

# How Can I Improve Labor Productivity?

By Michael Langemeier

Increasing labor productivity enables an industry or economy to produce the same amount or more output with fewer workers. Because labor productivity is directly related to output, it has a major impact on economic growth and the standard of living. U.S. labor productivity growth since 2011, at an annual rate 0.4 percent, is lower than the annual growth rate of 2.5 percent year experienced from 1995 to 2010 (Wolla, 2017). Unless this growth rate of labor productivity increases, slow economic growth rates and relatively low wage rate increases are likely.

What about labor productivity in production agriculture? Langemeier (2017; 2018b) provides labor efficiency and productivity benchmarks for farms. Labor efficiency is computed by dividing total labor cost (hired labor cost plus family and operator labor cost) by gross revenue. Labor productivity is computed by dividing gross revenue by the number of workers, which includes hired employees, family employees, and operators. If all of the employees, including family employees and operators, are fully employed, it is relatively easy to compute the number of workers. If some of the workers are seasonal or part-time, the total months worked for these employees or operators should be summed and then divided by 12 to arrive at the number of workers. Based on previous analysis, farms with below average labor efficiency and above average labor productivity have labor efficiency measures below 9.1 percent and labor productivity measures above \$650,000 per worker.

This article discusses the importance of resource allocation, physical capital, human capital, and technological change to labor productivity. Resource allocation refers to how much is being spent on inputs such as labor, purchased inputs (e.g., seed, feed, and fertilizer), capital, and management time in proportion to total costs.

## **Improving Labor Productivity**

### *Resource Allocation*

The first question to ask with respect to labor productivity is as follows. How efficiently am I using the current work force? These leads to various other questions. Have we used our labor in accordance with expectations? If not, are their inefficiencies in our production processes? Do we need to expand the operation to more fully utilize our work force?

After answering questions pertaining to labor use, we can expand our discussion to use of all inputs. It is imperative that farms use the optimal input combination as the scale of production increases, which is often referred to as using expansion path proportions. Examples can be illustrated with a couple of questions. If we add an employee or a family member, have we also appropriately changed our use of purchased inputs and capital? Conversely, if we buy machinery, are we making the appropriate changes in labor and purchased inputs?

### *Increases in Physical Capital*

Physical capital includes machinery and equipment, buildings, grain bins, and land. Farms have adopted technologies that use relatively less labor and relatively more capital for decades. The important point here is to determine whether the increases in physical capital that have occurred on your farm has led to improvements in labor efficiency and productivity. Of course, it is also important to determine whether asset purchases have improved profitability.

The impact of increases in physical capital or asset purchases has two dimensions. First, has each asset purchase increased technical and cost efficiency? Technical efficiency refers to a farm's ability to efficiently produce outputs for a given level of inputs, while cost efficiency measures a farm's ability to produce outputs at the lowest cost per-unit. To answer this question, it is important to make sure that the benefits of every asset purchase outweigh the costs. Second, how does each asset purchase impact our ability to expand or garner economies of scale? In particular, have asset purchases allowed us to more efficiently utilize labor? Labor costs are certainly one of the costs related to economies of scale or the response to per-unit costs with increases in output. As a farm expands, you would expect per-unit labor costs to decline. If a farm expands and labor efficiency and productivity remain the same, the farm has potential labor use problems that need to be explored.

### *Increases in Human Capital*

Human capital represents knowledge and skills that individuals acquire through education, experience, and training. It is important for farm managers and operators to assess their current management skills and gaps. Skill checklists can provide this self-assessment. Langemeier and Boehlje (2018), in their discussion of the skills and competencies needed for farm growth, describe skills pertaining to production, procurement and selling, financial management, personnel management, strategic positioning, relationship management, leadership, and risk management. If a farm has major gaps in their skill sets, they either need to try to fill this gap with education and training, or hire someone that has these skills.

### *Technological Change*

In production agriculture, technology adoption often fosters more efficient use of labor, and leads to economies of scale and competitive advantage for a couple of reasons. First, early adopters of technology often reap above average profits. Second, farms that do not adopt beneficial technology become increasingly inefficient. Muger et al. (2016) indicate that technical change is a key driver of productivity and profitability. The production frontier for production agriculture, which represents the relationship between aggregate output and aggregate input, is rapidly shifting upward. In this environment, even farms that make changes to their operations, such as becoming more efficient or expanding, are in danger of being left behind by the farms pushing the production frontier upward.

The upward shift in the production frontier will almost certainly continue (Langemeier and Boehlje, 2017). Forthcoming technology advancements will expand our use of robots, artificial intelligence, and data analysis. This leads to a couple of very important questions that need to be addressed by individual farms. Does our farm have mechanisms in place to fully evaluate potential new technologies? Do we have the ability and flexibility to fund multiple new technologies?

### **Concluding Thoughts**

Labor productivity represents the ratio of output per worker. The benchmarks for labor efficiency (total labor cost divided by gross revenue) and labor productivity (gross revenue per worker) are a labor efficiency measure below 9.1 percent and a labor productivity measure above \$650,000 per worker. Labor efficiency and productivity can be improved by examining per unit costs among inputs and making appropriate adjustments to a farm's input mix (i.e., labor, capital, and purchased input cost proportions); by increasing physical capital per worker; by increasing human capital per worker; and/or by adopting new technology.

In addition to benchmarking labor productivity, a farm should benchmark key financial and production metrics such as the operating profit margin ratio, asset turnover ratio, yield per acre, and animal performance, and examine the relationship between change in equity and retained earnings. More information pertaining to benchmarking can be found in Langemeier ([2018a](#)).

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