

ILLINOIS COMMISSION ON FORESTRY DEVELOPMENT¹

Gary L. Rolfe²

Abstract.--Research recommendations were developed by the Illinois Commission (Council) on Forestry Development for Illinois and central hardwoods in the context of national issues and priorities. Recommendations are a combination of reactive/proactive research initiatives integrated with landowner educational needs. Included is research on management options, enhancing multiple use, woodlot productivity, agroforestry, expert systems, private landowner goals and motivations and environmental issues. A statewide computer network and resource database and a comprehensive educational program is recommended to facilitate effectiveness of these research initiatives.

Productive forestlands are integral to the economy of the United States. With nearly 737 million acres of forest cover in the U.S., the production and maintenance of these lands is very important (Bentley 1986). Forest-based industry alone contributes more than 60 billion dollars annually to the U.S. economy and employs 1 of every 11 people in the manufacturing industries (Brown 1986). Couple these direct economic gains from our forest resource with the inestimable value of the resource for recreation, wildlife, soil and water conservation and its contribution to global atmospheric stability and it is easy to justify a well-financed and broad-based forestry research program. Such a program could provide the basic information needed to effectively manage this critical resource for the long-term.

Unfortunately, our forestry research programs have not kept pace with the significant need for information to effectively manage the resource. Currently, our University-based forestry research program nationwide totals less than 100 million dollars annually (Brown 1986). Industry-based forestry research programs are generally declining and the Forest Service program is only stable at best.

Although support for forestry research is not in keeping with the value and importance of the forest resource it is perhaps a less significant factor than the implicit nature of our research programs. Often, our research initiatives are driven by "crisis" situations. In other words, our research programs tend to be predominantly reactionary to meet specific problem situations encountered today. We are generally unable to channel research resources into a more long-term or proactive approach because of financial limitations and the need to quickly deal with providing the information needs of today (Brown 1986). An adequately financed research program could help to stimulate an anticipatory, proactive approach to our forestry research but funding is only one limitation. The forestry research community may, in fact, be another limitation because of our generally conservative attitude. We must be more aggressive in our forestry research and move into a proactive position which projects from today's database and today's issues into the future to predict tomorrow's needs. Certainly our research programs will always have a reactive component because not every issue can be predicted but we must move aggressively to establish a longer term view of the resource to ensure its future viability and contributions to society.

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²Gary L. Rolfe is Professor and Head, Department of Forestry, University of Illinois, Urbana, Illinois and also Chairman, Illinois Council on Forestry Development.

The Illinois forest resource picture is quite similar to the national one. Illinois has more than four million acres of some of the most productive forestland in the midwest but this important resource suffers from neglect (Rolfe and Richmond 1986b). The majority of our forestlands are privately owned and in relatively small parcels averaging less than 50 acres each

(Herendeen and Rolfe 1983). Currently these forestlands are producing about 144 million board feet annually but this is less than one-third of their capability (Rolfe and Richmond 1986a). The Illinois forest industry which is a one billion dollar industry can only benefit from improved productivity and management of Illinois forestlands.

Illinois now ranks in the bottom 10 states in wood production but near the top five states in wood use (Rolfe and Richmond 1986b). Narrowing this gap between production and use could result in significant gains at every level of the Illinois economy. Improving productivity through improved management of our forestlands can also increase the complimentary benefits we derive from our forest resource (Forging a Forestry Future in the Midwest 1983). Better management will result in improved diversity of wildlife habitat, enhanced recreational opportunities and significant soil and water conservation benefits.

Improving productivity on Illinois forestlands and consequent industry development is a challenge which requires a combination of a solid research database with effective landowner and public education programs. To meet this challenge the Illinois Commission on Forestry Development was created by the Forestry Development Act which was signed into law in 1983 (Rolfe and Richmond 1986a,b). The Commission (now a Council) is responsible to the state legislature and has the broad goal of evaluating the Illinois forest resource and making recommendations for development of this resource to meet the multiple public benefits only it can provide--timber, wildlife, recreation, aesthetics and soil and water conservation. Critical to realizing the full magnitude of these multiple forest resource benefits is a proactive research and education program. The Commission through its study of the Illinois forest resource has identified research and education needs integral to achieving this important goal. These research and education recommendations were developed in the context of both Illinois and national forest research needs and are a viable combination of both reactive and proactive approaches to both research and education.

NATIONAL RESEARCH NEEDS IN FORESTRY

To provide background perspective for the Illinois Commission on Forestry Development research recommendations it is necessary to consider important national research issues. These national issues are an integration of research needs developed through the work of several organizations including the National Association of Professional Forestry Schools and Colleges, the Joint Council on Food and Agricultural Sciences (Five-Year Plan on the Food and Agricultural Sciences, 1986), the Hardwood Research Council (McLintock 1987) and others.

