

# Response to incentive pay among vineyard workers

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## Piece rates don't guarantee productivity

Although farmers are accustomed to utilizing the diversity in a plant or animal species, when it comes to worker differences, some employers overlook the great variability in people and in their performance. For virtually every task, there seem to be some workers who can perform better than others. Workers who excel in one area, however, might not compare so well with others in a different task.

The purpose of this study was not to argue that some persons are "better" than others, but to test the idea that there are indeed differences among workers. In addition, the study began to investigate the conditions under which these differences are more and less likely to be apparent.

### Vineyard workers

Individual differences in productivity are often seen in vineyard pruning. Each worker is usually assigned one row to prune. Workers paid on an hourly basis tend to finish their rows at almost the same time; before moving on to a new set of rows, those who are through with their own help others to finish. While slow workers feel pressure not to be left far behind the main group, fast workers are pressured into not leaving the main group far behind either.

When paid by the vine, pruners usually spread considerably throughout the field. At the end of one row, a worker starts a new row without waiting for the others. The group cohesiveness that apparently fosters homogeneous work speed among hourly paid workers seems to be tempered by the desire to increase personal earnings under piece-rate pay.

This study examined individual pruning rates in two grapevine pruning crews within the same farming operation in the San Joaquin Valley. Both crews were paid by piece rate. Daily crew averages for earnings per worker-hour ranged from \$6.82 to \$9.23 during the week studied.

TABLE 1. Average pruning speed for 18 workers in crew 1 on four consecutive days

| Worker | Vines per hour |      |      |      | 4-day average* |
|--------|----------------|------|------|------|----------------|
|        | Day            |      |      |      |                |
|        | 1              | 2    | 3    | 4    |                |
| 1      | 43.9           | 47.7 | 43.4 | 53.7 | 47.2 abcd      |
| 2      | 37.8           | 38.1 | 49.0 | 41.5 | 41.6 ab        |
| 3      | 33.4           | 35.8 | 48.6 | 39.1 | 39.2 ab        |
| 4      | 46.3           | 34.4 | 54.8 | 46.9 | 45.6 abcd      |
| 5      | 46.0           | 45.0 | 39.2 | 43.9 | 43.5 abc       |
| 6      | 48.1           | 42.9 | 42.0 | 47.4 | 45.1 abcd      |
| 7      | 58.8           | 45.8 | 67.6 | 58.8 | 57.8 de        |
| 8      | 76.0           | 58.8 | 74.0 | 72.8 | 70.4 f         |
| 9      | 41.8           | 36.7 | 59.2 | 44.2 | 45.5 abcd      |
| 10     | 44.2           | 47.9 | 43.7 | 53.9 | 47.4 abcd      |
| 11     | 46.1           | 44.1 | 52.4 | 46.1 | 47.2 abcd      |
| 12     | 44.5           | 38.8 | 43.4 | 41.6 | 42.1 ab        |
| 13     | 90.1           | 58.8 | 69.2 | 70.6 | 72.2 f         |
| 14     | 44.8           | 37.4 | 54.4 | 51.5 | 47.0 abcd      |
| 15     | 59.1           | 44.8 | 72.0 | 52.5 | 57.1 cde       |
| 16     | 47.6           | 37.6 | 70.2 | 51.1 | 51.6 bcd       |
| 17     | 34.9           | 38.5 | 38.2 | 37.8 | 37.4 a         |
| 18     | 76.5           | 58.8 | 68.6 | 70.6 | 68.6 ef        |

NOTE: The high rates of pruning in this study can be partially explained by the fact that the vines were young (five years old) and closely winter-hedged.

\* Averages (means) followed by different letters are significantly different ( $P < 0.01$ ).

TABLE 2. Average pruning speed for 17 workers in crew 2 on each of four consecutive days

| Worker | Vines per hour |      |      |      | 4-day average* |           |
|--------|----------------|------|------|------|----------------|-----------|
|        | Day            |      |      |      |                |           |
|        | 1              | 2    | 3    | 4    |                |           |
| 1      | 67.2           | 58.8 | 64.8 | 54.1 | 61.2 cdef      |           |
| 2      | 67.2           | 58.8 | 64.8 | 65.9 | 64.2 ef        |           |
| 3      | 58.3           | 58.8 | 64.8 | 60.0 | 60.5 bcdef     |           |
| 4      | 67.2           | 64.2 | 47.2 | 54.0 | 58.2 bcdef     |           |
| 5      | Subset A†      | 58.3 | 52.5 | 53.4 | 47.9           | 53.0 abcd |
| 6      | 67.2           | 58.8 | 66.5 | 60.0 | 63.1 def       |           |
| 7      | 67.2           | 69.8 | 60.5 | 65.9 | 65.9 ef        |           |
| 8      | 67.2           | 58.8 | 53.3 | 54.0 | 58.3 bcdef     |           |
| 9      | 67.2           | 58.8 | 64.8 | 54.1 | 61.2 cdef      |           |
| 10     | 58.3           | 58.8 | 53.5 | 65.9 | 59.1 bcdef     |           |
| 11     | 56.3           | 49.3 | 47.5 | 44.9 | 49.5 abc       |           |
| 12     | 52.1           | 63.9 | 65.4 | 54.0 | 58.9 bcdef     |           |
| 13     | 44.8           | 39.8 | 41.5 | 42.4 | 42.1 a         |           |
| 14     | 60.0           | 76.5 | 64.7 | 70.8 | 68.0 f         |           |
| 15     | 54.3           | 63.4 | 56.9 | 42.0 | 54.2 abcde     |           |
| 16     | 47.3           | 52.5 | 53.5 | 42.0 | 48.8 ab        |           |
| 17     | 52.5           | 56.5 | 44.7 | 43.2 | 49.2 ab        |           |

