Chapter 26
Improving Productivity in Forest Nurseries

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Abstract

In recent years, planting-stock costs have nearly doubled and in some cases tripled, largely due to increased labor costs. Improvements in productivity are a means of offsetting these cost increases. Though poor productivity is frequently treated as a labor problem, it is really management's responsibility. Establishing specific productivity goals, formulating practical plans and strategies, executing plans in a well-organized manner, and effectively tracking and evaluating results are components of a long-term program to improve productivity. Important elements underlying the process include input from first-line supervisors and workers, establishment of effective training and motivation programs, and frequent feedback to workers on productivity performance.

26.1 Introduction

The cost of planting stock in recent years has nearly doubled and in some instances tripled. Today, that cost represents 1/3 to 1/2 the total cost of regeneration. Extremely tight cash flows due to the prevailing depression in the U.S. forest products industry make financing regeneration difficult. Furthermore, regeneration requires a sizable capital investment from which there are no cash returns for extended periods, perhaps up to 60 years. These conditions—which will probably persist for the foreseeable future—dictate that forest nurseries operating in the Northwest become especially proficient at producing high-quality, low-cost planting stock.

The typical Northwest forest nursery spends about 80% of its total operating budget on labor. Over the years, increased costs of wages and benefits have driven seedling costs close to planting costs—with little or no gain in productivity. Therefore, substantial improvements in productivity will be required if Northwest nursery managers are to keep regeneration affordable.

Our experience at Weyerhaeuser Company bears this out. Over the past 5 years, we have seen significant improvements in lifting, packing, and transplanting (Fig. 1), attained in spite of increasingly stringent culling criteria. As productivity has increased, seedling costs have been relatively stable or in some cases reduced during a period when inflation and wage increases were at or near double-digit levels. This chapter addresses problems underlying poor or marginal productivity in forest nurseries and offers measures for improving it.

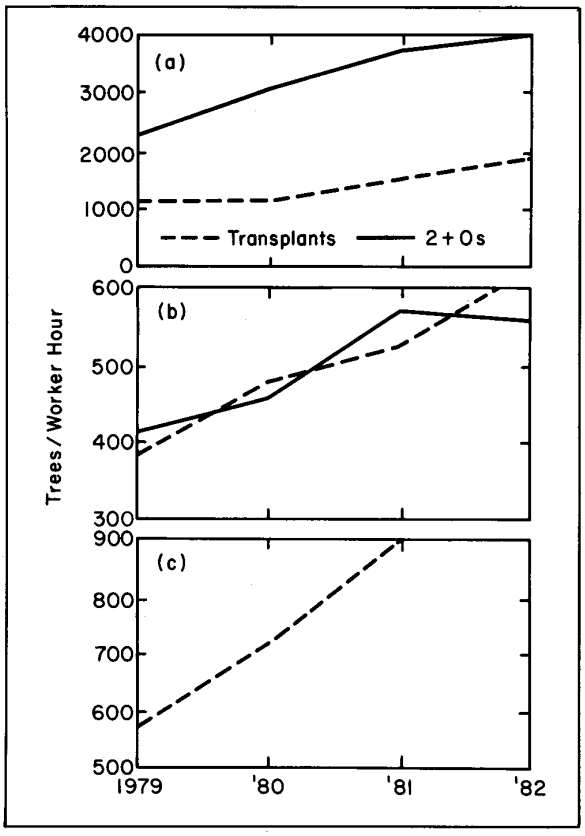

Figure 1. Productivity trends in (a) machine lifting, (b) packing, and (c) transplanting at Weyerhaeuser Company nurseries since 1979.

26.2 Defining Productivity

Nursery productivity can be defined as units of output obtained per hour of worker labor:

Productivity = units of output/hour of labor

In Duryea, Mary L., and Thomas D. Landis (eds.). 1984. *Forest Nursery Manual: Production of Bareroot Seedlings. M*artinus Nijhoff/Dr W. Junk Publishers. The Hague/Boston/Lancaster, for Forest Research Laboratory, Oregon State University. Corvallis. 386 p.