National research issues the Illinois Commission considered as background included:

While the United States has an abundance of total forest cover, productivity on the majority of these lands is considerably below potential with most regions of the country averaging only one-third to one-half of potential sustained yield. Intensive forest management including tree improvement, site preparation, reforestation, advanced silvicultural techniques and advances in harvesting technologies is needed. An expanded research program in these areas is critical. However, productivity increases should not be at the expense of the other benefits provided by our forests or at the expense of environmental quality. Concurrent research should evaluate these related environmental issues.

Products Development

The recent trend in composite products from wood gives rise to the need for a long-term view of the potential for forest products. New and creative uses of wood must respond to the public demand for new and improved products. The potential for chemicals from wood is largely untapped and new technologies will allow greater sophistication in the use of wood. A comprehensive expansion of products related research is recommended.

Marketing

Improved marketing systems must be developed in anticipation of public needs and demands. Research in development of wood-based products to meet these demands must be pursued now in anticipation of future public needs. International marketing and global trade issues must be studied and the role of our forests in meeting global needs more clearly defined.

Biotechnology

Application of biotechnology and high technology techniques to tree improvement for a multitude of goals is viable today and must have a high priority in research. Substantial gains in tree improvement can result from an expanded research program in this area.

Environment

Environmental issues relating to forests and productivity will continue to come to the forefront in research priorities. Atmospheric deposition, global CO₂ cycling and the "greenhouse effect", soil and water conservation, air quality and other related issues are of immediate concern.

Integrated Pest Management

Forest insects, pathogens and other pests in many forested areas of the country cause tremendous tree losses which can be as high as 20 percent of total production. More research is needed to emphasize integrated use of a range of

techniques including combinations of chemical, biological, biotechnological manipulation, and cultural practices to protect our forest resource.

Urban Forestry

Specific research programs must be implemented to effectively deal with the expanded demand for urban forest resources. Species selection and management systems as well as a better understanding of the needs of urban citizens are important issues to receive increased attention.

These issues and other more specific research questions at the national level served to provide background for formulation of the Illinois Commission on Forestry Development research recommendations.

ILLINOIS COMMISSION ON FORESTRY DEVELOPMENT RESEARCH RECOMMENDATIONS

The Commission reviewed research programs of the University of Illinois, Southern Illinois University, other midwestern universities and the U.S. Forest Service, North Central Forest Experiment Station and its branches to determine the current status of the research knowledge base in terms of this previously described broad national picture. Several research issues were identified as high priority for new or expanded research for our Illinois research program. A combination of a reactive approach to deal with current issues and a proactive approach for long-term planning is suggested. The Commission believes that it is especially important that we become more proactive in our research to develop the predictive capability needed to anticipate future resource based societal issues.

Important research recommendations of the Commission (Rolfe and Richmond 1986a,b) include:

Statewide Forest Inventory and Resource Database

Although only indirectly a researchable issue, maintenance of a current forest resource inventory and creation of an on-line computer database are integral to an overall effective research program for Illinois forests. A comprehensive resource database is essential to development of the productive capability we greatly need.

Previous inventories of Illinois' forest resources were conducted in 1948, 1962 and 1985 by the U.S. Forest Service. However, there is no provision for an ongoing, uniform method of collecting comprehensive data. Existing data offer insufficient detail for the needed proactive approach to long-term resource planning.

It is recommended that a comprehensive urban and rural forest inventory be conducted at

regular 10-year intervals to provide management agencies, forest researchers, members of the timber industry, and other concerned groups with current, usable information. New techniques such as satellite imagery interpretation should be incorporated and utilized as appropriate.

It is further recommended that an on-line forest resource database be created and maintained with up-to-date forest resource information. This computer database should be part of a statewide network and easily accessible to agencies, forestry professionals and researchers.

Management Options

Forest management practices have major impacts on the forest resource and the benefits available from Illinois forestland. Impacts of the management option chosen may not be readily apparent for many years but yet have a direct relationship to the benefits the landowner and the public ultimately receive from the forest.

The Commission recommends an expanded research program to evaluate and develop predictive capability of the consequences of a variety of hardwood management options and silvicultural practices. Studies should be designed to develop predictive capabilities of impacts to all relevant forest resources including timber, wildlife, recreation, soil and water conservation, and aesthetics. Consequences of a variety of management practices in urban setting should also be included.

Long-term economic predictions and simulations must be an integral part of this research program in management options. In many instances a clear economic forecast could encourage landowners to institute a comprehensive forest management program.

