BAREROOT SEEDLING PRODUCTION

MARKET AND DEMAND STUDY

Illinois Department of Conservation

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WHY:
1. TO DETERMINE PROJECTED DEMAND FOR SEEDLINGS.
2. TO DETERMINE THE PUBLIC BENEFITS OF SEEDLING PLANTINGS.
3. DEVELOP A LOGICAL PRICING POLICY.
4. IDENTIFY MARKET SEGMENTS AND CHARACTERISTICS
5. FACTORS AFFECTING DEVELOPMENT OF A PRIVATE BAREROOT SEEDLING INDUSTRY IN ILLINOIS.

I. DETERMINE PROJECTED DEMANDS

A. Soil erosion control cost share program
   1. A.S.C.S. cost share programs

B. Demand for Illinois coal - (Strip Mines)
   1. Mine Reclamation

C. Programs aimed at wildlife enhancement
   1. Free trees and shrubs from Wildlife Division
   2. Free planting by Wildlife Division

D. Price of seedling
   1. Three scenario's developed

      a. Midrange

         i. At $74/M there is a demand for 2.1 million trees per year.
         ii. Cost share and free distribution would induce 2.9 million in 1986 to 7.3 million in 1990.

      b. High Scenario

         i. Assumes 5% reduction in price per year.
         ii. 1986 price of $73/M for 2.2 million to 3.4 million in 1990.
         iii. Cost share and free distribution
              3.6 million in 1986 to 10.6 million in 1990.

      c. Low Scenario

         i. Assumes a 5% increase yearly.
            1986 price of $77/M for 1.9 million to .48 million in 1990.
         ii. Cost share and free distribution
             2.2 million in 1986 to 3.9 million in 1990.

## Public Benefits and Price Structure

If seedlings, and moreover trees, offered no public benefits, below-cost pricing would be illogical. The purpose of this section is to examine and quantify the public benefits accruing to seedling plantings and to present a logical approach to seedling pricing that reflects public benefits.

## Public Benefits

Public benefits are defined as those positive externalities which result from some good or service, above and beyond the private benefits which are derived from the good/service. If, for example, an individual purchases and plants seedlings to reduce soil erosion, the purchase price he/she is willing to pay reflects the private benefits he/she expects to derive (i.e., reduced soil erosion damages or costs). However, in planting the seedlings, the public at-large will also benefit in terms of increased wildlife habitat and aesthetics. Neighboring landowners may also benefit from reduced soil erosion. Since these benefits extend beyond the private individual and to the public, it is not feasible to add their value into the price of the tree and expect the individual purchaser to pay for them. Aesthetics and wildlife habitat improvements are thus public benefits, the cost of which should logically be borne by the public at-large.

The quantification of public benefits is an exercise in placing a monetary value on these goods. Research was conducted by Booker Associates to quantify public benefits associated with bareroot seedling plantings. The benefit categories included in this analysis are soil erosion control, energy savings, aesthetics, noise mitigation, wildlife enhancement, outdoor recreation, and air quality. The nature of these benefits are described below:

Soil erosion results in the loss of valuable topsoil. The loss of topsoil is a public concern since it results in a decrease in crop yields, requires the use of additional fertilizer and fuel, and requires additional irrigation to achieve the same level of crop production.

Energy savings is another public benefit. Energy conservation helps save natural resources for future use. Appropriately placed trees can protect homes from cold winter winds and provide relief from summer heat, thereby contributing to fuel savings that can amount to 15 to 33 percent for well protected homes.

The value of any tree can best be measured by its effect on the quality of life, a recognized public benefit. The aesthetic values of trees can be most easily quantified by the increase in property values, and thereby the net wealth of the community, accompanied by their presence.

Noise mitigation is another benefit associated with tree plantings. The adverse impacts associated with increased noise levels include the damaging effect on the ear, loss of sleep, and increased levels of frustration and irritation. It is well established that any improvements in the general, physical, or mental health of the citizenry is a public benefit.

