

**Evaluation of Flue-Cured Tobacco Labor Cost:
Hourly labor needed for production and H-2A overhead costs**



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Introduction

Tobacco production in North Carolina is of critical importance to the state and a center of production for US flue cured tobacco. The 2015 North Carolina Agricultural Marketing Report ranks tobacco the fifth leading money maker in the state and supplies 6.8% of the state's agricultural economic impact.¹ When considering acreage in comparison to income, tobacco occupies 3% of the states harvested acreage but accounts for 20% of the state's harvested crop income as compared to soybeans that account for 29% of the states harvested acreage and 17% of the states harvested crop income.² According to the 2012 Ag census North Carolina ranks first in tobacco production in the United States.³ Understanding the challenges NC tobacco growers face is important to the health of the state economy and tobacco production in the United States. The Department of Agricultural and Resource Economics conducted a survey to gain a more detailed and updated understanding of the labor cost for NC tobacco producers.

Flue Cured Tobacco is a very labor-intensive crop and the crop production budget for Flue-Cured Tobacco produced by N.C. State Agricultural and Resource Economics Department shows that labor accounts for 28% of total variable costs for farms using machine harvest and 37% using hand harvest. The H-2A program is important throughout agriculture but especially for labor intensive crops such as tobacco. With the growing uncertainty of regulations and political issues involved with labor regulations in the Agriculture industry, understanding how these regulations might affect tobacco production is of critical importance.

“The H-2A program allows U.S. employers or U.S. agents who meet specific regulatory requirements to bring foreign nationals to the United States to fill temporary agricultural jobs⁴.” For all H-2A labor there is a set wage rate at which they are to be paid. This wage rate is set on a state level. However, in addition to the wage rate there are other costs involved in hiring workers through this program. These state and federal regulations can be found in the “Employer Guide to Participation in the H-2A Temporary Agricultural Program.” Of these regulations, some of the more critical cost considerations captured in this study include:

- Provision of housing
- Workers' compensation insurance coverage
- Provision of tools, supplies, and equipment
- Provision of meals or cooking facilities
- Transportation and subsistence benefit
- Rates of pay guarantees (hourly and/or piece rates)

Farmers must also pay growers association fees and labor acquisition fees. These costs are not directly attributed to the H2-A regulations.

¹ https://www.nass.usda.gov/Statistics_by_State/North_Carolina/Publications/Annual_Statistical_Bulletin/AgStat/Section03.pdf

² https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NORTH%20CAROLINA

³ https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NORTH%20CAROLINA

⁴ <https://www.uscis.gov/working-united-states/temporary-workers/h-2a-temporary-agricultural-workers>

The goal of the research was to update and validate tobacco labor hours, update the cost associated to labor, and understand the overhead costs associated with H-2A workers. This information will be used to improve tobacco farm budgeting, tobacco farm planning, and understanding of the significance of labor regulations to the cost of production for flue-cured tobacco growers.

Important links for H-2A provisions and statutes:

- <https://www.law.cornell.edu/cfr/text/20/655.135>
- http://www.ncagr.gov/aglaw/migrant_workers.htm
- https://www.foreignlaborcert.doleta.gov/pdf/H-2A_Employer_Handbook.pdf

Methodology

The data in this study was collected through a paper survey. During the month of January, all Tobacco growers in North Carolina were required to attend a GAP meeting. At these meetings farmers were given the survey in a pre-stamped and addressed envelope and asked to fill out the survey and mail it back.

This survey was designed to capture the actual number of labor hours that a respondent needs for each work task and the overhead cost associated with H-2A Labor. Labor hours were captured by asking the farmer how many men he has in the field for each production task, how many acres were possible with his given laborers, and how many times each production task would need to be accomplished. A total number of labor hours for each labor task was then calculated using the information from each data point with an assumption of an eight -hour work day.

The survey dealt with overhead costs for H-2A labor with questions about what sources they obtained their labor from, how many employees from each source, and overall percentages of the labor for each source. If the respondents had any H-2A workers they answered questions on the overhead cost these workers incurred. The overhead or non-wage cost included utilities, workman compensation, acquisition costs of relocation assistance, per worker acquisition fees, and association dues.

