THE FUTURE OF TREE IMPROVEMENT AS SEEN FROM THE POINT OF VIEW OF THE STATES

by
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ABSTRACT

This paper examines the future of tree improvement in light of major changes in the global economy as well as ecology. It also reports on the responses of state forestry organization to current stresses.

The world population is increasing by 250,000 people each day and is expected to double by the year 2050. The demand for wood will probably increase even more due to the increasing standard of living in many countries.

Multiple use forestry appears to be giving way to restricted use of forests. As a consequence wood production is more and more confined to private holdings. Much of the wood needed will need to be produced on relatively few acres. Genetic improvement will be an important tool in achieving this.

State concerns vary greatly from region to region. A shared concern of all state forestry agencies is the reduced funding available due to the many competing demands on limited state budgets.

Keywords: Global economy, sustainable development, resource management, restricted-use management.

INTRODUCTION

Public perception of forestry has radically changed over the last decade and in response forest policy at the national level has changed dramatically as well. What do these changes mean for

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forestry and how are they likely to affect tree improvement?

STATE OF THE WORLD

In today's global economy, one cannot look at the future of forestry and tree improvement without looking at the future of the world as a whole. Obviously the world faces some increasingly serious problems in the form of increasing CO_2 levels, increasing levels of pollution, global warming, and potential exhaustion of mineral sources of fuel. All these concerns are driven by the threatening overpopulation of the world. Currently the population of the world increases by 250,000 people every day. This is the equivalent of adding the entire US population to the world every three years. By the year 2050 the world population is expected to have doubled compared to now. In addition the standard of living is increasing in many developing countries. Together this will put an enormous strain on the world's resources.

A recent book (Rörsch and de Hart, 1993) discussed a number of potential scenarios for future development of the world. I will briefly quote two of them in this context. The pessimistic scenario essentially says that the human population is already exceeding the carrying capacity of the earth and that it is too late to prevent disaster. The optimistic scenario, on the other hand, says that there is a technological fix for every problem. The latter is highly questionable while the pessimistic scenario could possibly be true.

A key concept popularized by the United Nations report, "Our Common Future" (1992) highlights the concept of sustainable development. This is somewhat of an oxymoron since, taken literally, development means growth, and growth by definition is not sustainable. However individual processes can be sustainable. In other words forestry and agriculture could be sustainable given the right technology.

Another important point made in both books is that one should look at these problems in three dimensions: ecology, technology and economy. Most often one looks at many situations in only one or two dimensions which gives a very incomplete picture. I'll come back to this shortly with some concrete examples. In reality, many problems have more than three variables, so in effect we are dealing with a multidimensional problem.

Let's go back now and look at some specific examples in forestry of one-, two- and three-dimensional approaches. The Spotted Owl controversy on the west coast is largely a one-dimensional approach with overwhelming consideration of the ecology, but very little attention to any other factors. On the other hand the usual way we look at plantation management is in two dimensions, considering only the technological and economical aspects. My feeling is that if we took the ecological aspects into consideration many of those aspects would actually look quite favorable. For instance, tree plantations will restore degraded soils, reduce atmospheric CO_2 levels, and provide a habitat for wildlife. In some cases they would restore the native vegetation, in other cases they might replace it with a different vegetation. The latter could be considered a negative factor.

Another interesting article pertinent to our problem appeared in Science not too long ago (Ludwig et al, 1993). It was concerned with principles of effective resource management and gave a number of good fishery examples, and a forestry example that seemed a little off-base. However they had a number of rules for effective resource management that seemed quite sensible. They deserve to be quoted in full:

"1. Include human motivation and responses as part of the system to be studied and managed. The shortsightedness and greed of humans underlie difficulties in management of resources, although the difficulties may manifest themselves as biological problems of the stock under exploitation.

2. Act before scientific consensus is achieved. We do not require any additional scientific studies before taking action to curb human activities that effect global warming, ozone depletion, pollution, and depletion of fossil fuels. Calls for additional research may be mere delaying tactics.

3. Rely on scientists to recognize problems, but not to remedy them. The judgment of scientists is often heavily influenced by their training in their respective disciplines, but the most important issues involving resources and the environment involve interactions whose understanding must involve many disciplines. Scientists and their judgments are subject to political pressure.

4. Distrust claims of sustainability. Because past resource exploitation has seldom been sustainable, any new plan that involves claims of sustainability should be suspect. One

should inquire how the difficulties that have been encountered in past resource exploitation are to be overcome. The work of the Brundland Commission suffers from continual references to sustainability that is to be achieved in an unspecified way. Recently some of the world's leading ecologists have claimed that the key to a sustainable biosphere is research on a long list of standard research topics in ecology. Such a claim that basic research will (in an unspecified way) lead to sustainable use of resources in the face of a growing human population may lead to a false complacency: instead of addressing the problems of population growth and excessive use of resources, we may avoid such difficult issues by spending money on basic ecological research.