In the nursery packing operation, for example, units of output would be 1,000s of seedlings packed per hour of labor. If a crew of 10 workers can pack 80,000 seedlings per 8-hour workday, then their productivity would be:

$$\frac{80{,}000 \text{ seedlings}}{10 \text{ workers} \times 8 \text{ hours}} = \frac{80{,}000 \text{ seedlings}}{80 \text{ hours}} = 1{,}000 \text{ seedlings/hr}$$

Seedling output in the equation refers to seedlings that meet or surpass predetermined quality specifications set or agreed to by the customer. These specifications usually include both quantitative aspects, such as height or caliper, and qualitative aspects, such as seedling health and physiology. Defective seedlings are never included in the output. High productivity (output) rates are impossible unless crop quality and yields are kept at an acceptable level. Similarly, productivity cannot be increased without improving quality and yield.

26.3 Four Steps to Increasing Productivity

Poor productivity-often considered a labor problem—is usually the result of poor management or lack of concern by management. Most nursery managers know the specific costs of various nursery activities but often do not know their specific productivity rates.

Labor costs are a function of wage rates and the number of worker hours needed to do a job. Although managers frequently have little or no direct control over wage rates, which often are determined at a higher level by the nursery owner, corporate policy, or bargaining-unit agreement, they do have control over how worker hours are allocated. Unlike cost ratios, productivity ratios (such as number of seedlings lifted or packed per worker hour) are a direct measurement of the work process. Improvements in this area lead to dollar savings that are immediately manifested as increased cash flow and reduced unit costs.

Increased productivity does not just happen—the nursery manager makes it happen. Improvements require a four-step process: (1) establishing goals, (2) formulating plans, (3) executing plans in a well-organized manner, and (4) tracking and evaluating results.

26.3.1 Establishing goals

Establishing specific goals to improve productivity requires in-depth knowledge of current nursery processes and productivity levels. This knowledge resides in the local nursery staff. This group, therefore, must play a leading role in developing productivity objectives and related strategies. If outside consultants are used, they should be deployed in a manner which supplements but does not overshadow the efforts of nursery staff. Ownership in these goals and strategies is extremely important and should not be underrated.

At Weyerhaeuser in 1976, we shifted the focus to becoming more cost effective in our nurseries. At one of our locations, an outside management consulting firm was brought in to help reduce costs and increase productivity. A typical industrial engineering approach, including time and motion studies, was taken, and numerous reports were made to the head office in Tacoma. In spite of the flurry of activity, real progress was virtually nonexistent because the on-site nursery staff had been largely excluded from active participation in the process. They had no ownership in the program and viewed the chosen goals as those of upper management and their well-paid consultants—not of the people actually doing the work at the nursery.

Specific productivity goals and targets are best developed by the nursery staff. It is then the manager's responsibility to make certain that these goals are challenging, yet realistic and achievable. Goals must be expressed in quantitative terms and communicated effectively to workers at all levels to secure their commitment.

26.3.2 Formulating plans

Specific plans and strategies on how to achieve productivity goals are absolutely essential. To be effective, planning should be focused on a few key areas rather than broadly aimed across all nursery activities. For example, in our initial efforts to improve productivity at Weyerhaeuser nurseries, we concentrated on lifting, packing, and transplanting (Fig. 1). These activities are highly labor consumptive, utilizing 80 to 90% of the total worker hours required to actually produce a crop. We felt that even modest increases in productivity could generate significant dollar savings.

Planning for productivity improvement means change and should involve workers from various levels at the nursery. The concept here is that the people who actually do a job know best how that job should be done. Proposed changes that are reviewed and critiqued by first-line supervisors and key people on crews will generally have a high probability for success. In many instances, however, managers fail to fully utilize these key staff people; consequently, change is often met by stiff resistance in the work areas. A higher degree of worker involvement in the planning stage is effective in diminishing this resistance because both supervisor and crew feel some ownership in the plan through involvement in the decision-making process.

