Transplant of unrooted cuttings is an important process in the production of rooted liner trays. There is potential for companies producing young plants to decrease production cost and increase profit margin by improving the efficiency of this process. However, there has been no comprehensive analysis regarding cutting transplant efficiency.

**Objective:**
- To benchmark labor productivity of transplanting cuttings (from receiving to moving plants to the greenhouse as shown in the image at right) at young plant operations
- To identify key factors that differentiate efficiency between businesses and workers

**Research questions:**
- How does labor efficiency vary between young plant producers?
- What factors affect their cutting transplant efficiency and cost?

**Materials & Methods**
- 15 companies surveyed. Each company transplanted between 200,000 to 3M cuttings in their peak week of 2016
- Participants had collaborated in previous studies by the Floriculture Research Alliance and were willing to share sensitive financial data (IRB approved).
- Face-to-face structured interview about demographics of sticking crew, training and selection, pay scheme and incentive, and labor availability.
- Collected data on labor for different processes during the peak week of sticking cuttings: cuttings transplanted during peak week, number of employees, hours, wage including benefits
- Standardized spreadsheet costing model
- Followed up phone interviews and site visits for data verification

**Key findings:**
- Cost per cutting varied between $0.01 and $0.05. Sticking cuttings contributed up to 74% of labor cost in the process from receiving cuttings, filling trays, sticking cuttings, and moving to the greenhouse.
• No clear economies of scale, although the three young plant producers who produced the least number of cuttings had the highest cost per cutting.

![Economies of Scale graph]

• Young plant producers should focus on transplant time (seconds per cutting) to decrease cost per cutting. This had a bigger impact than hourly wage level (not shown).

![Time versus Cost per Cutting graph]

Future research:
• Further analysis of factors behind differences in labor efficiency between firms
• Evaluating return on investment of robotics for the transplant process
• Develop an enterprise budget for cost to produce rooted cuttings

How can you use this information?
• Benchmark your sticking time and cost against other growers in our study
• Improve the efficiency of your transplant process to decrease unit production cost
• If you are considering a robot to automate the transplant process, ask us about how to evaluate return on investment.

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