5 Confront uncertainty. Once we free ourselves from the illusion that science or technology (if lavishly funded) can provide a solution to resource or conservation problems, appropriate action becomes possible. Effective policies are possible under conditions of uncertainty, but they must take uncertainty into account. There is a well-developed theory of decision-making under uncertainty. In the present context, theoretical niceties are not required. Most principles of decision-making under uncertainty are simply common sense. We must consider a variety of plausible hypotheses about the world; consider a variety of possible strategies; favor actions that are robust to uncertainties; hedge; favor actions that are informative; probe and experiment; monitor results; update assessments and modify policy accordingly; and favor actions that are reversible."

I would like to add a few rules that seem to be borne out by observation, which could be called Murphy's Laws of Resource Conservation:

1. If wood is desperately needed it will be cut regardless of future consequences. Looking at world history this seems to be the general outcome. I have little optimism that human nature has changed much recently. There is a corollary to this.

2. Environmentalism is a noble philosophy largely dependent on affluence. This can be framed in a different way which was

brought home to me personally[2] pretty strongly during World War Two:

3. If your main concern is to survive the next twenty-four hours the consequences for the next century are irrelevant.

Some of these considerations seem somewhat remote from my assigned topic, but I hope they provide a useful philosophical framework from which to view the following discussion.

THE FUTURE OF TREE IMPROVEMENT

Most efforts to predict the future are rather unsuccessful and I will therefore not attempt to do this. There is a more useful way of looking at it: the future doesn't just happen, collectively we make it happen. A good example is the organization of the SFTIC conference. We started planning this two years ago, and amazingly, it is happening on schedule as planned. Usually all goes well, except for an occasional mishap. In tree improvement we are doing very much the same thing. We are planning our seed orchards and progeny tests based on predicted planting programs and although changes beyond our control do take place, much of it actually develops as planned, although maybe a few years behind schedule. The question to ask therefore is what do we want to happen.

Let us accept as given that the philosophy of forest management is drastically changing. I grew up with the concept of multiple use management and as near as I can tell the concept is nearly dead. Instead we see a number of much more restricted uses. Examples of this are the use of forests as wilderness areas, national forests, parks, recreation areas, areas used for protecting endangered wildlife and finally production forestry which is taking place mostly on private lands, both industrial and nonindustrial. Accepting that this is not expected to change in the near future, we should make a vigorous case that production forestry is not only a legitimate land use, but is essential to the affordability of all the other uses.

Another thing that is of some concern is the need for crop rotation in forestry. Based on experience with other species such as Scots pine in the Netherlands and Christmas trees in the South,

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[2] During the last year of World War Two, my family and I survived on sugar beets and tulip bulbs, and cut every tree in our yard to keep warm and cook.

one can expect to see productivity losses after about three rotations. Evidence is beginning to accumulate that this is also the case for loblolly pine. We need to start thinking about alternatives to loblolly pine. This could be hardwood species such as sweetgum and various oaks, or agriculture crops. Planting improved trees might be appropriate in some cases, in other cases the best alternative could be clearcutting the areas and letting the hardwoods already present on the site reproduce by sprouting.

The above pertains particularly to industrial and non-industrial private land holdings. The following section speaks more specifically to the views of the state agencies.

RESPONSES OF STATE AGENCIES

To complete my assignment I contacted most of the state agencies. Following is a summary of the main points made in these conversations.

One thing that was obvious after talking to several agencies was the tremendous difference between regions. For instance, the state of South Carolina was mostly concerned about the effects of Hurricane Hugo, while the state of Virginia was much more concerned with the increasing value of land as real estate, because the land owners are less and less interested in the production of timber on their land, but consider it rather as a place to put a second home. All of the states face very severe budget pressures, which over time could negatively affect tree improvement programs.

A number of state foresters made the point that in many areas planting is the only option. This particularly pertains to land that is currently not forested. Planting programs are heavily dependent on incentive programs. Planting on private nonindustrial lands reached a high of 1.4 million in 1987, leveled off to a low of about 750,000 acres in 1992 and seems to be increasing again in response to the high current stumpage prices.

Many of the state foresters made the point that, because of the greatly reduced area available for production forestry, more and more wood needs to be produced on fewer and fewer acres, primarily on private lands. As a result they need to be managed as intensively as possible and tree improvement will be very much needed in the future to insure high productivity, while maintaining or improving quality.

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