



Forest Sector Research and Development

A position of the Society of American Foresters

Originally adopted on April 30, 2021. This position statement will expire in 2026, unless, after subsequent review, it is further extended by the SAF Board of Directors.

Purpose

Support increased forest sector innovation, research, and development investment, coordination, and capacity in the United States.

Scope

Research and development conducted for the United States forest sector.

Position

The Society of American Foresters (SAF) supports increased investment, coordination, and alignment of forest-sector research and development in the United States. Research is critical for enhancing the long-term productivity, health, utilization, and sustainability of the nation's forest resources. Population growth, land use change, climate change, forest product markets, and invasive species have the potential to substantially alter forest landscapes. Strategic coordination and collaboration between research, grant funding, industry, and end-users is vital in setting research priorities and objectives. Innovation, coordination, and prioritization of research throughout the entire sector is paramount to maintaining global competitiveness, enhancing forest benefits, reducing risks, and promoting forest conservation and stewardship.

Issue

In 2017, the *Blue-Ribbon Commission on Forests and Forest Products Research and Development (R&D) in the 21st Century* (year) concluded that forest sector R&D in the United States was largely unfocused and underfunded. The commission noted that research and grant-funding organizations do not cooperate strategically on national priorities and rarely engage end-users in setting research goals. Additionally, declines in funding, loss of research positions, shifting disciplines and priorities, and reductions in private sector participation have all resulted in the erosion of forest research capacity in the United States. This not only threatens current scientific discovery and innovation, but also the ability to address future resource issues and problems. Global competitiveness is at stake, with competing countries and manufacturing sectors investing in R&D at a much higher rate relative to their annual gross revenue.

Background

Research and development is critical to address the current and future challenges facing any sector. Forestry research programs provide basic information and applied solutions for forest ecosystems, new product markets, and training for the future generation of scientists and research professionals.

Research, via early studies, has provided a foundation for US forestry since its beginnings with Bernhard Fernow in the late 1880s. Gifford Pinchot later supported fire research projects, and the first research area was established near Flagstaff, Arizona in 1908 (Price, 1976). The US Forest Service's flagship Forest Products Laboratory was established in 1910. Forestry research and development has expanded greatly since those early years.

Research Programs

Forest sector research and development in the United States is conducted and supported by federal, state, private, conservation, and philanthropic organizations. The federal government provides the overwhelming majority of research funds, primarily through the Department of Agriculture. Other sources of federal funding include the National Science Foundation (NSF), National Aeronautics and Space Administration, and the Department of Energy. These organizations administer competitive grant programs and, in many instances, conduct internal research on forest ecosystems.

USDA Forest Service R&D operates a network of five research stations, 81 experimental forests and ranges, the International Institute of Tropical Forestry in Puerto Rico, and the National Forest Products Laboratory in Madison, Wisconsin. This group also manages the Forest Inventory and Analysis program, the only national inventory system that delivers current and consistent information about the status, condition, and trends of America's forestland (See SAF Position Statement, *The Forest Inventory and Analysis Program, year*). The National Institute of Food and Agriculture (NIFA) provides funding for programs that advance agriculture-related sciences.

Colleges and universities across the country conduct research on a variety of forest topics and provide training opportunities for the next generation of scientists and researchers. Faculty and staff lead and manage research cooperatives, experimental stations, centers, institutes, and laboratories. State agencies also conduct research, though on a much more limited scale.

Corporate and private sector forest organizations sometimes maintain research programs or invest in external programs (McGinley, Guldin, and Cabbage, 2019). This includes conducting research on their own lands, joining public-private research cooperatives, maintaining membership in the National Council for Air and Stream Improvement, or through certification through the Sustainable Forestry Initiative, which requires a commitment to forest research.

Funding and Engagement

The federal government, primarily through USDA, provides approximately 70% of the total related research funding (McGinley, Guldin, and Cabbage, 2019). Universities contribute 20% from state appropriations and non-federal sources, while companies certified to the Sustainable Forestry Initiative provide 10%. Total forest research funding peaked in 2011 due to higher than

usual levels of funding from NIFA and NSF, though all of these sources have experienced reductions since then. When accounting for inflation, total funding levels for the USDA Forest Service, NIFA, and NSF were flat from 2001 to 2014.

The McIntire-Stennis Cooperative Forestry Research Program, created in 1962, has never received an appropriation at the level it was authorized (Bullard et. al., 2011). The USDA Forest Service, the largest forest research organization in the world, continues to see budget cuts, loss of positions, and funding redirected from R&D to other agency programs, especially fire suppression. Corporate and private sector organizations generally have not maintained forest research programs at the same level of the traditional, vertically integrated forest products corporations. Similarly, private sector participation in research cooperatives has also declined due to land divestitures, corporate consolidation, and the Great Recession of 2008 (McGinley, Guldin, and Cabbage, 2019).

The United States, when compared to other heavily forested countries, spends much less on forest sector R&D as a portion of their annual forest-based revenue. Prior to the near collapse of the housing sector in 2008, the US wood products industry invested 0.6% of revenue in R&D (Kellison, 2014). Canada invests approximately six times the US total on forest research for a sector that is 18% the size of that in the United States (US Endowment, 2017). Finland, a country of 5.5 million people, outspent the US by 67% on forest research. Forest industry firms in both of these countries contribute significantly to these totals (48% and 33%, respectively), indicating a strong public-private partnership.

Scientists and Disciplines

The number of scientists involved in forest sector R&D declined by an estimated 15% from 2002 to 2016, most notably in forest industry, though reductions were also substantial at SAF-accredited forestry schools and USDA Forest Service (McGinley, Guldin, and Cabbage, 2019). This problem is increasing as the wave of “baby boomer” retirements occur, with limited investment in their replacements.

During the same period, research interests shifted towards the biological diversity of forests, socioeconomics, and ecosystem health and away from studying the productive capacity of forests, laws, policies, and products. For example, the “ecologist” job title now represents the highest proportion (23%) of USDA Forest Service research scientist positions and was the only job series in R&D that grew between 2005 and 2015 (McGinley, Guldin, and Cabbage, 2019). Forest scientists are becoming increasingly specialized. This reflects trends in current public policy priorities, where research is shifting away from applied research on production and commodities toward more basic research on forest conditions, goods, and services.

Research Needs

Increasing impacts from climate change, wildfire, insects, disease, and invasive species can threaten forest health, productivity, and sustainability. Forest tree biotechnology and advanced silviculture have the potential to offer solutions (see SAF Position Statement, *Regulation of Genetically Modified Trees, year*). Additionally, further understanding of the role of forests in mitigating greenhouse gas emissions (see SAF Position Statement, *Forest Management, Carbon, and Climate Change, year*) will become increasingly important in the future.

Applied research focused on developing new markets for smaller-diameter trees, low grade wood, non-timber products, and ecosystem services is needed to enhance forest health, retention,

and landowner profitability (see SAF Position Statement, *Parcelization, Fragmentation, and Loss of Private Forestland in the United States*, year). Investments in wood use and product development are critical for the innovation required to increase or even sustain the sector's competitiveness in global markets (Ellefson et. al., 2010).

Future Implications

If forest research capacity in the United States continues to erode, further declines in R&D and innovation (McGinley, Guldin, and Cabbage 2019) are expected. This is likely to result in less commercial product development of forest-based goods and services, making it increasingly difficult to address many of the complex issues facing forests. Additionally, strong forest sector R&D in other countries threatens US forest sector jobs, further endangering rural communities' economic stability and well-being (US Endowment, 2017).

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