



ILCA
Innovation Laboratories
for Climate Actions



CASE STUDY

ILCA in Bulgaria serving as a channel of
knowledge transfer and business-HEI
collaboration

University of Forestry, Bulgaria

THIS CASE STUDY WAS SUPPORTED BY THE ILCA PROJECT WITHIN THE EIT HEI INITIATIVE – CAPACITY BUILDING FOR HIGHER EDUCATION, FUNDED BY THE EUROPEAN UNION.

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2024

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INTRODUCTION

The innovation climate laboratory named Laboratory for Entrepreneurship and Innovations (LEI) at the University of Forestry in Bulgaria stands at the forefront of contemporary education and research, merging the boundaries of academic inquiry with practical solutions for climate change. As a pioneering climate lab, it has carved out a niche in the spheres of business consulting, forest policy formulation, and educational facilitation. This case study aims to dissect the laboratory's multi-faceted approach to fostering a generation of students equipped with the knowledge and skills necessary to combat and adapt to climate change. Set against the backdrop of a global environmental crisis, the laboratory's work is both timely and imperative. It serves as a crucible where theoretical frameworks on sustainability meet actionable strategies, shaping not only the minds of students but also influencing the practices of businesses and the policies governing forests. The lab's commitment to entrepreneurship and innovation provides a dynamic space where ideas can flourish, and transformative solutions can be cultivated. The narrative of the laboratory is one of ambition and hope – an emblem of what academia can achieve when it dares to step beyond its conventional boundaries and engage with the pressing issues of our time. The University of Forestry's venture into this holistic and integrative model showcases the potential of educational institutions to be catalysts for change, making the Laboratory for Entrepreneurship and Innovations a beacon of inspiration and a model worth emulating.

Rationale and Objectives

The establishment of the Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, is grounded in the urgent need for academic institutions to actively participate in addressing global challenges, particularly climate change. The rationale for this laboratory hinges on several critical observations:

1. **Climate Urgency** : The escalating effects of climate change demand immediate and effective solutions that can be applied locally and scaled globally. Forestry and land use are pivotal areas where impactful interventions can be applied.
2. **Educational Gap** : There is a recognized need for educational programs that not only inform but actively engage students in practical climate action strategies, ensuring that future leaders are prepared for the complexities of sustainability and environmental stewardship.
3. **Policy and Practice Disconnect** : Often, there is a significant gap between sustainable policies and their practical implementation, especially in the forestry sector. Effective consulting and policy facilitation can bridge this gap, leading to more robust and applicable environmental strategies.
4. **Innovation in Forestry** : The sector's traditional approaches are increasingly insufficient to meet the modern challenges of sustainability and environmental impact reduction. There is a pressing need for innovative solutions that incorporate new technologies and entrepreneurial strategies.

Objectives of the Laboratory

Based on its rationale, the Laboratory for Entrepreneurship and Innovations aims to achieve the following objectives:

1. **Foster Innovation in Climate Solutions** : To develop and promote innovative and practical solutions to climate change, focusing on sustainability in forestry and related industries.
2. **Educate and Empower Students** : To equip students with the knowledge, skills, and attitudes necessary to become leaders in climate action. This involves hands-on training in climate change mitigation and adaptation, entrepreneurship, and sustainable business practices.
3. **Policy Development and Facilitation** : To contribute to the formulation of effective forest policies that are both scientifically sound and feasible for implementation. The laboratory seeks to act as a think tank, providing expertise and research support to governmental and non-governmental organizations.
4. **Business Consulting** : To offer consulting services that help businesses within and related to the forestry sector, wood-processing, agriculture and ecology incorporate sustainable practices into

their operations. This includes assisting businesses in understanding and mitigating their environmental impact and identifying opportunities for sustainable growth.

5. Community Engagement and Collaboration : To engage with local, national, and international communities to promote understanding and collaborative action on climate change. This includes workshops, seminars, and public lectures that raise awareness and foster community involvement in sustainable practices.