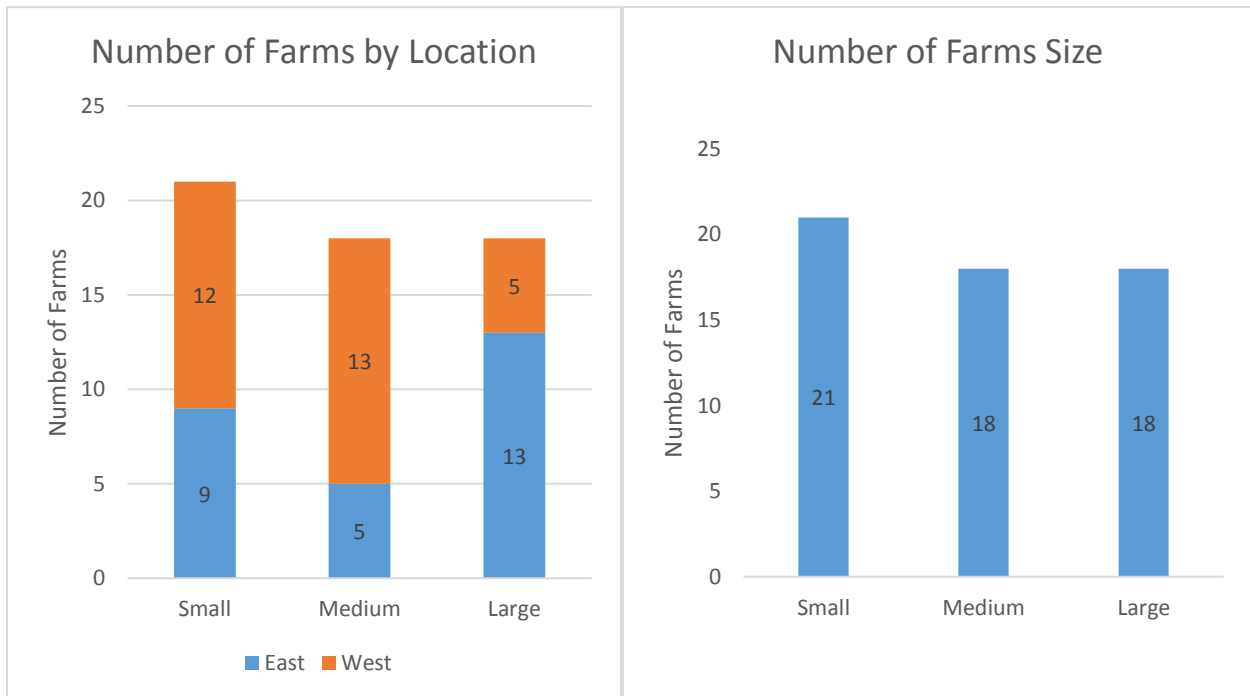
During the GAP meetings in North Carolina, 700 surveys were handed out and 73 surveys were completed and returned. A total of 57 surveys were used in the final data analysis due to misinterpretation of questions, lack of information, and extreme outliers. The respondents were generally classified by geographic location, production capacity and production method. Geographic location was divided by East and West which consisted of a boundary line of interstate 95. Of the surveys used, 27 came from eastern farmers and 30 were completed by western farmers. Production capacity entailed three categories: less than 75 acres, between 75 and 174 acres, and greater than 175 acres of tobacco grown by the farm. The data were further subdivided into the farms by method of production in three categories: hand harvest and hand topping, machine harvest and hand topping, and machine harvest and machine topping. This allowed the ability to see the difference in labor hours for each method of production.

Within each of these methods of farming are three main categories of labor based on the timeline of tobacco production: pre-harvest, harvest and bailing, and post-harvest. Pre-harvest includes any pre-plant activities such as transplant, cultivation, hand hoeing/weeding, topping, and suckering. Harvest and bailing includes first through fifth priming (harvesting), loading curing boxes, and bailing tobacco for market. Post-harvest includes equipment clean up and after harvest clean up.

Results

Farm Size

Total farm size of each individual farm ranged from 50 to 3,000 acres with an average total farm size of 955 acres of cropland. Tobacco specific acreage varied from 8 to 550 acres with an average of 143 acres of tobacco. The figure below shows the farm acreages broken into the main categories and are notated in following figures as Small (less than 75), Medium (between 75 and 174), and Large (greater than 175).