All tree species provide some degree of wildlife enhancement. This enhancement includes both the food and cover requirements for a wide variety of fauna ranging from the mayfly to the white-footed mouse to the whitetail deer.

Another benefit associated with the planting of trees is outdoor recreation. Outdoor recreation pursuits include both active and passive recreational interests. Many of these pursuits, including hiking, picnicing, playgrounds, and jogging can best occur in a wooded setting.

Air quality benefits include the removal of dust and other potentially harmful gases and the generation of oxygen.

In addition to these public benefits, the Illinois State nurseries also work towards protecting the gene pool by collecting seed and growing seedlings which are native to the state.

Public benefits were calculated based on a series of conservative assumptions and after intensive research investigations.

The weighted average net present value of public benefits (all species) is based on present value computations for individual species groups weighted by the percent of total distribution each group represents. This figure $291 per thousand, represents the net present value of public benefits generated on average, by the distribution of one thousand seedlings.

III. DEVELOP A LOGICAL PRICING POLICY

Two Goals

1. Maximize Benefits
2. Minimize Cost

1. Maximize Benefits

i. Grow 9.5 million seedlings

This reduces production cost to $125/M (Production)
This is below private nursery prices of $200/M

ii. An appropriate average sale price at 1985 dollars is $15

2. Minimize Costs

i. Grow 3 million seedlings and sell at $60/M

3 million seedlings at an average production cost of $300 per thousand equals $900,000 total production costs.

1. Weighted Average Price = $60 per thousand
Demand = 3.0 million seedlings
Total Revenue $180,000 ($60x3,000 thousand seedlings)
Total Cost = $900,000
Net Budget Expenditures = $720,000

2. Weighted Average Price $50 per thousand
   Demand 3.8 million (but only 3.0 million available)
   Total Revenue = $150,000 ($50x3,000 thousand seedlings)
   Total Cost = $900,000
   Net Budget Expenditures $750,000

3. Weighted Average Price = $70 per thousand
   Demand = 2.25 million seedlings
   Total Revenue $157,500 ($70x2.250 thousand seedlings)
   Total Cost = $900,000
   Net Budget Expenditures - $742,500

As the example above illustrates, the State nurseries may minimize net budget expenditures (costs) by pricing in accordance with expected production or supply. The following chart presents recommended weighted average prices per thousand given various quantities of seedlings produced for distribution.

| Quanity Produced (000, ^) | Average Prod. Cost Per Thousand | Recommended weighted Avg. Sale Price Per Thousand |
|---|---|---|
| 2,000 | $370 | $74 |
| 3,000 | $300 | $61 |
| 4,000 | $240 | $48 |
| 5,000 | $195 | $34 |
| 6,000 | $150 | $25 |
| 7,000 | $120 | $21 |
| 8,000 | $110 | $18 |
| 9,000 | $115 | $15 |

In closing this section, it should be noted that, for lower levels of seedling demand, the State may be able to further minimize net budget expenditures by contracting with private nurseries for seedling purchases. To determine levels of seedling demand at or below which this option becomes economically feasible, an analysis of the following variables would be required:

1) State sale prices for seedlings:

2) Projected quantity of seedlings demanded at these prices:

3) Private nursery prices which the State would pay to acquire this quantity of seedlings: and

4) Administrative and distribution costs (including packaging, personnel, transportation, and contract administration) borne by the State under a contractual arrangement.

If, for example, State sale prices average $74 per thousand, the quantity of seedlings demanded would be 2 million (+345 thousand).

Assuming that the State would pay an average price of $200 per thousand to acquire private nursery-produced seedlings and that the State's administrative and distribution costs would equal $150 per thousand, the total average cost of the "contract option" would equal $350 per thousand for 2 million seedlings, when compared to the State nurseries' own average production cost of $370 per thousand for 2 million seedlings, the "contract option", at $350 per thousand, would be more economical in achieving an equal level of distribution. If, conversely, the State's administrative and distribution costs under a contractual arrangement would equal $200 per thousand, the total cost of the "contract option" would be $400 per thousand for 2 million seedlings, thereby exceeding the State nurseries' own production cost of $370 per thousand. In this case, State nursery production and distribution of 2 million seedlings would be more economical than a contractual arrangement.

