ACHIEVING FORESTATION GOALS 1/

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Abstract.--Energy shortages place additional pressures on wood resources. Forest regeneration must and can be accelerated through definition of specific public and private management goals and objectives, speeded research, motivated people, realistic plans, and economically justified capital outlays. Time is the biggest problem we face in reforestation. The containerized seedling may help answer the quest for en masse regeneration to meet the world's wood demand projections.

My talk today is on the importance of containerized seedlings to our reforestation goals.

Mark Twain once commented that a good speech starts at the beginning.

For our topic, the logical beginning is somewhere about 15,000 years ago, roughly 12,000 miles from here in the Tigris-Euphrates River valleys. At that estimated point in time and geography, mankind made one of the most significant of its "giant steps forward." Anthropologists tell us it was there and then that men first began to break loose from the old, existing patterns of sustaining themselves by seeking and gathering wild, nature-provided fruits, grains, and vegetables. Somewhere in that period, some bold and innovative souls undertook the job of directly planting and raising for harvest those foods previously gathered only on a hit-or-miss basis.

That simple but momentous step eventually altered man from being a tribal nomad and made possible the rise of civilized societies. The act of man becoming a farmer ranks with the discovery of fire and the splitting of the atom in the milestones of humanity.

IS FORESTRY REALLY AGRICULTURE?

In the forest industry in North America, for the last three decades or more, we often have talked about comparisons between agriculture and modern forestry. The concept of raising trees as a crop has been an important educational tool in bringing the North American public to understand the unique aspects of this remarkable national resource.

Yet it has only been in recent years that many similarities have existed between agriculture and commercial forestry. Only in very recent times have foresters been able to start making the shift from being guardians of a nature-provided, unmanaged forest to becoming managers of a forest from seed to harvest.

Once again, this may prove to be one of the more significant events in human history.

Why? Because world civilization today finds itself facing a series of material shortages that clash with the needs and aspirations of exploding population growth. This audience needs no detailed explanation on the importance of wood fiber in modern civilization and the fact that this unique raw material is renewable. But we may be guilty of underestimating the future importance of the wood fiber resource while at the same time overestimating the amount of time available for renewing and upgrading the resource.

Satchel Paige, the grand old veteran of American baseball, once said, "Don't look over your shoulder, because someone might be gaining on you." But it's the look ahead that should properly frighten--and hopefully inspire--the professional forestry cadre of this continent.

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THE SHAPE OF THINGS TO COME

Using the cunit, 100 cubic feet of wood, as convenient measure, world wood fiber consumption is expected to reach 1.75 billion cunits by the year 2000. This is approximately double the current rate of annual consumption. That estimate came out of the 7th World Forestry Congress which some of you may have attended in 1972.

However, it may be that this projection, made only two years ago, was optimistically low. Since then, the impact of an increasing global oil shortage may mean an even higher demand for wood fiber than forecast by world forest managers in 1972. The future is likely to mean shorter supplies of petroleum along with the certainty of higher-priced petroleum. These in turn are sure to mean heavier switchovers from petrochemicals to cellulose-based plastics, fuels and special distillates. The 1972 wood demand projections anticipated that developing nations would use substantially less wood per capita in the future as they made a shift from wood fuel to fossil fuels for cooking and heating. Already this prediction has been brought into question by higher priced crude oil.

Finally, the energy problem is likely to see heavier demands on the wood resource in the form of greater emphasis on insulation and heat conservation available from wood construction. At the same time, steeper energy costs certainly will tend to make steel and aluminum higher priced, probably assuring little further use of these products as substitutes for wood in residential construction.

Of the three great mature markets in the free world, Europe, Japan, and North America, only North America has the potential wood resource and forest land base from which worldwide incremental softwood demands can be met.

The Ti. S. Forest Service in its "Outlook Report 2000" estimates that the turn of this century will see a U.S. domestic wood fiber demand of 219 million cunits per year. More specifically, the next 30 years will see U.S. sawlog consumption rise by 48 percent; pulpwood, 136 percent; and veneer and plywood, 100 percent. Shaped against this, at the present rate of reforestation, afforestation, growth, and annual harvest is an estimated supply of 189 million cunits per year. This means a shortfall of 30 million cunits.

