

I have been involved with forestry research since I earned my B.S. degree in forestry from Michigan Technological University in 1965 and my Ph.D. in Forest Genetics from Michigan State University (1969). I served as a Peace Corps Volunteer where I conducted forestry research at the National School of Forestry in Curitiba, Parana, Brazil (1970-72); and have taught forestry classes and conducted forestry research at Tuskegee University (1972-74) and the University of Maine (1974-80). I joined MeadWestvaco in 1980 to head up its genetics and tree improvement research. My testimony today is on behalf of the American Forest & Paper Association (AF&PA). I serve as chairman of AF&PA's Forest Science and Technology Committee, a committee comprised of industry representatives with a particular interest and expertise in forest-related research. The Forest Science & Technology Committee has a long history of reviewing publicly-supported forest research and working with the Forest Service in identifying research priorities for its Research and Development program. AF&PA is the national trade association representing forestland owners, manufacturers of solid wood products, and producers of pulp and paper products. The U.S. forest products industry had sales of over \$230 billion in 2004 and employed 1.1 million people. The industry accounts for about 7 percent of U.S. manufacturing.

We are fortunate to have vast forest resources in our country, but we also stand at a crossroads today because the ability to maintain healthy and sustainable forests is closely linked to the ability of the U.S. forestry sector to compete globally. This is becoming increasingly difficult in a globalized economy. New capacity growth is now more common in other countries, where forestry, labor and environmental practices are often not as responsible as those in the U.S. As a result of the competitive disadvantages faced by U.S. producers, jobs are being exported and domestic demand for our industry's products is increasingly being met by producers in other nations who do not share our high standards and commitment to sustainability. Without an economically healthy and viable forestry sector, support and investment in sustainable forestry - and all of the ecological and environmental benefits that go along - will go lacking. A competitive U.S. forest sector provides powerful incentive for landowners to maintain forests as forests. Research may well be the critical element needed to ensure this sector remains globally competitive.

The Forest Service and other USDA agencies play a central role in advancing forestry research in the U.S. The history is fairly impressive. Many innovations in forest management and wood utilization have stemmed from federally-funded research. Today, we are able to grow more wood fiber faster than 50 years ago, or even 20 years ago. This means, among other things, we can continue to grow more of what we use, disturb less land, and store carbon at a faster rate. We are also more efficient in using forest resources. Industrial wood productivity has increased by 40 percent since 1952. Attention to forest ecological health has greatly increased. The enhancements in tree-growing, milling and product technologies, and in fostering wildlife habitat, water quality and other ecological forest outputs have been possible in large part because of research conducted by the Forest Service, the universities, and the private sector.

However, the past is not necessarily prelude to the future. We have substantial challenges ahead. The dollars for funding research are fewer and our competitive challenges greater. We have to develop research strategies that will lead to bold and substantive new innovations. The entire forestry research community, and especially the Forest Service, should be positioned to make giant leaps in research to meet the economic and environmental challenges.

If we were to compare the state of forestry research with that of other disciplines, like medicine, engineering, and agriculture, forestry research is way behind. Consider, for example, that research in molecular biology is uncovering innovative ways to treat human disease by targeting and destroying harmful cells. If we knew more about the genetic make-up of different species of trees, or invasive organisms, we could also develop technologies to, on the one hand, select desirable attributes for specific commercial purposes or, on the other, control or eliminate undesirable influences. Perhaps chestnut blight or Dutch elm disease could be eradicated. Perhaps threatened ecosystems could be better protected. Perhaps we could grow more wood fiber with higher quality on fewer acres at less cost. Growing more fiber on fewer acres means less land disturbance, making enormous contributions to sustainable forestry - and improving our competitive prospects.

Today, it takes four times as much land to support a 500,000 ton pulp mill in the U.S. than it does in South America. That represents a competitiveness gap in forest productivity that should and can be closed. In the U.S., we have millions of acres at risk of fire, insects and disease. The agencies should be conducting research that can both make U.S. forest-based production more globally competitive, and solve the most challenging ecological restoration and forest health problems.

The industry has done and continues to do its share of forestry research. AF&PA members are committed to sustainable forestry for all forestlands and encourage funding for research programs that advance sustainable forestry. In fact, the Sustainable Forestry Initiative® (SFI) program, participation in which is required for all AF&PA member companies, includes in its standards an objective "to improve forestry research, science, and technology, upon which sound forest management decisions are based." Participants are required to report financial and in-kind support of research addressing multiple aspects of forest ecosystem functions. In 2004, SFI® program participants invested \$78 million in various kinds of forestry-related research. The industry funds research directly and through in-kind contributions of scientists and other resources.