By meeting these objectives, the Laboratory for Entrepreneurship and Innovations not only contributes to the academic mission of the University of Forestry but also plays a critical role in the broader fight against climate change, promoting a more sustainable future for all.

Design and Structure

The design and structure of the Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, should facilitate its multifunctional goals of research, education, policy support, and business consulting. Here's a detailed breakdown of how the laboratory can be organized:

Physical Design

The physical design of the LEI is provided by the university's facilities. They are available for the lab's activities.

- Workshop Areas : Practical areas where students and researchers can develop and test models, simulating real-world scenarios.
- Seminar Rooms : Smaller rooms for seminars, guest lectures, and discussion groups to facilitate in-depth analysis and learning.
- Research Labs : State-of-the-art laboratories tailored for specific studies on ecology, sustainable practices, and climate change mitigation technologies.
- Data Analysis Suites : Equipped with powerful computing resources for large-scale data modeling and climate simulation.

4. Administrative and Support Areas:

- Offices: For faculty and administrative staff.
- Meeting Rooms : For discussions with business clients and policy stakeholders.
- Resource Center: Housing a library of resources, case studies, and publications relevant to forestry and environmental innovation.

Organizational Structure

1. Core Teams:



- Research and Development (R&D) Team : Focuses on developing new technologies and strategies for forestry management and climate adaptation.

- Education Team : Develops curricula, organizes workshops, and manages student projects and internships.

- Consultancy and Policy Team : Offers expert advice to businesses and government bodies, facilitating the implementation of sustainable forestry policies.

3. Integration with University Departments:

- The laboratory closely collaborates with various university departments such as the Department of Ecology, Department of Alternative Tourism, Department of and Departments of Wood Technology and Production of Furniture.

- This integration facilitates a multidisciplinary approach, ensuring that the lab's projects and research are comprehensive and relevant.

Technological Infrastructure

- Sustainable Building Technology: The physical structures of the lab should be examples of sustainable design, using green building materials and incorporating energy-efficient systems.

- Advanced IT Infrastructure: High-speed internet, cloud computing solutions, and specialized software for simulation and design.

- Communication Tools: Tools and platforms for effective internal communication and for hosting virtual meetings with international partners.

This design and structure enable the Laboratory for Entrepreneurship and Innovations to effectively meet its objectives, fostering a synergistic environment that promotes learning, innovation, and practical solutions to the challenges of climate change and forestry management.

Innovation Processes and Tools

To optimize the impact and efficiency of the Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, it is essential to integrate structured innovation processes and advanced tools. Here's how this is structured:

Innovation Processes

1. Ideation and Concept Development:

- Brainstorming Sessions: Sessions to generate new ideas, capture and organize thoughts. These sessions are provided by the LEI team and
- Design Thinking Workshops: Focused on solving specific environmental or forestry-related challenges, these workshops engage participants in empathizing, defining, ideating, prototyping, and testing solutions.

2. Research and Development (R&D):

- Academic Studies: Assessing the technical and economic viability of new ideas and models, available for practical implementation in business. These studies the LEI team provides on a regular basis related to the common academic activities of each member. In this way the LEI is capable to share the latest achievements of the team members made in their research.

3. Collaboration and Partnerships:

- Cross-Disciplinary Teams: Combining expertise from environmental science, engineering, business, and other relevant fields to foster innovative solutions.
- Industry Partnerships: Collaborating with forestry enterprises, public administration, and NGOs to bring practical insights into the lab's projects and increase their market relevance.

4. Evaluation and Scaling:

- Scaling Strategies: Identifying successful innovations for larger-scale implementation and preparing detailed plans for rolling out solutions beyond pilot phases.

Innovation Tools

1. Digital and Analytical Tools:

- Contemporary non-parametric methodologies like Data Envelopment Analysis for provision of up to date information to each economic system being consulted by the LEI
- Data Analytics Platforms: To process large sets of environmental data for insights that drive policy and innovation decisions.

