Enhancing Burley Tobacco Production Labor Efficiency

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This study was undertaken to improve our knowledge of the actual utilization of labor on burley tobacco farms. Over the years, assumptions have been made about the potential labor savings of new production practices and the assumed labor savings have been applied to a decades old labor baseline. However, a comprehensive study of labor utilization had not been conducted since the shift to mostly migrant work crews. The objectives of this study were to: 1) quantify the range of labor hours required for specific tasks on working burley farms, 2) analyze work processes and identify efficient work methods, and 3) develop tools and training materials to assist growers in recognizing inefficient processes and implementing more efficient work methods.

During the first year of this study, multiple visits were made to six burley tobacco farms ranging in size from 15 to 220 acres of burley tobacco production. Crew sizes ranged from 5 to 24 workers during the observation periods. During each visit crews were observed and videoed during their work procedures. Crews were not explicitly informed of the purpose of these visits so as not to influence their normal work habits. Approximately 50 to 60 hours of video was captured for further analysis.

Summary and analysis of the video was conducted during the second year of the study. Work rates in terms of pieces (plants, sticks, etc.) per unit time were calculated to estimate labor requirements for various tasks. As expected we have observed a wide range of work patterns across farms and have tried to identify specific factors leading to increased or decreased efficiency. Observations for several tobacco operations are presented below:

Transplanting: Observed in-row rates of transplanting ranged from 40 to 80 plants/min/row which equates to a ground speed of 0.8 to 1.6 mile per hour. For multiple row units, the speed and efficiency of the operation is limited by the pace of the slowest worker. The number of rows per unit, the length of the rows, and the time required for plant and water loading impact the number of worker hours required per acre. In general, increasing the number of rows per unit reduces labor hours per acre since the time of the driver and any followers are used more efficiently. However, when there is an increase in non-productive time such as short rows leading to more turns or excessive downtime during water fill the impact on efficiency is greater with a larger crew.

Topping: The rate of topping appears to be affected primarily by individual workers with overall efficiency determined by the length of rest breaks. Growers can help improve the efficiency of topping by insuring crops are topped at the proper stage of no more than 10 to 25% bloom. Allowing more blooms will increase the numbers of suckers that must be removed by hand and significantly reduce the labor efficiency of topping.

Stick Dropping: Stick dropping rates were fairly consistent with most growers using a highboy setup to drop sticks. Some labor efficiencies can be gained by handling sticks in bulk either in bundles or on pallets.

Cutting: Cutting rates were extremely variable ranging from less than 50 to more than 150 sticks per hour for individual workers. Cutting rates were largely determined by the stamina, skill, and motivation of the individual worker. Short of attempting to provide training on proper technique or incentives for good performance there appears to be little a grower can do to increase an individual's rate of cutting. However, cutting efficiency can be reduced by inadequate or improperly placed sticks, poor weed control, and leaning or twisted stalks.

The labor activities which seem to hold the greatest potential for improved efficiency are field loading, housing and stripping.

Field Loading: The rate of loading sticks onto flat-bed wagons in the field was observed to vary from 8 to 16 sticks per minute. The loading rate seemed to be largely determined by the tractor driver. The key to efficiency was to minimize the amount of walking required by both the workers on the ground and the worker loading the wagon. The pick-up rate was only minimally affected by increasing the number of workers on the ground. For tandem hitched wagons the most efficient scenario observed was each crew picking-up only one stick row at a time. When picking up multiple rows the walking distance for the crew working the back wagon becomes a limiting factor and may even impede the progress and efficiency of the crew loading the front wagon. Transportation from field to barn can result in significant non-productive time if the same crew is used for pick-up and hanging.

Unloading and housing: An interesting observation in this study was that field loading rate and unloading rate at the barn were very similar within the same crew. The rate of housing was generally determined by the worker(s) on the wagon. The number of workers required and efficiency of labor use was significantly affected by the height and other design features of the barn. Regardless of the number of workers in the barn the rate at which a wagon was unloaded was limited by the pace of the worker handing sticks off the wagon. Reducing the distanced walked by that worker (with frequent moving of the wagon) or adding an additional worker on the wagon often increased the rate of housing.

Stripping: Observed rates of stripping ranged from 2 to 13 stalks per minute (just for leaf removal) showing a huge variation among growers. The slowest rates were observed for the traditional methods of individual leaf removal with the stalks passed from one worker to next with each grade removed by a different worker. The faster rates were achieved in systems

where a single worker removed each grade with a few large “swipes” and placed the leaf in piles or containers near them. Additional workers would remove the stripped leaf for baling. With this method, the stalk is only handled one time leading to improved efficiency. This method must be monitored closely to insure proper grade separation is achieved without introducing unwanted materials such as suckers or pieces of stalk into the cured leaf. Stripping efficiency is greatly improved by eliminating the need to carry out stalks through the use of conveyors and stalk choppers.

As expected we observed significant differences between individual operations regarding the efficiency of labor tasks. Some growers could benefit from adopting more efficient labor practices that minimize wasted motion and non-productive time. Note that non-productive time does not mean rest breaks as employees still need sufficient rest time to remain efficient. Clearly this is not a one size fits all situation as each individual operation must look at the unique circumstances for that operation and adapt the methods that work best for them given facility and labor constraints. To help grower with these types of decisions we are planning a publication to identify some of the practices discussed above and are developing some relatively simple labor calculators in which growers could input their specific information to help better understand the implications of specific decisions. For example, using the transplant labor calculator a grower could see the impact adding more row units to the transplanter or the impact that row length has on transplanting efficiency. The harvest labor calculator can be used to look at the impact of crew size, load size, haul time, wage rate and other factors on labor efficiency and cost. A rough draft of the calculator tool is included with this report. We are continuing to work on adding a calculator for tobacco stripping and to refine the tool. It is expected this tool could help growers make better decisions regarding labor use and potentially identify additional factors to improve labor efficiency within their operation. We expect to have the publication and calculators available to growers by the Spring of 2017.