\* Averages (means) followed by different letters are significantly different ( $P < 0.01$ ).

† The differences among workers in subset A were not statistically significant ( $P < 0.05$ ). The reason there were seven workers who pruned at 67.2 vines per hour and three at 58.3 per hour is that the seven workers started one hour later and sometime during the day caught up with the group of three. All ten finished at the same hour.



**Regardless of how they are paid, workers prove to be individuals.**

Crew 1 had 18 workers, each of whose work rate was recorded as average number of vines pruned per hour on each of four consecutive days. There was much variability between workers and, perhaps more significantly, workers were consistently different (table 1). On day 1 the slowest worker pruned an average of 33.4 vines per hour, the fastest 90.1. Faster workers on day 1 also tended to be more productive on days 2 to 4. Analysis of the data rejects the possibility that such observed variability among workers was accidental (null hypothesis).

Crew 1, then, looks like a typical crew under piece rate, when compared with other crews paid by the vine (data not included here). Workers showed consistent differences from day to day.

In crew 2, pruning rates ranged from 44.8 to 67.2 vines per hour on the first day. Statistical analysis of worker productivity also rejects the possibility that worker differences occurred by chance. At first glance, crews 1 and 2 appear to be very similar.

A closer look, however, reveals an interesting phenomenon within a large sub-

set of crew 2. The grower's payroll records show that workers 1 through 10 (subset A, table 2) pruned exactly the same number of vines on the first day. On the second day, seven pruned at the same rate. By the third day, only four workers pruned at the same rate. Analysis of the data shows no statistically significant differences among the workers in subset A. These ten workers, especially during the first part of the week, did not behave as typical piece-rate paid workers do.

### **Incentives**

The study confirms that workers have different abilities. Farm operators can make use of such differences if they understand how to select and motivate employees. Despite their limitations, the results also suggest that, under some circumstances, pay incentives do not affect worker performance as straightforwardly as has been thought.

Possible explanations for piece-rate workers staying as close together as did subset A of crew 2 range from (1) a deliberate slowdown that they hoped would induce the grower to increase the pay per

vine to (2) desire for easy social contact. The explanation offered by the vineyard manager was closer to the second: there were many related workers in the crew.

In other situations, workers have been known to work no faster than an agreed-on pace (bogey) to prevent working themselves out of a job, protect slow workers from being embarrassed or fired, and prevent their employers from lowering the piece rate. Workers who exceed such bogeys are called "rate-busters" and groups often exert pressure on them to bring them back into line.

In many settings, but especially in agriculture, with its pronounced variations in conditions (such as crop load and vine vigor), farmers ask employees to work first on an hourly basis until the piece rate is set. Many employers think in terms of how much they expect workers to earn in an hour. They derive a piece rate by dividing this figure by the production rate in the trial period. The higher the trial production rate, the lower the piece rate. Most workers readily understand that they might obtain a more favorable rate by not working fast until after the piece rate is firm.

One vineyard operator who was paying by the hour switched to piece rate during a pruning season. Workers produced no differently after than before the change. A year later, the same manager changed from an hourly to a piece rate for putting in and tightening vineyard cross-arm supports. The difference in worker productivity was substantial. Total costs were cut by more than half. Production quantity had gained at the expense of quality, however: the supports had been sloppily installed. When shown their unsatisfactory work, the employees agreed to retighten the cross arms at no extra cost to the grower.

Since workers cannot repair incorrect pruning cuts, one question is how much speed can increase without hurting pruning quality. A more difficult problem is to find out what was different about the year or the job in which workers responded to the piece rate compared with the one in which they did not.

### **Conclusions**

Differences in workers with respect to pruning productivity are as real and important as, for example, differences in vine vigor due to the grape rootstock used. However, paying by piece rate does not guarantee that worker differences will be brought out.

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