2. Educational and Dissemination Tools:

- Short-time training courses. The lab easily reacts to the changing environment by combining the right people at the right time in order to provide the expertise necessary to address the current needs of different stakeholders.



- Mentoring the young researchers' ideas, including students, graduates, and Ph.D. students. The LEI is capable of providing mentoring on particular problems solving in favor of the university activities, thus increasing the capacity of education if necessary.

By systematically employing these innovation processes and tools, the Laboratory for Entrepreneurship and Innovations will not only advance its research and educational objectives but also significantly contribute to the practical application of sustainable forestry practices and climate resilience strategies.

Collaboration and Engagement

The Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, recognizes the critical importance of collaboration and engagement with various stakeholders to advance its mission of fostering innovation in forestry and climate change mitigation. Here's how the laboratory is structured to facilitate these interactions:

1. Academic and Research Partnerships:

- Inter-Departmental Collaborations: The laboratory collaborates with other university departments to leverage interdisciplinary knowledge and techniques.
- Joint Research Initiatives: Partnerships with other academic institutions and research centers worldwide to conduct collaborative research projects, share resources, and exchange knowledge.

2. Industry Collaborations:

- Corporate Partnerships: Engaging with forestry and different companies to apply the latest innovations in real-world settings and adapt research findings to practical applications.
- Consultancy Projects: Offering expertise to industry clients, helping them implement sustainable practices and innovate within their operations. This not only provides benefits for the laboratory but also real-world data and case studies for research.

3. Government and Policy Engagement:

- Policy Advisory Roles: Members of the laboratory serve on advisory panels to help shape national and regional policies on forestry and environmental sustainability.

- **Regulatory Collaboration:** Working with governmental bodies to test and refine regulatory changes, ensuring that new policies foster innovation while protecting environmental and public interests.

4. Community and Public Engagement:

- **Educational Outreach:** Conducting workshops, seminars, and public lectures to raise awareness about climate change and sustainable forestry practices. These events are designed to engage the community and stimulate public interest in environmental issues.

- **Citizen Science Projects:** Encouraging community members to participate in data collection and environmental monitoring efforts, fostering a culture of involvement and stewardship.

5. International Networks and Conferences:

- **Scientific Forums:** Participating in international conferences and symposia to stay connected with global trends, share findings, and network with international peers.

- **Collaborative Publications:** Co-authoring papers with international researchers, expanding the reach and impact of the laboratory's research.

Through these diverse modes of collaboration and engagement, the Laboratory for Entrepreneurship and Innovations not only amplifies the impact of its research and educational programs but also ensures that it remains at the cutting edge of developments in forestry and climate action. This integrative approach helps bridge the gap between theory and practice, making the laboratory a pivotal force in driving sustainable change.

Impact and Success Stories

The laboratory at the University of Forestry, Bulgaria put into practice the developed concepts and the accumulated potential within the ILCA project :

Forest Week as a powerful tool for public, government and policy engagement

On the occasion of the celebration of "Forest Week-2023" on 04.04.2023 from 3-5 p.m. in the hall "Academician Mako Dakov" of the Forestry University (LTU) the discussion on the topic "Creating new forests as a means for climate change mitigation". The discussion was opened by Associate Professor Dr. Emil Kichukov - Head of the Center for the Promotion of Entrepreneurship at LTU.



Representatives of the management of LTU took part in the discussion: art. cor. Prof. D.Sc. Ivan Iliev - Rector of LTU, Prof. Dr. Milko Milev - Deputy. Rector, Prof. Dr. Ivan Paligorov - Dean of FSU, Prof. Dr. Rumen Tomov - Dean of AF, Assoc. Dr. Marius Dimitrov - Dean of FGS, Assoc. Dr. Ekaterina Todorova - Dean of FELA and etc. professors from the university; representatives of the Forestry Executive Agency - Eng. Tony Krastev - Director of the Directorate "Forests" and experts from the Directorate, representatives of the Southwest State Enterprise YZDP - Blagoevgrad and territorial divisions "State Forestry" and "State Hunting", representatives of interested parties companies: "Mini Maritsa East" - Eng. Vladimir Etov, Head of the "Ecology" Department and of "Dundee Precious Metals - Chelopech" - Mr. Atanas Stoev, as well as a number of students.