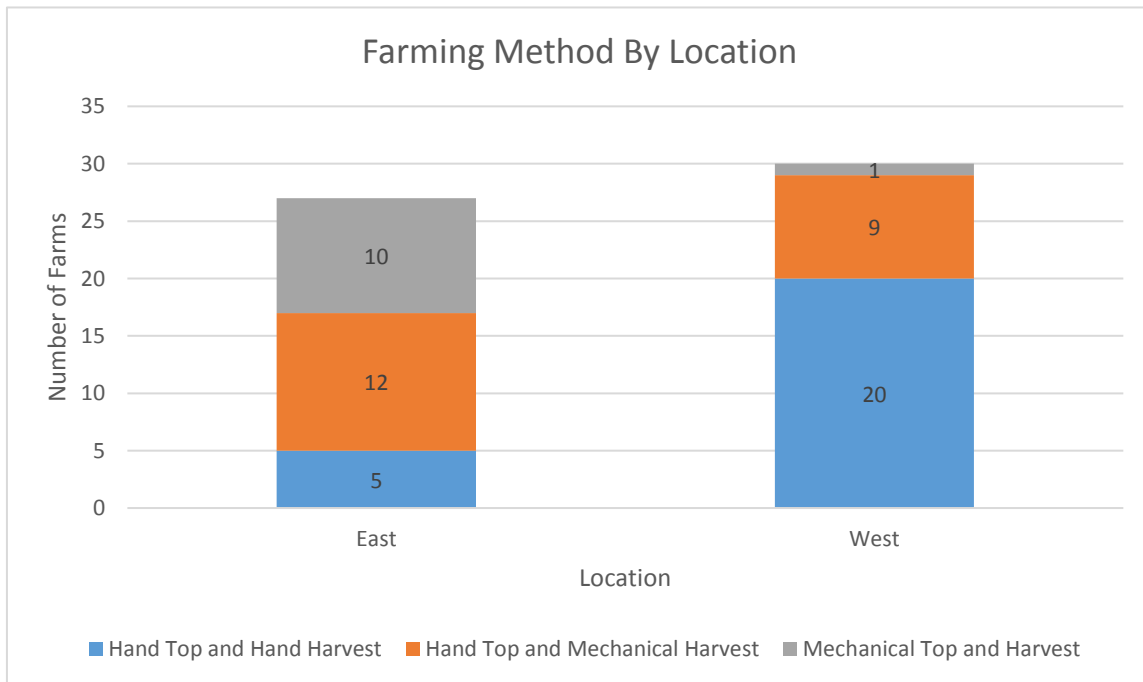
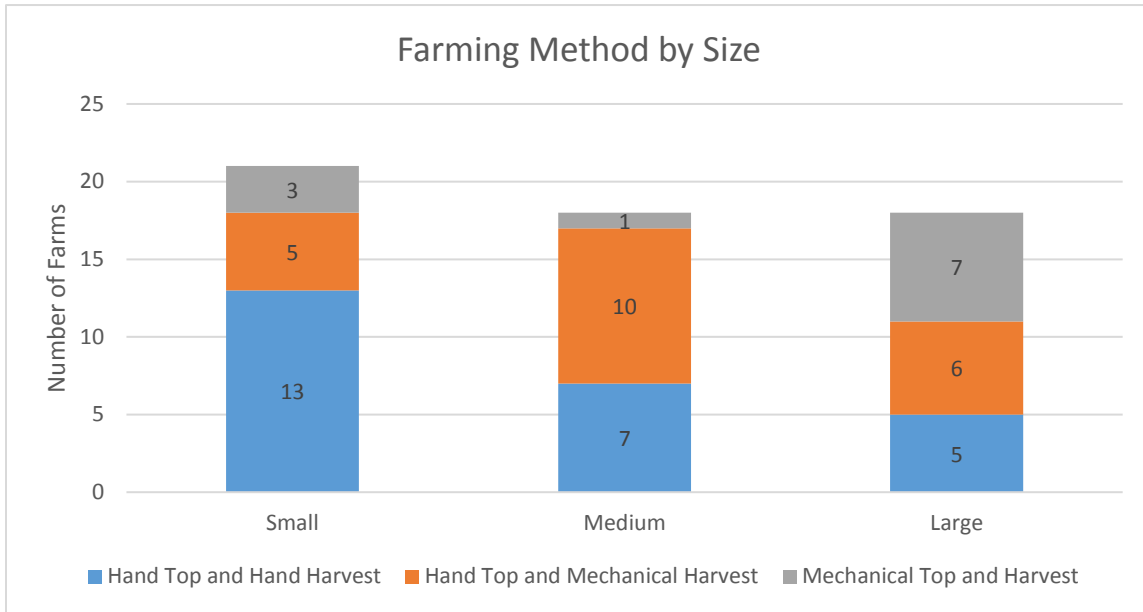


Sixty six percent of farmland is rented, with eighteen percent acreage on the farm devoted to tobacco. Larger farms had a larger percentage of rented land, with small farms renting 56% of total acreage, medium size farms 65%, and large farms renting 78%. Larger farms devote a higher percentage of their land towards tobacco production, with large farms devoting 25% of acreage to tobacco, medium sized farms devoting 18%, and small farms 12%.

Farming Methods

The data from the survey allowed the results to be categorized by differences in production. In general, tobacco growers varied by the scale of tobacco production in harvested acreage and by their geographical location.

This difference can be seen in the following charts.