So far, we've talked only about forest areas for product usage. All of us are well aware of the rapidly increasing recreational demands on our North American forests. In most cases, these uses are compatible with productive forest goals and objectives. Other uses are not compatible, yet receive considerable public support. Hence, demand continues for single-purpose recreational or aesthetic set-asides of forest lands in both Canada and the U.S. which remove such lands from actual wood fiber production.

SUPPLY AND DEMAND IMPLICATIONS

To sum up, we're looking with certainty at radically escalating demands on our forest resources, paired at present with obviously inadequate levels of supply. Whether convenient for the moment or not, the law of supply and demand is always present and always operable. Matching the rising demand for wood fiber against a rather inelastic supply, it is certain that wood values will rise. For the forest manager, this means the strong likelihood that more money will be available to do a far better job in both utilization and regeneration. Hitherto, society has not been willing to pay for good forest management, either through public funding or product prices. But the current and next generations of forest managers in North America will find themselves in the historically unique situation of having a fighting chance to get the financial resources necessary to practice intensive forestry rather than the caretaker brand of forestry that has been their professional lot in the past.

Putting it another way, without adequate funding--public and private--there will not be the necessary forest resources needed by mankind 30 to 50 years hence.

At this point, let's take a look at reforestation needs and goals for Canada and the U.S. over the next five to 10 years.

The current annual level of artificial or man-caused forest regeneration in Canada is about 300,000 acres; in the U.S., about 1.7 million acres, for a total of approximately 2 million acres.

By contrast, here are the needs: In Canada, approximately 50 million acres of understocked or nonstocked land, harvested land, and burned-over land are in need of artificial forest regeneration. The equivalent figure in the U.S. is estimated to be 75 million acres. This means that the two North American forest nations have 125 million acres or about 10 percent of their forest lands currently not producing for lack of adequate regeneration. Obviously, we have not been keeping up with our regeneration obligations.

In other words, regeneration efforts in the U.S. and Canada on roughly two million acres are reducing the backlog by less than 2 percent annually. To play some real catch-up ball here means a major increase in forest regeneration in both nations.

Reforestation on this scale poses tremendous technical challenges. It poses still other challenges, for the forest manager and for the Congressman or Member of Parliament who must vote appropriations for such measures.

Reforestation is a critical and certainly a costly part of the production process in the forest industry. Like our post-Neolithic ancestors who probably were forced to make the drastic change from harvesting purely wild resources to growing their own, the time is past when we can depend upon unaided Nature to do the forest regeneration job both quantitatively and qualitatively that is needed and in the time frame facing us.

Time means nothing to Nature. But we, as forest managers with the responsibility of supplying increasing national, continental and global wood fiber needs, cannot tolerate lengthy delays in good restocking.

Adequate regeneration is the keystone of the whole forest production concept. Without good initial stocking of seedlings free to grow, all other subsequent forest management techniques are in jeopardy. To reach the needed higher levels of forest productivity, we must face up to the discipline of establishing and attaining set standards of restocking. The old excuses can no longer be allowed to apply. We must learn to work within finite time frames with no hit or miss options.

PUTTING IT ALL TOGETHER

The achievement of good forest regeneration is a complicated process, and requires the coordination of many efforts.% These include:

1. Management goals and objectives. These must be specific, although obviously they will vary, depending upon financial and geographical circumstances. In my own company, for example, we have established the 12 months following harvest as the interval during which effective regeneration shall be accomplished. We also have definite regeneration stocking goals in southern pine of 800 stems per acre free to grow at the end of the first growing season. The equivalent figure for Douglas-fir is 650 stems per acre.

2. Research. Advancing the scientific knowledge of managing a forest is essential. For example, how can we make two cunits of wood grow where one grew before? How can we accomplish this faster and in a more cost-effective manner?