Enhancing Multiple Use

The forests of Illinois provide a variety of benefits and as a consequence, are managed for several different uses. Individual landowners often have non-timber production goals but ultimately sell their timber.

Research is needed to develop management systems which optimize multiple benefits. Management systems should be developed which enhance the landowners major goal but also provide the other multiple benefits only our forests can provide. In some instances, multiple uses may be in conflict, so research must be developed in a systems approach to achieve the maximum benefit for the landowner and society.

Woodlot Productivity

Research on maximizing forest productivity while maintaining a stable ecosystem is especially important. Illinois forests can show

greatly improved productivity with good management techniques but this should not be accomplished at the expense of a quality environment or greatly reduced multiple benefits. A comprehensive expansion of the current research program in woodlot productivity is required. Development of predictive capability for assessing long-term productivity and environmental impacts of improving productivity is essential.

Genetics and tree improvement research utilizing new bio-technology techniques must also be expanded. Genetic manipulation at the molecular level offers a tremendous opportunity to improve productivity without impacting environmental quality or long-term site productivity. Disease, pest resistance and impacts of environmental stress may also be greatly minimized through genetic manipulation.

Agroforestry

Current research programs to develop agroforestry systems for Illinois marginal lands should be expanded. Illinois has nearly two million acres of land which is clearly marginal for rowcrop agriculture. These lands should be quickly brought into permanent cover but landowners often face a severe financial limitation in taking these lands out of rowcrop production. Agroforestry systems allow the landowner to gradually retire his land from rowcrop production while establishing a forest production system. These techniques are essential for adoption of forest practices by many Illinois landowners.

Expert Systems

Further research in the development and techniques for implementation of computer-based expert systems to assist private forest landowners in better decision-making is especially needed. With the shortage of forestry professionals in Illinois it is very important that we move towards systems which are easily accessible by landowners and which can provide decision-making techniques. Expert systems coupled with a resource database and a statewide computer network should greatly improve our ability to manage the Illinois forest resource. Forest growth simulation and yield as well as economic scenarios should be an integral part of these systems.

Private Landowners

With 93 percent of Illinois forestlands privately owned by more than 110,000 landowners it is critical that we fully understand landowner goals, motivations and interests to facilitate good management on their forestlands. Expanded research is needed to further our knowledge of private landowners and their role in development of Illinois forest resources.

Environmental issues are at the heart of a comprehensive proactive research program for Illinois forestlands. In each of the previously described research areas it is very important that adequate research be conducted to provide current and projected environmental consequences of prescribed forest management practices. It is also important that we develop a better understanding of the specific roles of forests in maintenance of air and water quality.

Beyond these major research areas there are many silvicultural issues which must be better understood. For example, the statewide evidence of "hard maple takeover" and techniques to promote oak regeneration continue to be of great concern. Research in new and expanded uses of wood; especially low quality wood and sawmill residues is very important and must continue. Marketing techniques for landowners and primary industry must also be developed and involve a significant research element.

It is very difficult to separate research needs for Illinois forestlands from the overwhelming educational needs of Illinois landowners, the public, and public officials. The Illinois Commission, in its study of resource education programs, found that our programs are considerably inadequate to meet the needs of both the rural population and the urban community.

A basic educational framework is provided by the Illinois Cooperative Extension Service and the Department of Conservation Division of Forest Resources but both are greatly understaffed and unable to provide the needed broad-based forest resource education. Forest landowners require a comprehensive program to educate them on the multiple benefits available from their forests and how to achieve those benefits. These types of educational programs must be based on the proactive research program previously described. Landowners need to know how specific management actions today impact tomorrow's forest and environment. Development of predictive capability involving all of the multiple benefits to be derived from our forests is essential.

The process of educating these forest landowners also requires basic research to determine landowner motivations and goals and how to best work with them to encourage good forest management. Educational programs must be designed to provide the types of information which can have maximum impact on the management of the Illinois forest resource.

The urban community has even greater educational needs with 83 percent of the population or 9.5 million people living in Illinois urban areas (Rolfe and Richmond 1986a). Urban citizens are the predominant users of our forest resource. Resource education programs for

this important group are equally essential if we are to effectively manage our forest resources for multiple values over the long-term.

It is imperative that Illinois forestry research programs are based on the needs of the public but they must also include a strong proactive element which is so very important to long-term maintenance and enhancement of the total forest resource. Continued reliance on reactionary research efforts and relatively low levels of funding for forestry research in Illinois will not suffice to promote and protect our forest resources over the long-term. The Commission strongly recommends a significant expansion of the research programs at the two state universities and encourages the U.S. Forest Service to expand research relating to central hardwoods. The Commission also encourages researchers in Illinois to develop complementary, interactive programs to realize the maximum gain from our research dollars.

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