Managers and staff alike must remember, however, that production systems in nurseries are integrated and require balance throughout. For example, packing depends on lifting, which precedes it, and on storage and shipping, which follow it. Improvements in one area must not be bottle-necked by inefficiencies in another. Furthermore, because nursery operations are highly dependent on weather conditions, developing contingency plans is essential.

In the end, meaningful plans must be practical and realistic. Crews should be able to execute plans using the available system and the equipment on hand or that which can readily be obtained. Because each nursery is unique, comparing one nursery to another is relatively pointless. The real, important issue is what is appropriate for each individual nursery, given its physical, operational, and financial conditions.

26.3.3 Executing plans

Setting goals and planning are academic issues if plans are not executed properly. Getting the job done is primarily the responsibility of first-line supervisors and crew members. How well they function ultimately determines productivity level, hence cost. Therefore, training and motivation of employees are especially important contributing factors here.

26.3.3.1 Training

Much of the work in nurseries is seasonal, which creates a certain turnover rate among employees. To achieve and maintain high levels of productivity, training and retraining must be an ongoing process. Proper job instruction and orientation are a crucial requirement for new employees, and refresher training is often helpful for regular employees returning after an extended layoff. Lack of training seriously handicaps workers in achieving maximum productivity.

26.3.3.2 Motivation

Good productivity heavily depends not only on how well the work is organized but also on the extent to which the work group is motivated. Effective motivators are specific productivity performance goals, some level of participation in decisions

affecting a worker's job, and both positive and negative feedback-which is probably the most important. Employees who are simply ignored do not know whether their work is satisfactory and therefore cannot be expected to operate anywhere near their maximum productivity levels.

Incentive programs can be highly effective motivators in cases where baseline productivity is well defined and the results are at an acceptable level. For example, at one of Weyerhaeuser's nurseries where incentive programs are aimed toward production teams or work groups rather than toward individuals, we have found that cash awards are not the only method of providing incentive. Alternatives such as gift certificates, leaving work earlier on Fridays, or a company-paid catered lunch are often more effective than their equivalent in cash. Employers must understand what will motivate the work team and should ask team members to find out. Before an incentive program is implemented, however, managers must be sure that the production system and its associated hardware are not limiting factors and that the proper steps have been taken in work organization and training. If not, incentives often result in added costs rather than incremental benefits.

Everyone in the work group should be included in the incentive program. Excluding support personnel, for example, will be perceived as unfair. In addition, communication of incentive-program rules and details must be absolutely clear and well understood by all involved; otherwise, misunderstandings may lead employees to believe that management is "cheating," and the incentive program will immediately lose its effectiveness.

The nature of incentives is to increase output—but not at the cost of product quality. Therefore, quality control, always important in the nursery, becomes even more so when productivity incentives are operating. An effective way to place equal emphasis on both quality and quantity is to tie incentives to certain quality criteria. In the event that these criteria are not met, incentive payoffs would be automatically terminated.

26.3.4 Tracking and evaluating results

Keeping track of progress toward productivity goals throughout the season is vitally important. This information must be available on at least a daily basis to enable first-line supervisors to correct problems as they arise and provide quantitative performance feedback to crews. Accumulated from year to year, productivity records allow for the development of more intelligent production planning based on observed trends. Budgeting can then be based primarily on work measurements rather than on inflation.

26.4 Conclusions and Recommendations

Although poor productivity is often treated as a labor problem, it is really management's responsibility. Managers should:

- Define productivity in specific terms for each nursery operation, then focus on those operations for which changes will create the most significant overall improvements. Operations that are most labor intensive are likely candidates.
- Use a step-by-step process in which goals are established, plans formulated and executed, and results evaluated. Consult first-line supervisors and key personnel on crews; remember that those most directly affected by changes better accept them if they have participated in the decision-making process.
- Ensure that employees receive adequate instruction and orientation and that they remain highly motivated through continued participation, feedback, or incentive programs; remember that trained and motivated workers do the best job. Tie quality control to productivity incentives.
- Bear in mind that results do not occur overnight but require long-term commitment and perseverance.