOMÜ)

1. Akikat Dimagambetov: 5 days (Days 1, 2, 3, 4, and Hackathon)
2. Ayşe Öncüler: 5 days (Days 1, 2, 3, 4, and Hackathon)
3. Berk Çelikel: 5 days (Days 1, 2, 3, 4, and Hackathon)
4. Ecem Arslan: 5 days (Days 1, 2, 3, 4, and Hackathon)
5. Eftelya Nergis Özbiçerler: 5 days (Days 1, 2, 3, 4, and Hackathon)
6. Esma Zehra Sağlam: 5 days (Days 1, 2, 3, 4, and Hackathon)
7. Ezgi Coşkun: 5 days (Days 1, 2, 3, 4, and Hackathon)
8. Melis Buse Uslu: 5 days (Days 1, 2, 3, 4, and Hackathon)
9. Melis Köleoğulları: 5 days (Days 1, 2, 3, 4, and Hackathon)
10. Altuğ Dirim (Altuğ Didim): 4 days (Days 1, 3, 4, and Hackathon)
11. Asya İrem Kayış: 4 days (Days 2, 3, 4, and Hackathon)
12. Ayşe Ayzıt Bekirhan: 4 days (Days 1, 2, 3, and 4)
13. Ceren Şevval Yıldız: 4 days (Days 1, 2, 3, and 4)
14. Ecem Dilay Demirkalp: 4 days (Days 1, 3, 4, and Hackathon)
15. Eray Ekrem: 4 days (Days 1, 2, 3, and Hackathon)
16. Eylül Türkmen: 4 days (Days 1, 2, 3, and Hackathon)
17. Hiranur Başak: 4 days (Days 1, 2, 3, and Hackathon)
18. Nurten Coşkun: 4 days (Days 2, 3, 4, and Hackathon)
19. Zülal Hoş: 4 days (Days 1, 3, 4, and Hackathon)
20. Cansu Demirboğa: 3 days (Days 1, 2, and Hackathon)
21. Didem Durmuş: 3 days (Days 1, 3, and Hackathon)

22. Emek Can: 3 days (Days 1, 2, and 4)
23. Melike Güneş: 3 days (Days 1, 2, and 4)
24. Mert Doğrucu: 3 days (Days 1, 2, and 4)
25. Muhammed Emir Karagöz: 3 days (Days 1, 3, and 4)
26. Ranya Demir: 3 days (Days 1, 3, and 4)
27. Zübeyde Gökteke: 3 days (Days 1, 3, and 4)

Ionian University (IU)

1. Andriana Argyrakou: 5 days (Days 1, 2, 3, 4, and Hackathon)
2. Eleftheria Michou: 5 days (Days 1, 2, 3, 4, and Hackathon)
3. Konstantina Voukelatou: 5 days (Days 1, 2, 3, 4, and Hackathon)
4. Lydia Epitropaki: 5 days (Days 1, 2, 3, 4, and Hackathon)
5. Maria Gkouzou: 5 days (Days 1, 2, 3, 4, and Hackathon)
6. Maria Martini: 5 days (Days 1, 2, 3, 4, and Hackathon)
7. Panagiota Skoufa (Skoufa Panagiwta): 5 days (Days 1, 2, 3, 4, and Hackathon)
8. Georgia Konstantina Tsami: 4 days (Days 1, 3, 4, and Hackathon)
9. Maria Serafeimidi (Maria Serafimeidi): 4 days (Days 1, 2, 3, and Hackathon)
10. Maria-Epistimi Kanaki (Maria Epistimi Kanaki): 4 days (Days 1, 3, 4, and Hackathon)
11. Michael Koumianos (Mike Koumianos): 4 days (Days 1, 2, 3, and Hackathon)
12. Argiro Avgoustidou: 3 days (Days 1, 3, and 4)
13. Regina Evliatou (Reggina Eylliatou): 3 days (Days 1, 4, and Hackathon)

Univerza v Mariboru (UM)

1. Jovana Jevtić: 5 days (Days 1, 2, 3, 4, and Hackathon)
2. Matjaž Muršec: 5 days (Days 1, 2, 3, 4, and Hackathon)
3. Milica Marković: 5 days (Days 1, 2, 3, 4, and Hackathon)
4. Irina Mozhginskaya: 4 days (Days 1, 2, 3, and Hackathon)
5. Lara Ribič: 4 days (Days 1, 2, 3, and Hackathon)
6. Nika Hozjan: 4 days (Days 1, 2, 3, and Hackathon)
7. Hana Skrbinšek: 3 days (Days 1, 4, and Hackathon)
8. Mojca Duh: 3 days (Days 1, 3, and Hackathon)
9. Til Trinkaus: 3 days (Days 1, 3, and Hackathon)
10. Vid Švab: 3 days (Days 1, 3, and Hackathon)

University North (UNIN)

1. Bojana Đurašević 4 days (Days 1, 2, 3, and Hackathon)
2. Ema Zavrtnik 4 days (Days 1, 2, 3, and Hackathon)
3. Gabriela Berić 4 days (Days 1, 2, 3, and Hackathon)
4. Inka Jakupc 4 days (Days 1, 2, 3, and Hackathon)
5. Iva Škrlec 4 days (Days 1, 2, 3, and Hackathon)
6. Jana Iličić (Jana Iličič) 4 days (Days 1, 2, 3, and Hackathon)

7. Lara Bosanac 4 days (Days 1, 2, 3, and Hackathon)
8. Maja Crljenica 4 days (Days 1, 2, 3, and Hackathon)
9. Martina Blažun 4 days (Days 1, 2, 3, and Hackathon)
10. Mia Nardić 4 days (Days 1, 2, 3, and Hackathon)
11. Michaela Zrnić (Michael Zrnić) 4 days (Days 1, 2, 3, and Hackathon)
12. Paula Vidoša 4 days (Days 1, 2, 3, and Hackathon)

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