It makes industrial land available for the establishment of research plots and participates in research cooperatives with universities and the U.S. Forest Service. The industry directly supports the National Council on Air and Stream Improvement (NCASI), an organization that conducts peer-reviewed research on forest ecology, water quality, wildlife and silviculture. We also participate in the Southern Forest Research Partnership, an organization with the mission of developing "collaborative relationships that provide new and revised research knowledge to enable the Southeast to remain competitive in the global forestry market while enhancing the forest landscape and assuring that this natural resource will be sustained indefinitely."

In wood utilization research, forest products companies have for decades contributed to the work conducted at the Forest Products Lab (FPL) and regional Forest Service experiment stations. Collectively, industry's direct and in-kind contributions to the FPL, alone, are estimated to be \$2-3 million annually. AF&PA member companies provide an annual review (dating back to the 1970s) of Forest Service utilization research. They have co-sponsored the Research Demonstration House (\$200,000 industry contribution) that serves as a showcase for FPL's research; and have underwritten research into critical safety issues.

## CURRENT AND FUTURE NEEDS

Despite the investments to date, there is a great deal more to be done. In particular, I want to emphasize the role that research can and should play in enhancing forest productivity, improving wood utilization, developing systems to measure forest health and resources, and finding improved ways to use forests for environmentally friendly products and services. Specific areas that demand greater attention include:

? A far better scientifically-based understanding of our nation's forests to consistently achieve ecological, social, and economic objectives.

? The development of high efficiency softwood tree propagation systems; softwood species make up the majority of the nation's reforestation seedlings and building products.

? A national strategy for advancing and applying scientific understanding of forest genetic resources, including but not limited to: species and provenance testing, breeding plan development, deployment of material with different levels of genetic diversity, and sequencing the pine genome.

? Hardwood production systems capable of competing with Eucalyptus plantations in the southern hemisphere.

? Reliable quantitative estimates of the value of wood quality improvements to manufacturing in terms of energy efficiency and product quality.

? A national strategy for integrating technology, policy and economics to spur development of

"precision forestry" and "landscape management" as components of sustainable wood production systems.

? Reliable quantitative estimates of the potential of different forest management systems to sequester carbon and reduce greenhouse gas emissions, including the use of wood for sustainable domestic energy production.

? A national strategy for gathering and analyzing information on the current and potential contributions of managed forests to sustaining water quality and biodiversity.

Within the context of these priorities, as we look at the research conducted by the U.S. Forest Service and by other USDA federal agencies, there are several activities and focus areas that are especially critical:

? Agenda 2020: Agenda 2020, the industry's technology alliance, was initiated in 1994 in partnership with the Department of Energy to improve energy efficiency and accelerate the delivery of new technologies to our manufacturing processes. Now organized as a membership alliance within AF&PA, Agenda 2020 is building on a decade of tangible results to expand its federal and state partnerships, and establish new international and crossindustry collaborations. Current federal partnerships, in addition to the existing efforts with the Department of Energy, include projects with the U.S. Forest Service and the Cooperative State Research, Education and Extension Service (CSREES) programs of the USDA, as well as the National Science Foundation. Agenda 2020's technology initiatives leverage these collaborative partnerships to drive innovation in the forest products industry's processes, materials, and markets. Technology objectives are defined to address shared industry and national strategic goals. The research, development and deployment (RD&D) projects coordinated through Agenda 2020 provide the foundation for new technology-driven business models. The objective is to create options to meet industry's competitive challenges, while contributing solutions to strategic national needs associated with energy, the environment, and the economy.

? Integrated Forest Products Biorefineries: Through Agenda 2020's Advancing the Forest Biorefinery initiative, the forest products industry can evolve existing infrastructure to develop Integrated Forest Products Biorefineries (IFPB) -- geographically distributed facilities that process both forest and agricultural materials to produce renewable "green" bio-energy and bio-products. This can be done while preserving existing traditional product lines, creating higher skilled and better paying jobs, strengthening rural communities, and opening new domestic and international markets for forest products companies. These IFPBs would contribute to reducing greenhouse gas emissions and dependence on foreign fossil fuel by substituting domestic, renewable ligno-cellulosic materials as the feedstock for products now derived from nonrenewable carbon. If fully developed and commercialized, these technologies could produce enormous energy and environmental benefits for the industry and the nation both, including contributing to a diversified, more secure national energy supply. IFPBs have the potential to annually produce nearly 2 billion gallons of ethanol and another 1.09 million barrels (oil equivalent) of other renewable transportation fuels. Early estimates show an industry-wide potential to reduce fossil energy consumption by over 250 TBTUs/yr, with an additional benefit of cutting approximately 40 million tons of carbon emissions annually.

