

A Century of Forest Knowledge: Reflections from an International Scientific Milestone

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Abstract

This special issue of the Forestry Ideas is dedicated to the international scientific conference ‘A Century of Forest Knowledge: Education, Innovations, Challenges’, held to mark 100 years of university forestry education in Bulgaria. This event served as a significant academic forum for forestry researchers, practitioners, and policymakers. Given the unprecedented pressures facing forest ecosystems – from climate change and extreme weather events to prolonged droughts, wildfires, and other global challenges – the role of forest science and education has become more critical than ever. The conference placed strong emphasis on sustainable forest management, biodiversity conservation, ecosystem restoration, and the protection of old-growth forests. These themes reflect the urgent need for integrated, evidence-based approaches to forest management and conservation. The conference brought together a vibrant international community, featuring 116 scholarly contributions from 433 co-authors across 13 countries and over 30 academic and research institutions. We were also honoured to host participants from scientific organisations, governmental bodies, and non-governmental organisations, further underscoring the interdisciplinary and collaborative spirit that defines modern forestry science. The main thematic fields of the conference were: Climate change and forests; Ecosystem biodiversity, conservation and environmental restoration; Agriculture in mountainous and semi-mountainous regions; Forest disturbances and management challenges; Forest stand dynamics, growth and yield; Forest policy and key challenges; Forest operations and wood processing; Wildlife conservation and management; Landscape architecture.

Key words: biodiversity, conservation, ecology, education, forestry, management.

One hundred years ago, on 28 January 1925, the Academic Council of Sofia University resolved to establish the Department of Forestry within the Faculty of Agronomy, thus laying the foundation for higher forestry education in Bulgaria. Today, we celebrate a century of knowledge dedicated to forests – a century of educa-

tion, innovation, and challenges.

This centennial milestone is a source of well-deserved pride and an occasion for reflection. Over the past 100 years, our faculty has much to celebrate and be proud of: the pioneering professors who shaped a generation of young foresters instrumental in restoring Bulgaria’s forest

wealth; the thousands of alumni who have contributed to forest conservation; and the foresters who, even today, uphold the honour of their profession, faithfully serving Bulgaria's forests and preserving them for future generations. The forests of Bulgaria, as we know them today, owe their existence to the tireless efforts and dedicated service of generations of foresters educated at the University of Forestry.

Forestry emerged as a scientific discipline in Europe, and later took root in Bulgaria, in response to industrialisation, deforestation, soil erosion, and flooding. The need for afforestation, flood control, and the mitigation of natural disasters, which had become evident over the past few centuries, was recognised by Bulgarian society. The first foresters undertook the noble mission of creating new forests, addressing these environmental challenges with commitment and vision.

Nowadays, forestry aims to conserve and naturally regenerate forests, preserve biodiversity and old-growth forests, and maintain their ecological, climate-regulating, water-protective, and recreational functions. The forest wealth of Bulgaria is of inestimable value owing to its ecological functions, diverse species composition, and the presence of primary forests. The country ranks among Europe's leaders in terms of the biodiversity of forest ecosystems and the highest proportion of old-growth forests. A significant part of them is included in the Natura 2000 European ecological network. Forested areas in the country span 4.18 million hectares, accounting for 37 % of its territory. Almost 8 % of the total forested area is protected, 65,688 ha of forests are in reserves of different categories, and 78,359 ha (2 % of the forests) within national parks (Angelstam et al. 2021, Nagel et al. 2025). Old-growth forests designated by Ministry

of Agriculture and Food cover 109,303 ha (2.81 % of the total forested area). Most old-growth forests are located within national parks and reserves. This achievement is a testament to the contributions of our faculty's alumni, as we celebrate the 100th anniversary.

However, the situation was markedly different a century ago. Looking back, we encounter a starkly contrasting picture. At the end of the 19th and the beginning of the 20th century, the condition of Bulgaria's mountains and forests was disastrous. The 'ancient and impenetrable' medieval forests had all but vanished, surviving only in the accounts of travellers. Contemporary evidence of this past grandeur is found in the few remaining majestic, silent forests such as Tulovska Koriya, Marashka Koriya, and Yulievka Koriya (Tsavkov et al. 2025). According to data from Felix Vogely, published in his first manual on 'Torrent Control and Afforestation' (1911, pp. 68–79), 168 floods were recorded along the Maritsa, Yantra, Iskar, and Tundzha rivers in the first 11 years of the 20th century, resulting in 84 human casualties and damage exceeding 1 billion Bulgarian leva (BGN). These devastating floods swept away fertile lands, denuded mountain slopes, and even claimed human lives. From 1900 to 1926, Bulgaria's forest area decreased from 3 million to 2 million hectares, representing a mere 19 % of the country's total area.

In recent decades, Bulgaria's forests face numerous challenges – climate change, prolonged droughts, extreme weather events, floods, natural disasters, unprecedented forest fires, and the decline of some coniferous forests established in the past. Many of these challenges are of global significance. Foresters must address these issues, requiring modern education aligned with current

trends, innovative approaches, and a robust scientific foundation.

Celebrating a century of forest knowledge, the University of Forestry, which includes the Faculty of Forestry, stands as a modern educational and scientific hub. Originating as the successor to the Faculty of Agronomy and Forestry at Sofia University and having operated as an independent higher education institution for 72 years (Fig. 1), the University of Forestry now educates students across five faculties, offering 11 bachelor's, 28 master's, and 36 doctoral programmes. It is not an easy task to summarise 100 years of history in a few pages, but significant and valuable information has been published in several articles and books (see Stoyanov 1968, Milev et al. 2010, Iliev et al. 2023, Tsavkov 2025).