Prof. Dr. Svetoslav Anev presented an introductory presentation on the topic, after which Prof. Dr. Nasko Iliev presented a presentation on the topic "FORESTATION - A POWERFUL TOOL FOR CARBON FIXATION", and Prof. Dr. Emil Kichukov presented the international project of the program HEI of EIT Climate - KIC "Innovation Labs for Climate Action" - ILCA with coordinator Savonia University of Applied Sciences, Finland and partner LTU.



Most of the participants took part in the discussion on the topic, resulting in the following proposals:

Politicians should also be invited to such discussions on strategically important issues for the country and humanity.

A request should be made to the National Assembly and the Council of Ministers to take stricter measures regarding the installation of solar panels, as well as legislative restrictions on the use of fertile land for similar purposes.

Discussions on topics related to climate change and possible actions to solve problems related to them should be held more often and the participation of journalists and their coverage in the national media should be sought.

The information was prepared by Assoc. Dr. Emil Kichukov – team member of the of the "Innovation Laboratories for Climate Action" - ILCA.

Innovation week supported by the Innovation Laboratory

On the initiative of the University of Forestry, from November 20 to 24, an international innovation week was held under the ILCA project "Innovation laboratories for climate action", in which the university works together with eight other scientific and educational organizations from Finland, Lithuania, Romania and Ukraine. During the week, a number of events were held, such as: Round table-discussion on the topic "Management of waste wood" with the participation of business representatives, IAG under the Ministry of Agriculture, local and national authorities, teachers and students; presentation of innovative start-up companies, such as "Carboni", "Carbonsafe", etc. in front of students and teachers; presentations, exhibitions and events of startups (Sofia2Go, EnEfect, etc.) and non-governmental organizations "BDZP" under the motto "Eco-entrepreneurship and sustainable behavior"; Round table "Management of forest fires" with the participation of representatives from the Forestry Executive Agency, State Forestry Enterprises, fire safety experts, volunteers, teachers and students.



The head of the project for LTU, Prof. Dr. Ekaterina Todorova, presented the project to the representatives of business, state administration, teachers and students attending the solemn meeting "50 years of environmental education in Bulgaria".



On the last day of the week, the best student projects from each of the partners related to the sustainable use of natural resources, the circular economy and eco-efficiency were presented in a video conference between the project participants. LEI in the University of Forestry conducted a students contest for green innovation ideas, that was presented on the last day of the Inno Week.



Representatives of the project took part with a presentation table at the annual conference of the Branch Chamber of the Woodworking and Furniture Industry and in a discussion "The circular economy and the requirements of the EC on sustainable development."

Training and mentoring for capa town building within the University of Forestry

The laboratory at the University of Forestry offered the local public, in the form of students and staff, opportunities to upgrade knowledge. The laboratory (LEI) developed and conducted various short-term trainings on the issues of green innovation, entrepreneurship, circular economy, modern methods of applying green thinking in people's lives, etc.



Mountainous communities engagement and education

Thanks to the teaching premises that the Forestry University provides for the use of the laboratory, it succeeds in working local communities in remote parts of the university. One such division in forestry in the Yundola district. This is a remote area where local people support themselves by gathering herbs, mushrooms and working in the forestry department. For the first time the University of Forestry managed to engage them into educational activities and knowledge transfer thanks to the Innovation Laboratory-LEI. Through this way these communities were provided with courses on the thematic of entrepreneurship, innovations and utilisation of bio-waste generated in their farms and homes.