As the analysis above indicates, further study of State administrative and distribution costs for the contract option, at various seedling demand/production levels, would be required to determine the viability of this option.

Should contractual arrangements prove to be economically feasible, the utilization of contracts for seedling production could conceivably spur the development of a private bareroot seedling nursery or nurseries in Illinois. There is no guarantee, however, that "in-State" private bareroot seedling nurseries could effectively compete with other regional nurseries for the State's and in particular, other private nursery business given the size of competing out-of-state nurseries and their established markets.

IV. IDENTIFY MARKET SEGMENTS AND CHARACTERISTICS

A. Rural Landowners 597
B. Suburban Landowners 87
C. Government 167
D. Industry 177

A. Rural Landowners

1. 307 purchase for general reforestation
2. 237 purchase for timber production
3. 197 purchase for windbreaks
4. 157 purchase for wildlife
5. 10% purchase for soil erosion control
6. 57 bought from private nurseries

B. Suburban

1. Conifers for windbreaks
2. Wildlife shrubs to attract wildlife
3. Some bought from private nurseries because they needed fewer trees than the minimum amount of 250 from state nurseries

C. Government

1. State agencies get free trees
2. Wildlife habitat major use
3. Federal use is general reforestation

D. Industry

1. Mine reclamation
2. Commercial farming
   89% of stock is purchased from state nurseries
   Price and diversity of stock major factors in buying state stock

V. FACTORS AFFECTING DEVELOPMENT OF PRIVATE BAREROOT SEEDLING INDUSTRY IN ILLINOIS.

A. Production and sale of bareroot seedlings by Illinois State Nurseries is not a major factor inhibiting the development of private bareroot seedling nurseries in Illinois. Without purchase price subsidies and at higher private nursery prices, the maximum estimated seedling demand which would accrue to private nurseries in lieu of state production is .75 million seedlings per year.

B. Demand for private nursery stock within Illinois is between 5.5 - 7.9 million per year. Primarily lining out stock. 90 - 95% of this demand is being filled by out-of-state producers.

C. Illinois farmland is high priced.

1. 53% higher than the average of the five surrounding states.

D. Per capita income in Illinois is 21% higher than the average of the adjoining states.

1. This translates into higher wages paid to workers

E. The taxes per capita is 17% greater than the average of the other states.

F. New private nursery must compete with established out-of-state nurseries.

G. Plus side for a new nursery.

1. Business taxes in Illinois about 3% less than the average of the surrounding states.

TABLE 15

REGIONAL ECONOMIC VARIABLES

| | Value of Farmland Per Acre 1984 | Income Per Capita 1980 | Income Median Household 1980 | Taxes Per Capita 1982 | Business Taxes 1981 |
|---|---|---|---|---|---|
| Illinois | $1,692 | $8,742 | $17,476 | $1,197 | 4% |
| Wisconsin | 958 | 7,243 | 17,680 | 1,260 | 7.9% |
| Kentucky | 927 | 5,978 | 13,965 | 855 | 3-7% |
| Indiana | 1,477 | 7,142 | 17,582 | 876 | 6-12% |
| Iowa | 1,396 | 7,136 | 16,799 | 1,130 | 6-10% |
| Missouri | 759 | 6,917 | 15,581 | 843 | 5% |
| Average of Surrounding States | 1,103 | 6,883 | 16,321 | 993 | 7% |

As can be seen from Table 15, the average price per acre of farmland in Illinois is 53% higher than the average of the five surrounding states. The per capita income (translated into the wages paid to workers) is 21% higher than adjoining states.