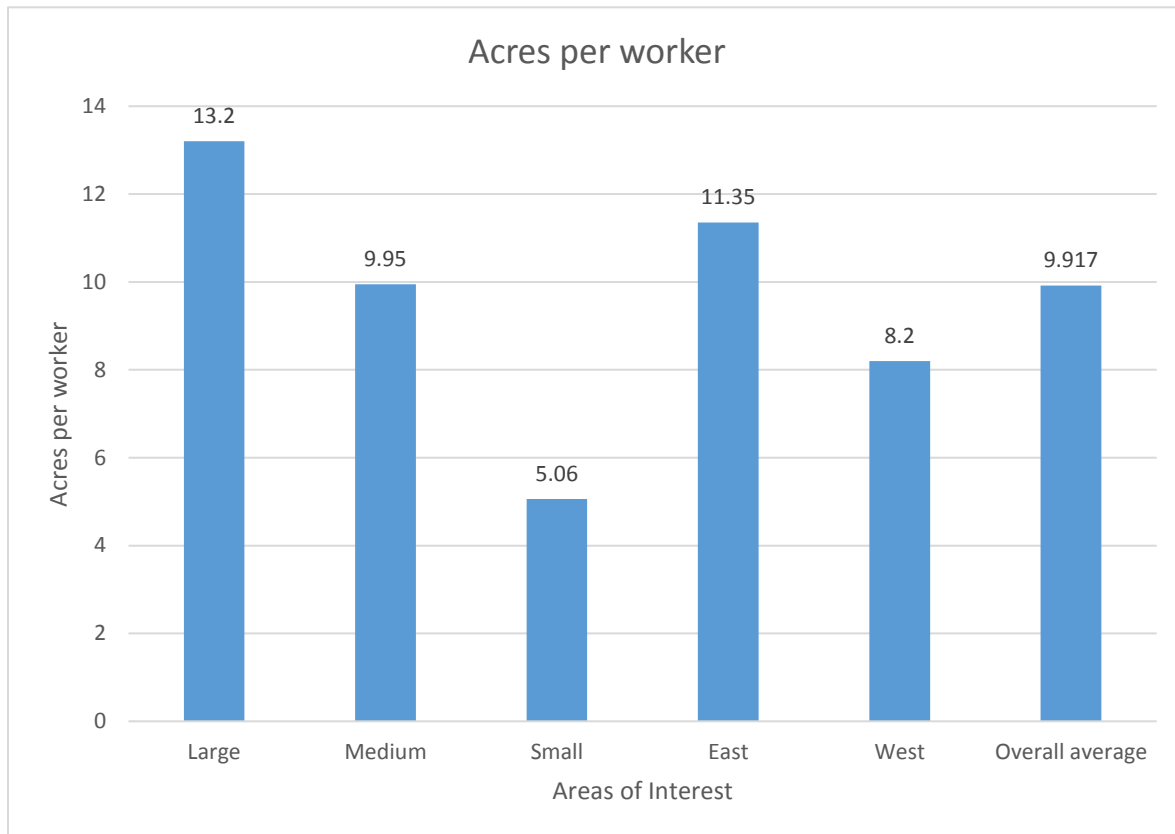


The use of machines in production of tobacco becomes more prevalent as acreage increases and Eastern farms use more machinery in their production practices than the Western farms.

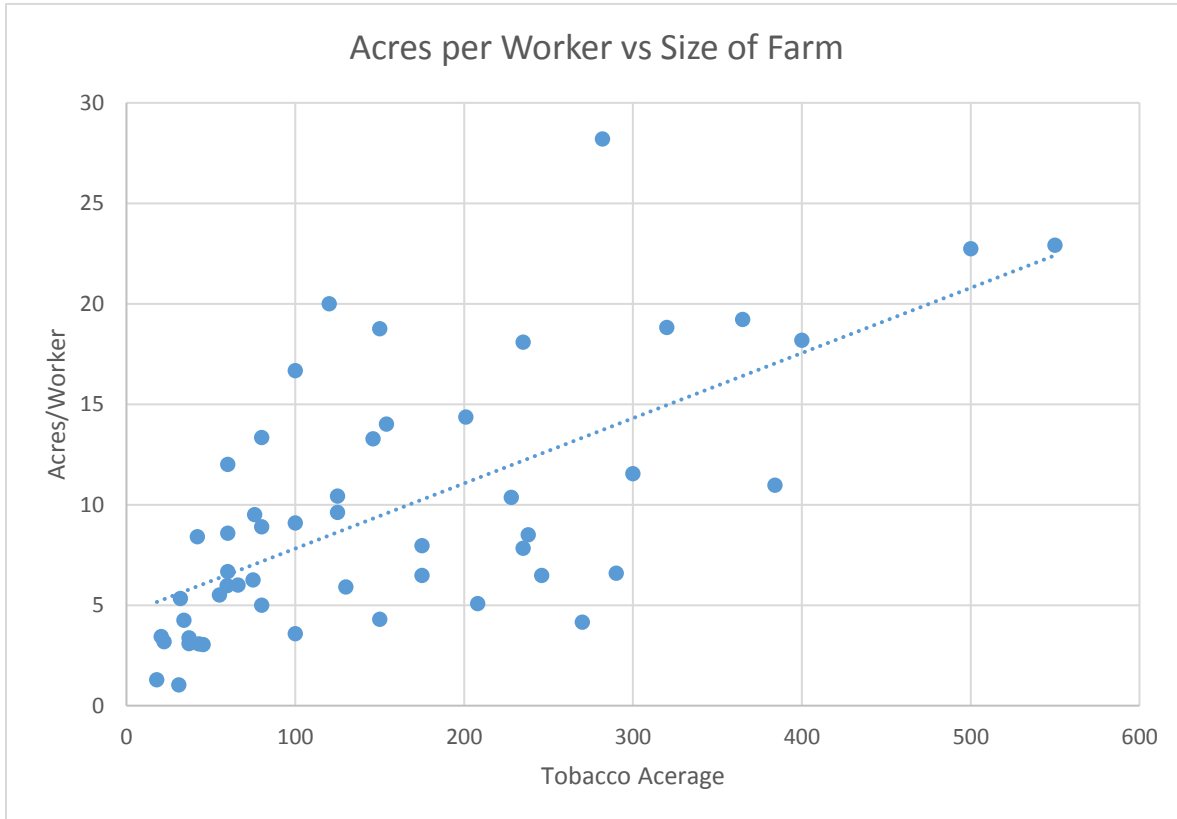
Labor

The average farm had 17.6 tobacco workers. However, there was a large variance in the number of workers per farm. To compare all farms, the project estimated the number of acres per worker. The figure below shows the acres per worker results for all of the areas of study.