Multidisciplinary pitching

The innovation laboratory at the Forestry University - LEI achieved a breakthrough in the thinking of the team members and all participants in the various initiatives. Thanks to the lab, specialists from different fields participated in the idea generation sessions and worked as a unit. The individualism characteristic of Bulgarians was overcome, thanks to the unifying role of the laboratory. Numerous brainstorming sessions were conducted

Sandanski town roadmap

Situated in the beautiful countryside of Bulgaria town of Sandanski is a famous spa centre and one of the national hubs for vegetables production. The purpose of the climate roadmap for Sandanski town in Bulgaria is to strategically outline actionable measures aimed at enhancing water management, waste reduction, and promoting sustainable urban mobility to mitigate climate change impacts and foster a resilient and environmentally conscious community.

The main objectives are:

1. Implementing water conservation and management strategies to ensure sustainable access to clean water resources and mitigate the risks of water scarcity and pollution.
2. Establishing waste reduction and recycling initiatives to minimize the environmental impact of waste disposal and promote a circular economy within Sandanski town.
3. Enhancing urban mobility infrastructure and promoting eco-friendly transportation options to reduce greenhouse gas emissions, alleviate traffic congestion, and improve air quality in the town.

The practice evolutionary develops the process of ideas generation, stakeholders engagement, identification of actions, evaluation and implementation. The first phase includes:

- Situational analysis
- Context definition
- Actor involvement
- Defining focus areas: water, urban mobility and circular economy

The second phase includes three workshops for stakeholders involvement and transferring their ideas into actions. The workshops are following:

- Workshop 1: identifying. In this workshop all the stakeholders participate in sessions on water, waste and mobility. They provide actions related to problems and rank them according to the importance.
- Workshop 2: evaluation. In this workshop participants from the first one evaluate actions regarding their feasibility and provide particular features to every action like budget, challenges of implementation, time slots and difficulties.
- Workshop 3: selecting. The participants from the previous two workshops select the next actions needed and provide practical steps for implementation.

The third phase includes actual implementation of the most feasible actions and development of long term collaboration: Climate Innovation Lab Community, EIT-Climate-KIC and other actors.

The main lesson learned is the key role of HEIs in improving the climate oriented management of municipalities.



Lessons Learned

The various initiatives and projects carried out by the Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, provide valuable insights into effective strategies for enhancing climate action and fostering sustainable practices. Here are the key lessons learned:

- 1. Interdisciplinary Collaboration:** The successful integration of different academic disciplines and perspectives has been crucial. Engaging specialists from diverse fields has led to more holistic and innovative solutions. This interdisciplinary approach has also helped in overcoming individualism, fostering a team-oriented mindset that is essential for addressing complex environmental issues.
- 2. Community Engagement and Education:** Active engagement with local communities, especially in remote or marginalized areas, has been instrumental. The laboratory's initiatives in regions like Yundola show that direct involvement in education and knowledge transfer can significantly impact local sustainability efforts. Providing practical courses on entrepreneurship and bio-waste utilization empowers communities to develop sustainable practices that directly benefit their local environment and economy.
- 3. Effective Public and Policy Engagement:** Events like "Forest Week" have demonstrated the power of public discussions and policy-oriented debates in raising awareness and driving legislative and behavioral change. Engaging policymakers, industry leaders, and the general public in meaningful dialogues about forest management and climate change mitigation can lead to more informed decisions and stricter environmental regulations.
- 4. Innovation and Entrepreneurship in Education:** Incorporating entrepreneurship and innovation into the curriculum has prepared students to think critically and creatively about climate change and sustainability. Competitions and innovation weeks serve not only as platforms for idea generation but also as incubators for viable green business concepts that students can take forward into their careers.
- 5. Strategic Stakeholder Involvement:** The inclusion of various stakeholders in the planning and execution phases of projects enhances the relevance and applicability of the outcomes. For instance, the involvement of business representatives, local and national authorities, and students in discussions about waste wood management during the innovation week shows the importance of gathering diverse inputs for comprehensive solution development.
- 6. Sustainability in Practice:** The laboratory's efforts have highlighted the importance of translating theoretical knowledge into practical actions. Through training sessions and short-term courses, participants not only learn about green innovations and the circular economy but also how to apply these concepts in real-world settings effectively.
- 7. Capacitation and Knowledge Upgrading:** Continuous learning opportunities for students and staff help keep the academic community at the forefront of the latest environmental and forestry management practices. This ongoing capacitation is essential for maintaining the relevance and impact of educational institutions in combating climate challenges.