   To answer such questions, Weyerhaeuser's extensive forestry research program grew from 25 people and a budget of $420,000 in 1967 to 140 people and a budget of $3,450,000 in 1974. This forestry research team includes 54 people with advanced degrees--33 of them Ph.D's and 21 with master's degrees. Our strategic planning goals for 1980 call for approximately doubling that number of people in forestry research and tripling the present budget. In part, these efforts are aimed at solving tangible problems in actual forest regeneration operations. We're stressing "quality survival" in our restocking and not just raw seedlings stuck in the ground. To this end, a number of successful research projects have been of great value. Quality of seedlings from the nursery has been improved through application of research on soil management, lifting and storage of seedlings. Dependability of nursery production, a very important consideration in a large-scale regeneration program closely coordinated with harvest, was dramatically strengthened by positive freeze-damage control procedures using sprinklers. Good progress has been made in controlling browsing of newly planted seedlings with the development of a harmless organic repellent, since improved, and holding promise for further improvement by chemical synthesis. Research has also been vital in learning to control pales weevil damage, a critical factor in southern pine regeneration.

   Greater research efforts are needed throughout the forest industry. In an age that finds mankind exploring outer space and probing into the sub-atomic riddles of all matter, it is remarkable that most of our forest seedling culture and outplanting is still being accomplished in a basically primitive and costly style that hasn't changed very much in decades.

3. People. I can assure you that while a manager may set objectives, it is the people in any given organization who accomplish results. Without people trained and motivated to do the job, the best of regeneration plans will fall short of expectations in the field. In Weyerhaeuser, we had 312 people in operating forestry and forestry research in 1967 when we embarked on our intensive High Yield Forest program. In 1974, that figure has grown to 3,765 full- and part-time people. Some of the skills include mensurationists, plant pathologists, biometricians, wildlife biologists, agronomists, soils scientists, geneticists, physiologists, silviculturists, hydrologists, ecologists, and environmental scientists, in addition to several hundred foresters. We believe in financial and other forms of incentives. The research team that developed an animal repellent for seedlings received

stock bonuses personally awarded by our company president. As a spur to achievement in regeneration, we have a President's Plantation Award program recognizing excellence in seeded and planted plantations. Annual winners receive both company-wide recognition and shares of stock with an initial four-digit value. Our foresters also participate in the company's supervisor recognition program. And, our Senior Management visits regularly outstanding examples of regeneration success - and failure.

4. Plans. Intelligent, realistic planning is the heart of any complex endeavor such as broad-scale forest regeneration, assuming now that the right people are in place and motivated to carry out plans. In addition to quarterly and annual plans, my company's planning configurations include three-year woods operating plans, 7-10 year midterm corporate plans, 15-30 year facilities plans, and long-term tree farm High Yield Forestry planning of 60 to 120 years, depending on the timber region, harvest levels, and other specific circumstances.

5. Performance audits. Both the people and well-laid plans can only be known if measured. Even though forestry is still much more of an art than a science, certain Yardsticks of performance can be used. In Weyerhaeuser, regeneration progress is gauged on the number of trees in the ground, free to grow, at stated intervals of inspection: one, two and three years and again at age five.

6. Capital outlays. It requires capital. During 1974, Weyerhaeuser will spend $38 million on planting, seeding, site preparation, fertilization, regeneration facilities and tree improvement activities alone. That compares with $1.3 million in 1967 when we started High Yield Forestry. The increase is about thirty-fold. Yet by 1980, we plan to be spending $72 million per year on these activities.

All forest managers must have their homework done convincingly in order to command the quantity of capital inflows that massively expanded forest regeneration requires. Even with higher wood values, that kind of investment requires detailed economic justification. But, almost all economists are warning that the mid-range period ahead is going to be one of sharp and painful scarcity of capital to meet societal and economic needs.

NEED FOR RESETTING PUBLIC PRIORITIES

I think all of us realize by now that some major socio-political decisions will be involved in this process. By way of example, the U. S. Forest Service as the largest single forest manager in this country last year was funded to the extent of planting 102 million seedlings and reforesting 299,000 acres of the approximately 92 million acres of commercial forestlands for which it is responsible. Weyerhaeuser Company planted 102 million seedlings and reforested 181,000 acres among its 5.7 million fee ownership acres. I bring up this comparison not to criticize our friends in the U.S. Forest Service, but to underline the need for adequately funding public forest management in the United States.