Tobacco farmers from the East used more harvest equipment with higher acres per workers. Similar Western farms used more hand labor for production, resulting in a smaller number of

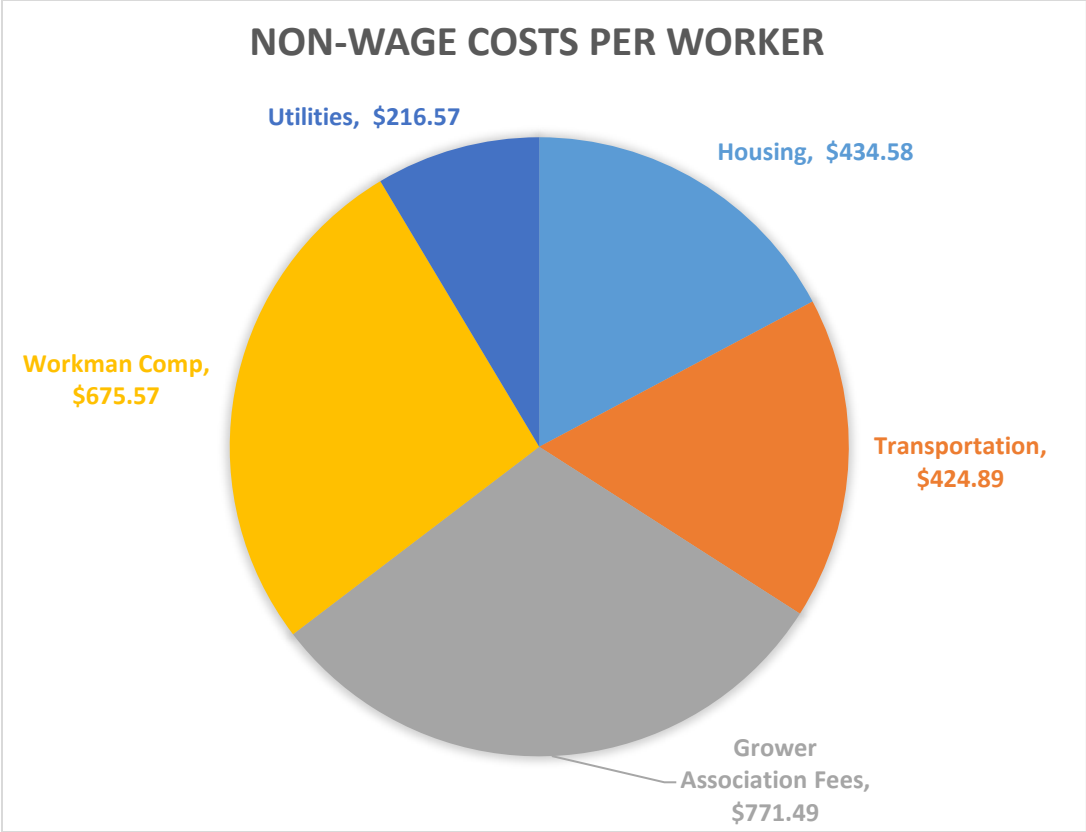


acres per worker. The survey shows that as size of farms increase, acres per worker increase. The following scatterplot better shows this relationship from survey data.