? Forest Inventory and Analysis (FIA): The FIA program conducted by the Forest Service is the most comprehensive data collection and analysis program that exists to assess the sustainability and health of the nation's forest resources. FIA's core mission is to provide reliable information on the nation's public and private forestlands. We are pleased that FIA has made progress over the last few years in implementing its annual forest inventory system, but there remains work to be done. The Forest Service has an obligation to achieve its stated goals to cover 100 percent of U.S. forest lands, fully implement the annual inventory, expedite data availability and analysis, improve working relationships with the states, and modernize FIA management systems. FIA has made progress, but it is not there

yet.

? **Biotechnology and Tree Improvement:** Current research efforts in cloning technologies and understanding genetic interactions in trees are sorely lacking. A national strategy is needed for advancing and applying scientific understanding of forest genetic resources, including but not limited to: species and provenance testing, breeding plan development, deployment of material with different levels of genetic diversity, and sequencing the pine genome. The Forest Service is coordinating an initiative to sequence the loblolly pine genome. The Loblolly Pine Genome Initiative offers tremendous potential, but will require a major federal commitment and targeted resources. The genomics phase is the datagathering process. With the genetic information, functions of individual genes can be explored. This could speed up testing, selection and commercialization of improved planting stock.

? **Forest Products Utilization:** The Forest Products Lab and regional Forest Service experiment stations conduct important research on the efficient and effective use of wood fiber. Improved wood utilization contributes to the environment in many ways. Just as one example, exploration of small diameter wood use and bioenergy production can help address the forest health problem caused by overcrowding and forest fuel build-up. Also, since the emerging field of nanotechnology is expected to be a critical driver of global economic growth and development, the application of nanotechnology science to wood-based lignocellulosic materials offers the potential to sustainably meet the wood-based needs of present and future generations.

In addition to the Forest Service Research and Development Program, important contributions are made through the USDA Cooperative State Research, Education, and Extension Service (CSREES) and the universities that partner with the agency. There is a significant need for practical research and outreach designed to produce and measure healthier, faster-growing forests. We are supportive of the following research programs:

? **Cooperative Forestry Research (McIntire-Stennis) Program:** This program is the foundation of forest resources research and scientist education efforts at universities. It provides cutting-edge research on productivity, technologies for monitoring and extending the resource base, and environmental quality. The program is a federal-state-university partnership and one that has been highly effective in leveraging the federal investment and producing results; in fact, program funding is matched more than three times by universities with state and nonfederal funds.

? **National Research Initiative (NRI) Competitive Grants Program:** NRI grants are a significant source of funding for basic and applied research on forest resources, including their management and utilization. Last year, however, less than 6 percent of the \$180 million funding was allocated to forestry research proposals. Given the considerable potential of the program to contribute to the nation's sustainable forestry research needs, the percentage of NRI funding allocated to forestry research should be increased, with specific focus on grants that support forest productivity, wood utilization, and biorefining technologies. I also recommend the establishment of a separate NRI panel to coordinate projects that relate to forestry and forest ecosystems, including forest products.

? **Renewable Resources Extension Program (RREA):** This program provides the foundation for extension and outreach efforts delivered to private landowners through universities. Cutting-edge forestry research is of limited benefit unless it can be effectively delivered to the nation's forest landowners.

## CONCLUSION

Targeted research is needed to support sustainable forestry and healthy forests, both through a greater understanding of the status of our nation's forests and through the development of processes that enable economic utilization of fiber removed. Research helps find innovative ways to promote and enhance forest sustainability and provides scientifically sound data that benefits

both public and private forests. In February, 2005, the National Council on the Science of Sustainable Forestry (NCSSF) convened a workshop on the global outlook for timber. The consensus among the presenting analysts and participants was that there is a strong correlation between the economic viability of forests and their sustainable management. They identified globalization as a challenge and raised concerns about the prospect that the U.S. was losing its competitive edge. The workshop noted that this, in turn, has potentially negative impacts on forest investments, reduces forest management opportunities, and makes other land uses more attractive than forestry.

Research can play a critical role in improving the competitiveness of the forest products sector. Efforts to achieve and maintain healthy forests are enhanced by research investments in enhancing forest productivity, addressing the threats of insect and disease, quantifying carbon sequestration, and understanding forest management decisions on wildlife, water quality, biodiversity, landscapes and habitats.

AF&PA looks forward to working with this Committee and others to help continue critical forestry research and to develop innovative new research programs that advance sustainable forestry on our nations' forestlands. Thank you for the opportunity to testify, Mr. Chairman. I would be happy to answer questions from the Committee.