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Novel Biotechnological Solutions in Climate Change Mitigation

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

The second day started under the moderatorship of Prof Dr Yiannis Kourkoutas and Assist Prof Dr 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 Dr Vasiliki Kachrimanidou and Assist Prof Dr Maria Alexandri gave lectures about Industrial biotechnology, followed by the Q&A session.

The fourth day, Assoc Prof Dr 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](#)

[Lectures](#)

[Student Evaluations](#)

2. Student Satisfaction Survey Analysis

A. Participant Demographics and Focus Areas - Ionian University

The following table summarises the distribution of participants across academic years and their primary biotechnological focus areas as defined in the training questionnaire.

Table 1: Participant Profile Summary

Category	Metric	Total (N=13)	Percentage (%)
Academic Year	1st Year	0	0%
	2nd Year	0	0%
	3rd Year	11	84.6%
	4th Year	2	15.4%
	Graduate (MSc or PhD)	0	0%
LTTA Focus Area	Climate Change Mitigation	2	15.4%
	Mitigation of Disaster Effects	0	0%
	Plant Biotechnology	1	7.7%
	Microbial Biotechnology in Soil-Plant Systems	3	23.1%
	Industrial Biotechnology	6	46.2%
	Other (Biopolymers)	1	7.7%

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	48.2% (4) 38.5% (5)
Entrepreneurship: Considering starting a biotech start-up or initiative.	3	15.4% (4) 0% (5)
Industry Preference: Prefer to work in biotech industry (public/private).	4	84.6% (4) 0% (5)

Satisfaction: Overall LTTA organisation met expectations.	5	23.1% (4) 53.8% (5)
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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:

- The students reported that through their participation in the LTTA activity they gained a clearer and more structured understanding on climate change and its impact on the environment, agriculture and food production. They highlighted specific examples including the effect of minor temperature variations on plants and crops along with the potential of biotechnology to provide sustainable solutions that support climate change mitigation. Likewise, students emphasized the added value of working with partner universities from different countries and delivering presentations in English.

• Most Inspiring Aspect:

- Students reported that the LTTA was particularly engaging due to the range of relevant topics discussed, including seed priming, plant biotechnology, climate change and disaster impacts on agricultural productivity, and blueberry cultivation. The innovative and sustainable ideas presented, along with the diverse approaches adopted by the students in exploring their toppings, made the experience particularly enriching. Some students also noted that the activity stimulated a strong interest in biotechnology and environmental issues, emphasizing the close interconnection of these fields, specially through applications such as isolation and introduction of beneficial genes into crops to enhance tolerance and resistance. Furthermore, collaboration and presentations with students from different countries and universities expanded the possible perspectives to an inspiring and impactful experience.

• Career Impact:

- Students reported that the LTTA helped them to appreciate the valuable knowledge gained through experiential learning and exposed them to a wide range of future academic and professional possibilities. It also influenced their perspective on climate change and strengthened their interest in environmentally benign solutions, particularly the ones related to reducing risks to crops and adapting agricultural practices to changing weather conditions. The program also inspired some students to considered a career or entrepreneurial path in biotechnology, potentially through a master's degree focusing on sustainable innovations in the food sector. Moreover, participants noted that they developed great confidence in conducting independent research and communicating their findings in English. Ultimately, while students are still exploring their options, the LTTA broadened their horizons, revealed new opportunities and motivated them to pursue their goals in biotechnology and the food industry.

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:

- Based on the students' responses, there were no major challenges during the lectures, although occasional technical or connection issues resulted in minor confusion for both speakers and participants, and at times the audio quality hindered comprehension. Certain lecture topics were demanding due to their advanced content, specialized vocabulary, or complex procedures, especially for undergraduate students. Despite these challenges, the programme was well-structured, with lecturers offering consistent support by addressing questions and clarifying difficult concepts. Presenting the team's project to universities from different countries also posed a challenge but was highly valuable. Regardless of minor difficulties, the lectures were engaging, generally comprehensible, resulting in a positive overall learning experience.

• Mitigation Strategy for Piloting:

In an attempt to mitigate the above-mentioned technical difficulties and challenges, our suggestions are listed as follows:

- Conduct pre-session technical checks and provide guidance on troubleshooting connectivity or audio issues.
- Share the lectures materials (notes and/or presentations) to support the comprehension of advanced biotechnology topics.
- Include a structured Q&A session or discussions in small-groups to elucidate complex points.
- Provide presentation guidance to students, prior to their presentations, including tips on clear communication and strategies to explain complex concepts in diverse audience.
- Implement brief post-lecture feedback to quickly identify and resolve issues associated with technical problems and topic difficulty.

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	2/13	Students noted that LTTA presentations generated interest on marketable added value products and the role of biotechnology in sustainability and food science. <i>(Business-wise, I understood that the biotechnology sector does not set barriers and that in</i>

		<i>the future it is necessary, especially in food science.)</i>
Critical Thinking	7/13	Students highlighted how they applied critical thinking in search of identifying relevant and reliable information during project preparation. <i>(Critical thinking was used in researching and organizing the content.)</i>
Problem-Solving	2/13	Responses stated that LTTA enhanced problem-solving skills either related to teamwork or even team collaboration on the project. <i>(example- finding solutions to problems that may occur during teamwork/ the target of the presentation was to find the solution to climate change problems)</i>
Effective Communication	8/13	The majority of the students underlined how LTTA boosted their communication skills, both through collaborating with their teammates while preparing the project and through interaction with the instructors. <i>(I used effective communication both with my team and with the rest of participants and lecturers due to the presentation we had to make in the last lecture.)</i>
Teamwork	13/13	Students reported that the LTTA significantly enhanced their teamwork skills, as they learned to collaborate effectively with diverse team members, share responsibilities, coordinate tasks, and work together under time and content constraints to achieve common goals. <i>(effective teamwork and coordination were essential during the preparation of our group presentation, as we had to collaborate efficiently)</i>
Other 1: Time management skills	2/13	Students noted that they had to practise time management to meet the specific time allowed for their presentations.

		(we had to collaborate efficiently while respecting the LTTA time and content limitations)
Other 2: Remote learning and Active listening skills	1/13	(paying attention during teacher's presentation)

F. Indicators of Achievement

- **Attendance Rate:** (Requirement: 70% for certification, determined at least 3 days of participation).
- **Certification:** Thirteen (13) students successfully attended the LTTA, which equals to 100% attendance rate

G. Conclusion and Recommendations

The LTTA assessment indicates that the LTTA successfully fostered the readiness of students to think creatively about generating biotechnology-based ideas to mitigate the impacts of climate change. Through collaborative projects, problem-based learning activities, and expert-led discussions, students were encouraged to apply the theoretical knowledge stemming from the presentations to their project preparation. The feedback provided by the participants along with the project outcomes (particularly in the presentations) highlight increased confidence, creative engagement, critical thinking, team work, effective communication and their interest to delve into innovative and interdisciplinary biotechnology approaches. Overall, the LTTA offered a strong foundation to promote creative thinking in the context of biotechnology and climate change mitigation.

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Date: 30/01/2026

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, and 4)

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. Esmâ 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 Eyliatou): 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 Jakupec 4 days (Days 1, 2, 3, and Hackathon)
5. Iva Škrlec 4 days (Days 1, 2, 3, and Hackathon)
6. Jana Iličić (Jana Iličić) 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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