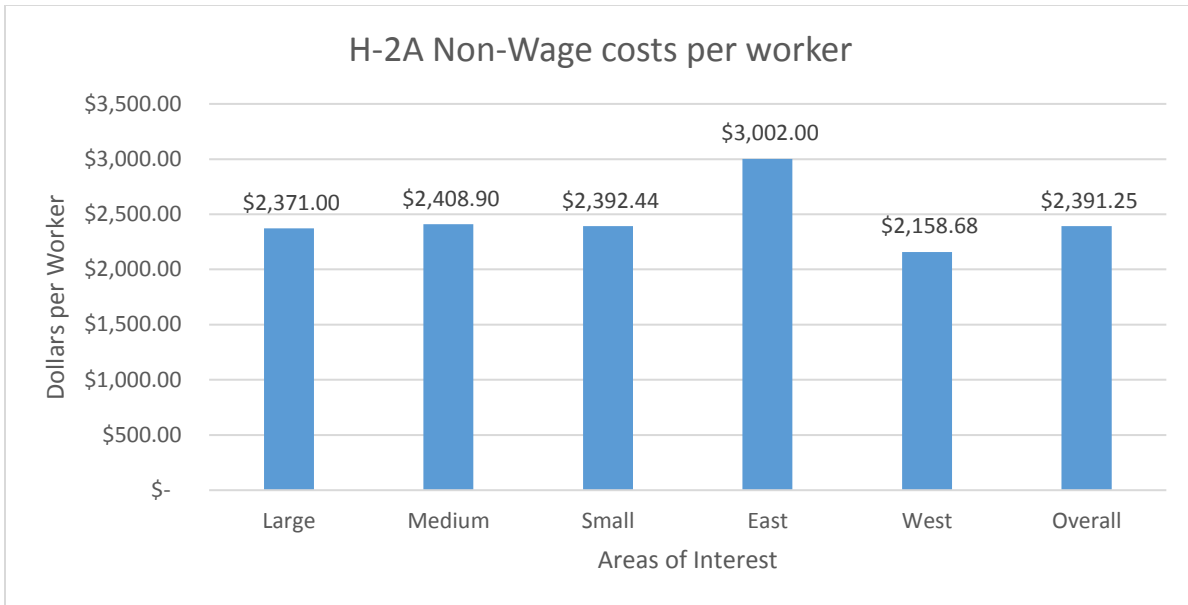


The Eastern tobacco farmers reported utilizing family for 15% of their total labor, seasonal workers were 26% of their total labor, other migrant workers as 10% of their total labor, and H-2A as representing 49% of their labor. The West tobacco farms sourced their labor by utilizing family as 17% of total labor, seasonal as 12% of labor, other migrant workers as 0% of labor, and H-2A as 71% of labor.

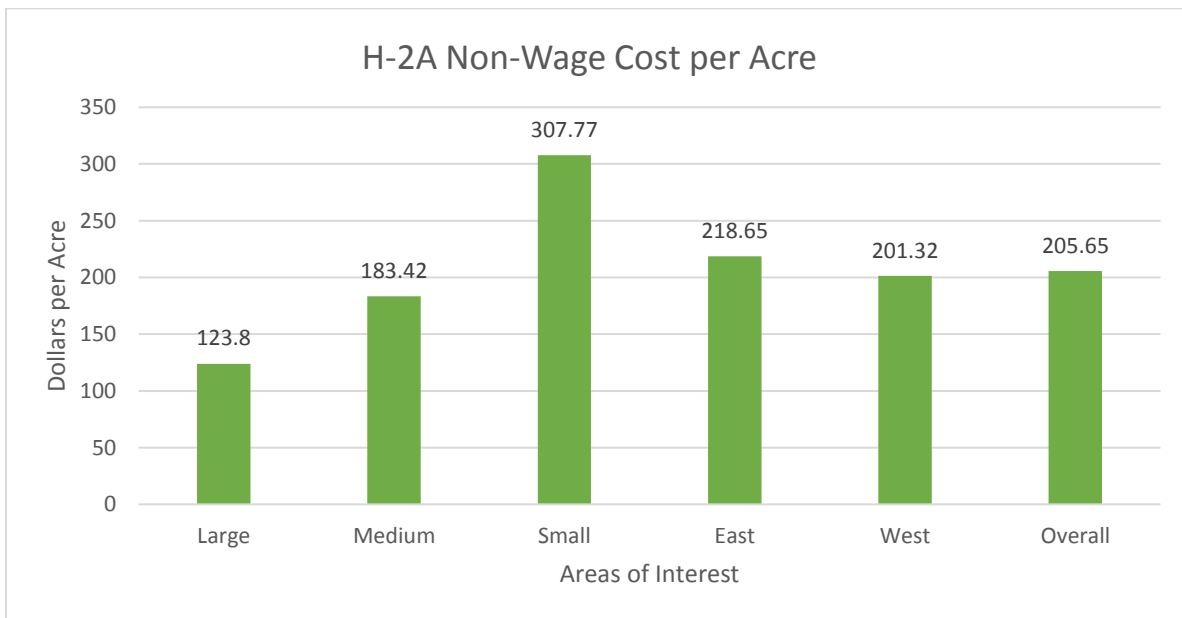
One of the goals of the tobacco labor project was to estimate the additional overhead cost specific to H-2A workers. Those categories include housing, utilities, and workman compensation, acquisition costs of relocation assistance, per worker acquisition fees, and grower association fees. The graph on the following page shows the per-worker average of each of these costs separately.



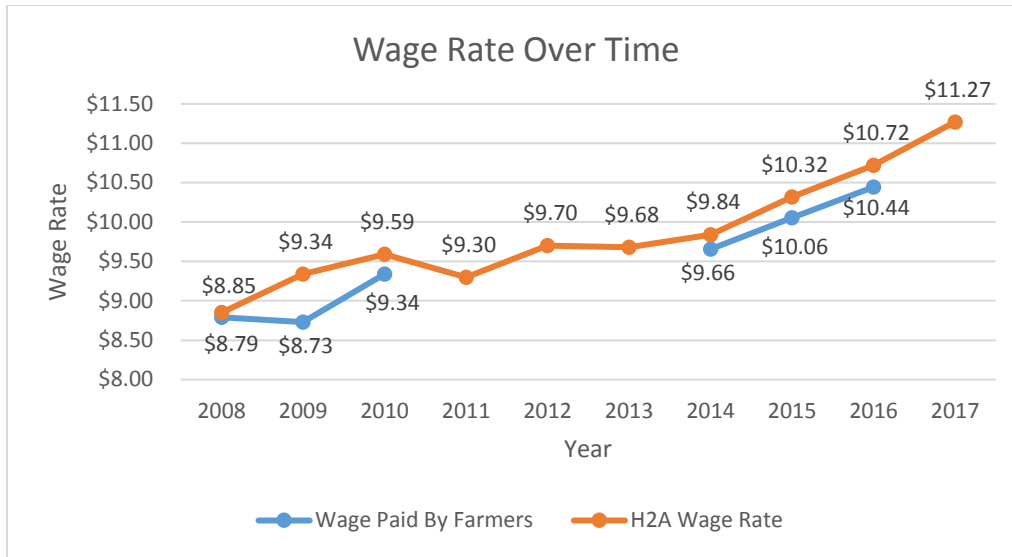
Tobacco farmers reported spending an average of \$2,391.25 per worker for the non-wage costs, ranging from a maximum of \$4,462.50 per worker and a minimum of \$1,312.50 per worker. When comparing H-2A cost by farm size there is no significant difference in non-wage cost per worker. However, there is a significant difference between non-wage costs per worker when comparing the Eastern and Western farms. Eastern farms have a higher average cost per worker represented on the following chart which shows farms by size on the left and farms by location on the right.