Future Directions and Sustainability

As the Laboratory for Entrepreneurship and Innovations at the University of Forestry, Bulgaria, continues to evolve and expand its impact, strategic planning for future directions and sustainability is essential. Here are key areas the laboratory can focus on to enhance its effectiveness and long-term sustainability:

1. Expanding Research Focus:

- **Emerging Technologies:** Investigate emerging technologies such as artificial intelligence, blockchain, and remote sensing to enhance forest management and climate action strategies.
- **Biodiversity Conservation:** Integrate biodiversity considerations into climate action plans, studying the synergies between biodiversity preservation and climate resilience.

2. Strengthening Partnerships:

- **International Collaborations:** Forge new partnerships with international research institutions and innovation labs to exchange knowledge and co-develop solutions to global environmental challenges.
- **Industry Collaboration:** Strengthen ties with the private sector, particularly in green technology and sustainable forestry practices, to translate research into market-ready solutions.

3. Enhancing Educational Programs:

- **Curriculum Development:** Continuously update educational offerings to include the latest research and technologies in forestry and environmental science.
- **Skill-Based Training:** Expand skill-based training to include modern tools and methodologies, such as data analysis, enhancing graduates' employability and effectiveness in the field.

4. Policy Influence and Advocacy:

- **Policy Workshops:** Regularly host workshops that bring together policymakers, researchers, and practitioners to discuss and develop policy frameworks that support sustainable forestry and climate adaptation.
- **Advocacy Campaigns:** Launch campaigns to advocate for stronger environmental policies and increased public and private investment in climate action.

5. Community Engagement and Outreach:

- **Public Seminars and Webinars:** Increase public awareness and engagement through frequent seminars and webinars on important environmental issues.
- **Community-Based Projects:** Develop more community-based projects that directly involve local populations in sustainable practices, enhancing public participation and support for environmental initiatives.

6. Sustainability and Self-Funding:

- **Grant Writing and Fundraising:** Enhance capacities in grant writing to secure funding from international donors, foundations, and government grants focused on environmental innovation.
- **Revenue-Generating Services:** Develop consultancy and advisory services as a revenue stream to support the lab's activities, making it partially self-sustaining.

7. Technological Upgrades:

- Infrastructure Improvements: Invest in upgrading laboratory infrastructure to support high-quality research and development activities.

- Digital Transformation: Embrace digital tools and platforms for better data management, remote collaboration, and dissemination of research findings.

8. Monitoring and Evaluation:

- Impact Assessment: Implement robust monitoring and evaluation frameworks to assess the impact of the laboratory's projects and initiatives on the environment and local communities.

- Feedback Mechanisms: Establish feedback mechanisms to gather insights from all stakeholders, ensuring the lab's activities remain relevant and effective.

Conclusion

The Laboratory for Entrepreneurship and Innovations stands as a tool of progress in the environmental and forestry sectors. Its comprehensive approach to combining theory with practice, engaging with diverse stakeholders, and pioneering sustainable solutions serves as a model for others. The laboratory not only represents the potential of academic institutions to contribute to global challenges but also highlights the critical role of innovation and collaboration in achieving sustainable development and mitigating climate change. As the laboratory continues to grow and evolve, it promises to remain a key contributor to the field, shaping the future of forestry and environmental stewardship for the better.