Somehow, and soon, this country must reset public priorities so that financial support may be given to its basic public forestry function. For example, the thirty-plus billion dollars that the U. S. has spent to date on its space programs, including the moon landings, would finance nearly one thousand years of the Forest Service's regeneration budget at the present annual level. As a taxpayer, I am not sure that relationship adequately reflects relative benefits to the nation and its people.

We are here to exchange data on containerized seedlings. As you're probably aware, the containerized seedling effort has been viewed by many forest regeneration experts as the Great White Hope, and by others as a high-risk gamble. The gentlemen you will be hearing from in the next couple of days will have data that hopefully throws a great amount of light on this question. The session on Wednesday featuring field performance in particular contains some data on survival rates of containerized seedlings versus bare-root seedlings that I know will be of interest to you.

Speaking as a forest manager, I personally admit a favorable bias on the containerized seedling question. The real key to the whole question is to think in terms of the total cost package involving, as I stressed earlier, seedlings in the ground at a given time, free to grow.

Recent years have seen something of a revolution in the growing of commercial produce through the use of containerized planting systems not greatly different from what we'll be discussing here. My company is already committed to a heavy investment in growing and planting containerized seedlings. But I qualify that by repeating that we view the contain-

erized seedling not as a panacea, but instead as one nmore important tool in meeting regeneration goals.

ROLE OF THE CONTAINERIZED SEEDLINGS

Certainly, the containerized seedling system offers some attractive possibilities. The uniformity of this system lends itself to increasingly mechanized growing and planting. This alone may be of compelling importance as labor becomes scarcer and higher in cost. Already it is difficult to find enough people for the labor involved in forest regeneration. Where are we going to find them when present U.S. and Canadian regeneration programs are drastically multiplied in scope?

We see containerized seedlings as giving us increased flexibility in our total regeneration program, given our commitment to having every acre successfully regenerated within a year of harvest. Flexibility stems from having more kinds of seedlings, bare-root or containerized, specially produced for given sites in a very broad spectrum of sites. Containerized seedlings show particular promise on difficult sites having normally short planting seasons.

The containerized seedling also offers flexibility in adjusting to alternative regeneration plans. Its shorter production time in growing a plantable seedling means that the system can be "turned on" for faster production when needs and opportunities arise. The advantages in shorter growing time and extended planting season time are very real. And remember, if you will, that time is the biggest problem we face in forest regeneration during the rest of this century.

Of course, there will be variations in the utility of containerized seedlings, depending upon terrain, climate, species, and other variables. It is our job at a symposium like this to try to ascertain under what conditions the containerized seedling makes both biological and economic sense.

One thought that occurs here is a matter of economic flexibility. Historically, the forest industry has been able to change harvest patterns to meet mill scheduling or marketing demands. But we have not that degree of flexibility in regeneration practices. The containerized seedling does seem to promise us a wider range of options here than the conventional, slower production of bare root seedlings.

As forest management specialists, we may be witnessing a historic meeting between a great problem and a great solution. Consider, if you will, the challenge and opportunity facing us in the transition from an old-growth to a second-growth, managed forest in the western U.S. Consider also the combination of problems and opportunities in the South with its poorly stocked acres paired against the very real assets of rapid growth and short rotation.

The challenges facing us are tremendous. But so is the rate of technological change. And not the least of these may be the subject at hand in the form of the much cussed and discussed containerized seedling, a technique still in its infancy, relatively speaking.

That great statesman of the western world, Sir Winston Churchill, wrote in retrospect of a historic turning point in World War II, "Indeed, it may be said that before Alamein, we never had a victory; after Alamein, we never had defeat." Perhaps in years to come, we will look back at the introduction and rise of the containerized seedlings in much the same light--that before the containerized seedling, we never really had effective, en masse reforestation on the scale needed--but that after its introduction, the issue was never in doubt that North American foresters would eventually meet the challenging and epochal goals facing them. I commend to you the task and look forward to reading the results of the symposium.

Thank you very much.