The study converted the non-wage cost to a per acre basis, assuming the workers are used only for tobacco production. The average is \$205.65 per acre with a maximum of \$665.34 and a minimum of \$41.93. The non-wage cost per acre decreases as the number of tobacco acres increases. The study showed no significant difference in geographical regions.



The following graph represents farm wage rates since 2008. The wage paid by farmers from 2008 to 2010 (collected in a previous survey by the Agriculture and Resource Economics Department) along with data most recently collected in this survey is represented in blue against the North Carolina H-2A wage rate in orange on the following chart.



As shown above H-2A wages have increased from \$8.85 in 2008 and set to be \$11.27 in 2017, an overall increase \$2.42. The wages paid by farmers has increased from \$8.79 to \$10.44 in the past 8 years. This is an overall increase of \$1.65 or 19% in wage paid by farmers since 2008.

Tobacco growers need accurate labor costs to budget and evaluate tobacco production. The survey asked tobacco growers to estimate the number labor hours that are needed for each task. The labor hour results vary significantly between the different sizes, location, and method of production.

Across all farms the total labor hours average based on production methods are as follows: Hand top and harvest used an average of 114 hours of labor per acre, Hand top and machine harvest used an average of 60 hours per acre, and Machine top and harvest used an average of 51 hours per acre. Farms with harvester, and box loading system had lower total labor hours per farm. A table that contains hourly averages for each method, in all areas of interest can be found in the Appendix.

Respondents reported topping and suckering required the most labor. Machine topping reduced hour of labor compared to hand topping. Topping takes 16 hours on average by hand, 15 hours on average using a machine, and suckering requires on average 14.5 hours. Together, topping and suckering make up 30.5 hours of labor when hand topping. When a mechanical topper is being used 29.5 hours of total labor for is required for topping and suckering. Topping and suckering accounts for 27% of hand top and harvest production method, 51% of hand top and machine harvest production method, and 59% of machine top and harvest production method. Topping and suckering demonstrates that as the use of machinery increases, the use of hand labor does not show a significant change for certain aspects of tobacco labor.

Discussion

Eastern Farms trended to be larger farms while the West trended toward medium and small farms in respect to the average respondent in this survey. Furthermore, the chart titled “Farming Method by Size” shows that as acres of tobacco increase the use of equipment also increases. Due to the correlation between increase in acres and increase usage of equipment in production,

it would be expected that number of workers needed per acre would be inversely correlated to increase in acres. This is shown to be the case by in the “acres per worker” calculation. The larger the farm, the greater number of acres per one worker.

Farmers have several different sources and options to find labor. This includes the local workers, family, migrant, seasonal, and H-2A. Many farmers use workers from more than one source. This can be seen in the percentages of each labor source option.

Overall, the total cost per worker is unchanged across the size categories, however economies of scale become prevalent when considering the number on a per acre basis over those same categories. This is a result of the inverse correlation discussed earlier when comparing tobacco acreage to acres per worker.

The reported labor hours per acre had large variance in every labor category no matter the size, method or location. This exemplifies that no farm is the same. Each individual farmer has their own methods and styles on how they prefer to grow their crops. Overall, hand top and harvest had the most labor demands of all styles. Farms using mechanical topper reported 4 hours less than the hand topping farms. Farms with mechanical toppers do not show significant saving in labor hours, because suckering still requires hand labor. The farms with mechanical tobacco harvesters reported 53 less labor hours compared to hand-harvest farms. With a wage rate of \$11.27, labor costs with mechanical harvesters would be \$597 per acre less than hand-harvest farms.

The farms using all hand labor had very little differences in labor hours utilized. Small farms reported 110.7, with medium sized farm reporting 109 hours and large farms at 112.3. Small farms with machine topper and harvester reported 45.36 total hours of labor used, medium sized farms reported 40.22 hours of labor, and large farms with machine topper and harvest reported 54.4 hours. Mechanical topper and harvester provided significant labor saving for all farm sizes.