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Given the unprecedented pressures facing forest ecosystems – from climate change and extreme weather events to prolonged droughts, wildfires, and other global challenges – the role of forest science and education has become more critical than ever. The conference placed strong emphasis on sustainable forest management, biodiversity conservation, ecosystem restoration, and the protection of old-growth forests. These themes reflect the urgent need for integrated, evidence-based approaches to forest management and conservation. Forests support countless rare and endangered species and provide vital environmental and social functions.

In the face of today's dynamic environmental challenges, decision-making

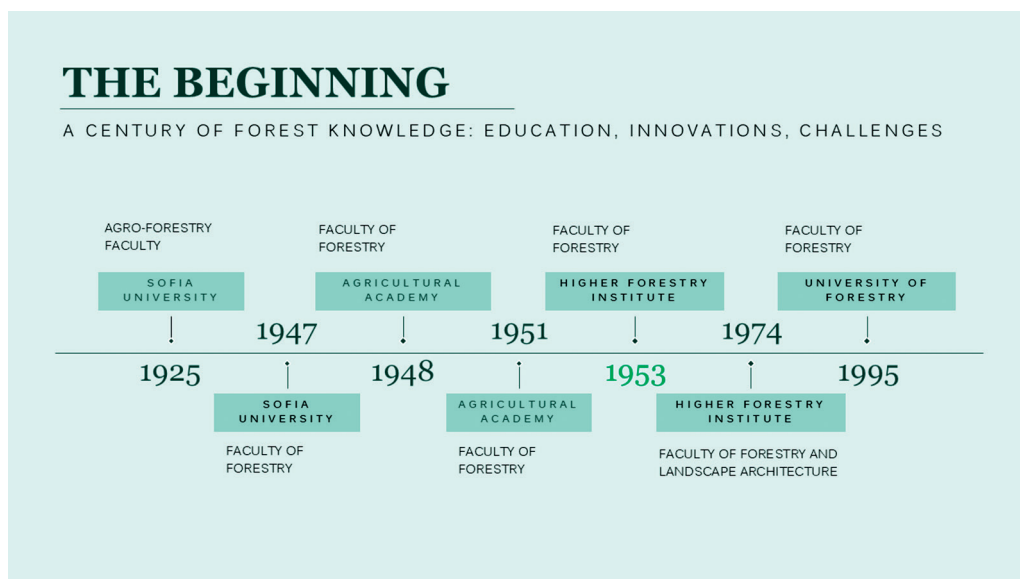


Fig. 1. A century of higher forestry education in Bulgaria: The timeline of the most important milestones in the history of University of Forestry.

in forestry management and conservation is fraught with uncertainty. Climate variability, shifting ecological conditions, and emerging threats such as invasive species and large-scale forest disturbances introduce significant risks. These complexities challenge policymakers and forest managers to make informed decisions with long-term implications. Adaptive resource management has become a cornerstone of modern forestry, enabling flexible, evidence-based strategies that respond to changing conditions. Advanced ecological and forestry models play a critical role in this process, providing predictive tools to assess risks, simulate ecosystem dynamics, and guide sustainable practices. By integrating data-driven models with adaptive management, foresters can better navigate uncertainties, ensuring the resilience of Bulgaria's forests while balancing conservation goals with societal and economic needs. These approaches underscore the importance of continued innovation and interdisciplinary collaboration in shaping effective policies for the future.

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The articles selected for inclusion in this special issue reflect the depth and diversity of the conference proceedings. Topics range from innovative forest monitoring technologies and climate-adaptive silvicultural practices to policy-oriented research on governance, education, and stakeholder engagement. Taken together, these contributions illuminate recent progress in forest science and delineate key priorities for future research.

The word cloud effectively highlights the main keywords (Fig. 2) from the articles included in the issue, providing a visual representation of the central themes in forestry, ecology, and conservation. The prominence of terms like 'forests', 'management', 'conservation', 'ecology', 'biodiversity', and 'climate' reflects the critical focus on sustainable forest management and the ecological challenges faced today. Other notable keywords, such as 'fires', 'drought', 'carbon', and 'restoration', underscore the pressing issues of climate change, natural disasters, and efforts to mitigate their impacts. The inclusion of terms like 'analysis', 'models', and 'technology' suggests a strong emphasis on data-driven approaches and innovation in addressing these challenges. Additionally, words like 'Bulgaria', 'mountains', and 'European' indicate a regional focus, likely tied to the context of Bulgaria's forest ecosystems and their significance within Europe.

We are confident that the insights presented in this volume will enrich academic discourse and provide useful guidance for both policy and practice. The conference, and by extension this special issue, has fostered valuable international collabora-



Fig. 2. Word cloud of the first 250 words, sorted by the frequency of appearance in the key words of the papers presented at the conference, produced using the R package *wordcloud* (Fellows 2018) in R (R Core Team 2025).

tion, knowledge exchange, and interdisciplinary dialogue that will continue to shape the next century of forestry science.

We extend our sincere gratitude to all authors, peer reviewers, and members of the editorial and scientific committees for their invaluable contributions to this publication. We also thank the institutions and sponsors who supported the organisation of the conference and the preparation of this special issue.

It is our hope that this collection of work not only marks a historic milestone in Bulgarian forestry education but also serves as a catalyst for continued innovation and cooperation in addressing the complex challenges facing our forests and societies.

As we look to the next century, the University of Forestry remains poised to lead in sustainable natural resource management solutions.

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