Summary

Labor is almost 30% of the total cost of production. Understanding the cost of labor is critical for tobacco farmers. Tobacco farmers reported having an average of 17.6 workers on their farms, with a large range in number of workers per farm. One of the unexpected findings of the survey is the sources of labor. The Eastern tobacco farms reported family provided 15% of their total labor, seasonal workers provided 26%, other migrant workers 10% and H2A labor was 49%. The West tobacco farms reported family provided 17% of the total labor, seasonal workers 12%, and H2A was 71% of total labor. Tobacco farmers reported spending an average of \$2,391 per worker for nonwage costs or \$205 per acre.

Tobacco labor cost is very dependent on how labor is sourced and the method of farming as well as the geographical location. Utilizing mechanical harvester can greatly reduce the labor cost. The hand top and harvest used an average of 114 hours of labor per hours, hand top and machine harvest use an average of 60 hours per acre, Machine topper and harvest used an average of 51 hours per acre.

The investment in new harvest equipment can have a significant savings on the total labor costs. However, the decision to invest new tobacco machinery is complicated and depends on several factors such as farm size, price received for tobacco, and labor sources.

Appendix

Labor Hours by size

Hand Top and Harvest	Large (4)	Medium (6)	Small (7)
Pre-Harvest	47.9	33	46.6
Harvest/Bailing	63.2	72.8	62.5
Post-Harvest	1.2	3.6	1.6
Total	112.3	109.4	110.7
Hand Top & Machine Harvest	Large (6)	Medium (9)	Small (5)
Pre-Harvest	44	31.1	43.06
Harvest/Bailing	17.8	22.1	19.89
Post-Harvest	0.922	1.68	4.2
Total	62.722	54.88	67.15
Machine Top & Harvest	Large (7)	Medium (1)	Small (3)
Pre-Harvest	41.3	15.5	27.3
Harvest/Bailing	11.5	22.7	16.5
Post-Harvest	1.24	2.02	1.56
Total	54.04	40.22	45.36

Labor Hours by Location

Hand Top and Harvest	East (5)	West (13)	Overall
Pre-Harvest	48.9	42.5	44.37
Harvest/Bailing	75.3	67.3	67.3
Post- Harvest	1.17	2	1.75
Total	125.37	111.8	113.42
Hand Top & Machine Harvest	East (12)	West (7)	Overall
Pre-Harvest	40.17	34.806	38.025
Harvest/Bailing	12.66	33.05	20.17
Post-Harvest	2.3	1.78	2.1
Total	55.13	69.636	60.295
Machine Top & Harvest	East (10)	West (1)	Overall
Pre-Harvest	35.09	29.866	34.5
Harvest/Bailing	14.58	6.857	13.88
Post-Harvest	1.33	0.055	1.26
Total	51	36.778	49.64

2016 Grower Production Survey



January 2016

We thank you for your time to complete this survey. Your input is critical to help us evaluate labor cost and future machinery investment decisions. With the uncertainty in labor supply and rising labor cost, understanding farm level effects of the changes will provide useful information to tobacco growers and extension agents.

1. Total farm acres _____
2. Owned _____
3. Rented _____

4. Total tobacco acreage of your farming operation.

Acres				
Crop	2013	2014	2015	2016
Tobacco Flue Cured				
Tobacco Burley				

Labor: (tobacco production only)

5. What is the average wage rate paid (excluding benefits) for tobacco labor? (Complete chart below)

Employee Classification	2014	2015	2016
Family Members			
Seasonal (Residents)			
Migrant Labor			
H2A			

Full Time			
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6. What is the total number of hired workers on your farm? _____

7. Number of employees in each category?

A. Family member's _____

B. Seasonal (resident) workers _____

C. Migrant Labor _____

D. H2A workers _____

8. What is the number of **full time** employees on your farm? _____

9. What percentage of your tobacco labor is allocated for each of the categories?

Labor Category	Percent
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A. Family member's _____

B. Seasonal (resident) workers _____

C. Migrant Labor _____

D. H2A workers _____

Production:

10. What is the average man-hours per acre used for tobacco production?

A. Field Preparation _____

- B. Topping and suckering _____
- C. Machine Harvest _____
- D. Manual Harvest _____
- E. "Hanging boxes" _____
- F. Taking out and Baling _____

11. What was your **total labor** cost for tobacco production?

- A. 2013 _____
- B. 2014 _____
- C. 2015 _____
- D. 2016 _____

12. What is your **total cost of production per pound** of tobacco? _____

13. What is your **total cost of production per acre** of tobacco? _____

14. Do you use a **mechanical** topper? (Yes or No) _____

If **YES** then what percentage of your tobacco acreage do you **mechanically** top? _____ %

15. How many times do you **hand** top? _____

16. How many additional times do you **hand** sucker your tobacco? _____

17. Method of applying chemical sucker control? _____

18. Do you use a **mechanical** harvester? (Yes or No) _____

If **YES** then what percentage of your tobacco acreage do you *mechanically* harvest?
_____%

19. Do you use a box loading system? (Yes or No)_____

20. In what part of tobacco production do you have the greatest labor needs?

Additional comments:

Home County (This is only used to determine geographical location):_____

If you would be willing to answer some follow up questions to this survey please list your contact information below.

Providing your email address will better enable us to send the survey results back if you wish to receive them for planning purposes.

Name:

Phone #:

Email:

Mailing Address: