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AGRICULTURAL WORKER TIME AND ACTIVITY STUDY: BROCCOLI SECTOR, CENTRAL COAST, CALIFORNIA

April 15, 2017

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Supported by: California Department of Pesticide Regulation

UC SAREP Is a program of the Agricultural Sustainability Institute at UC Davis and the UC Division of Agriculture and Natural Resources

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Acknowledgements

We wish to thank the farmers, farm managers, foremen and farmworkers who generously agreed to collaborate with us on this study; none of this would be possible without them. We also wish to thank Victor Zurita, who spent many hours in the fields observing activity patterns and conducting surveys; Celeste Enriquez and Jorge Contreras, who conducted farmworker surveys and entered detailed data. Celeste Enriquez also provided invaluable help with data analysis and synthesis. We are very grateful to the Department of Pesticide Regulation for funding this research.

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EXECUTIVE SUMMARY

The California Department of Pesticide Regulation (DPR) contracted with the UC Sustainable Agriculture Research and Education Program (SAREP) to conduct a time and activity assessment among field workers in California's broccoli sector.
The assessment sought to answer several questions, principally the number of hours worked per day and activities field workers engaged in during the course of the year. Methods included (1) on-farm observations on two farms on the Central Coast during the period May-November 2016; (2) a survey of 151 farmworkers employed in the broccoli sector; and (3) an analysis of electronic labor tracking data for non-harvest field workers on one farm during calendar year 2016.

Principal findings include the following:

Observation Data

- Workers spent a minimum of 0.2 hours and a maximum of 9.9 hours – including lunch and breaks – in the observed fields on any given day.
- Harvest activities accounted for the longest amount of time in the fields, with a mean of 6.5 hours and a maximum of 8.8 hours per day on days that harvest activities occurred.
- The observed field workers spent a total of 682 person-hours on all production and harvest related tasks on 8.75 acres of broccoli, or 78 person-hours per acre.

Labor Tracking Data

- We analyzed electronic labor tracking data for all direct hire field workers on 1,000 acres of broccoli during calendar year 2016.
- The dataset provided hours worked on the following tasks: drip irrigation, listing/sidedressing, spraying and hand weeding.
- The dataset did not provide hours worked on harvest activities, which were contracted out to a third party.
- The data indicate a total of 2,809 hours of non-harvest labor on 1,000 acres, or 2.81 hours of non-harvest labor per acre. The breakdown of labor use is as follows:
    - Drip irrigation: 108 hours, representing 0.11 hours/acre (3.8% of non-harvest hours)
    - Listing/sidedressing (by tractor): 975 hours, representing 0.98 hours/acre (34.7% of non-harvest hours)
    - Spraying: 349 hours, representing 0.35 hours/acre (12.4% of non-harvest hours)

- Hand weeding: 1,377 hours, representing 1.38 hours/acre (49.0% of non-harvest hours)

Farmworker Survey

- Survey respondents reported a mean of 304 days of employment in any agricultural activity during the preceding year, a mean of 102 days of non-agricultural employment and a mean of 95 days of unemployment.
- 135 (89.4%) respondents reported agricultural employment only during the preceding year.
- Respondents reported a mean of 255 days of employment in broccoli during the preceding year and a mean of 161 days of employment in other crops, including strawberries, caneberries, onions, nuts, grapes, asparagus, spinach, cabbage and green beans.
- Two-thirds (67.6%) of respondents reported agricultural employment only in the broccoli sector.
- 44 (29.1%) respondents reported employment on farms using organic production practices. Respondents with employment on organic farms reported working a mean of 249 days on those farms.
- Respondents reported living and working in California (including non-agricultural jobs and unemployment) a mean of 340 days over the course of the year.
- 19.7% of respondents reported migrating more than 75 miles during the course of the year.

INTRODUCTION

The California Department of Pesticide Regulation (DPR) regulates the sale and use of pesticides in California. DPR uses scientifically generated data to assess worker exposure to pesticides and identify and test mitigation measures. Pesticide exposure assessments make assumptions about frequency and duration of fieldwork tasks that can result in pesticide exposure.

Current assessments are based on a default 8-hour workday for all tasks, with the assumption that workers perform each task daily throughout the entire period that the task is performed (e.g., that all workers harvest daily throughout the harvest season). DPR seeks more accurate information about task durations as well as the frequency with which individual farmworkers perform specific tasks, information that is currently not available. DPR also seeks information about the other jobs farmworkers perform, to obtain a more accurate assessment of total exposure.

DPR contracted with the UC Sustainable Agriculture Research and Education Program (SAREP) to conduct a pilot time and activity study among workers employed in the California broccoli sector. This sector was chosen for a number of reasons, including high use of manual labor and limited data on worker time and activities.

The assessment sought to answer the following questions:

- What are the principal tasks associated with broccoli production?
- What is the duration of each task, in terms of number of hours per day?
- What are general work patterns over the course of the year?
    - Which other tasks and crops are broccoli workers engaged in?
    - How many days per year are broccoli workers employed in other crops?
    - In which crops do they work?
    - In which tasks do they engage?
    - What percent of workers work on farms using organic production practices? How many days per year do they work on organic farms?
    - How many days per year are broccoli workers employed in non-agricultural work?
    - How many days per year are broccoli workers unemployed?
    - Where do broccoli workers live and work over the course of the year?
    - What percent of broccoli workers migrate during the course of the year?
    - To what extent are broccoli workers able to shower after work?
    - To what extent are broccoli workers able to wear freshly laundered clothing to work?

BACKGROUND: CALIFORNIA'S BROCCOLI SECTOR

- There are approximately 120,000 acres of broccoli production in California, up from approximately 30,000 acres in 1970.[1]
- California's principal broccoli producing regions are the Central Coast (Monterey, Santa Cruz and San Benito Counties); the Southern Coast (Ventura, Santa Barbara and San Luis Obispo Counties); the Central Valley (Fresno, Stanislaus and Tulare Counties) and the Southern Desert Valleys (Imperial and Riverside Counties).
- Monterey County is the top broccoli-producing county in California, with 61,447 acres in production in 2015, followed by Santa Barbara County (26,276 acres) and Imperial County (14,738 acres). [2] [3] [4]

RESEARCH METHODS

Answers to the research questions were obtained via a multi-method design consisting of the following components: (a) on-farm worker observations; (b) a survey of workers employed in the broccoli sector; and (c) an analysis of electronic labor tracking data for all hourly and piece rate workers on one broccoli farm. The research methods and data collection tools were approved by the UC Davis Institutional Review Board. All grower and worker observation data were confidential while farmworker surveys were anonymous.

Worker Observations

- Observations were conducted on two broccoli farms that agreed to participate in the research.
- The observed farms were located in Monterey and Santa Cruz Counties on California's Central Coast.
- One farm is a small, organic diversified farm. The other is large conventional farm producing cool weather crops including broccoli, cauliflower, strawberries and lettuce and other leafy greens.
- The farms were offered a $500 honorarium to defray costs associated with participation in the research. (One farm accepted the honorarium while the other declined.)
- Foremen on each farm received a $500 honorarium as a means of thanking them for helping to identify workers and other forms of assistance with the research.
- Sample fields were identified on each farm. One field had 8 acres of broccoli while the other field had 0.75 acres.

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[1] Daniel Geisseler and William R. Horwath. (2016). Broccoli Production in California. Davis, CA: University of California. https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Broccoli_Production_CA.pdf.
[2] County of Monterey. Monterey County Crop Report 2103. Salinas: CA. Office of the Agricultural Commissioner.
[3] County of Santa Barbara. Santa Barbara County Agricultural Production Report 2015. Santa Barbara: CA. Office of the Agricultural Commissioner.
[4] County of Imperial. 2015 Imperial County Agricultural Crop and Livestock Report. El Centro, CA: Office of the Agricultural Commissioner.

- Observations were conducted over the course of the entire workday, beginning at the start of each workday and lasting until workers left for the day.
- Observations consisted of recording start and stop times for each activity workers engaged in. A (See Appendix A for a copy of the observation form.)
- Participating workers received a $10 gift card each time observations were conducted.

Farmworker Survey

- An interviewer-administered survey of 151 agricultural workers reporting employment in the broccoli sector during the previous 12 months was conducted during the period June-December 2016. Sampling was based on a convenience sample of workers. (See Appendix B for a copy of the survey instrument.)
- The survey consisted of a work history, which gathered information on employment and related activities for the previous 12-months. Information gathered included type of work (agricultural, non-agricultural), crop or sector, principal tasks, dates of employment, location and whether the farm used organic production practices.
- The survey also elicited information regarding bathing and laundering as well as respondent demographic characteristics.
- Recruitment was based on a convenience sample of workers identified at a range of locations in Santa Cruz and Monterey Counties, including farms, an apartment complex, farmers markets, flea markets, supermarkets and other retail locations, parks, laundromats and other public places.
- Selection criteria included 18 years of age or older and one or more days of employment in the broccoli sector during the previous 12-months.
- Survey respondents provided informed consent.
- All respondents received a $10 gift card.

Analysis of Electronic Labor Tracking Data

- One of the farms where observations were conducted employed digital technology to track labor.
- Workers scan a card with a chip or magnetic stripe, which digitally records activities and associated times or numbers of trays picked.
- The farm using labor tracking technology agreed to share labor-tracking data for all direct-hire non-harvest fieldworkers employed during calendar year 2016.

STUDY LIMITATIONS

There are several limitations to this study:
- Observations were conducted on two farms only. Production practices and labor requirements may vary significantly from farm to farm.
- Observations were conducted on farms in Santa Cruz and Monterey Counties only. Production practices on the Central Coast may differ those in other regions.
- Labor tracking data are from one farm only and do not include harvest activities, which were contracted out to a third party and not available.

- Observation data are for one production cycle only. Labor requirements may differ based on seasonality.
- Observations were conducted on one field per farm only. It is possible that workers engaged in field work on other fields after leaving the observed fields.

OBSERVATION DATA FINDINGS

Time and Activities

Observations were conducted each time workers were in the sample fields. Between one and 23 workers were observed on 48 distinct days. As seen in Table 1, workers spent a minimum of 0.2 hours and a maximum of 9.9 hours – including lunch and breaks – in the observed fields on any given day. Harvest activities accounted for the longest amount of time in the fields, with a mean of 6.5 hours and a maximum of 8.8 hours per day.

It is important to note that these times represent only hours spent in the observed fields. With the exception of harvest activities requiring the entire day, it is likely that workers spent time in different fields after completing their tasks in the observed fields.

Table 1. Broccoli Production: Hours per Day per Task

	Number of Observations	Mean Hours	Minimum Hours	Maximum Hours
Cultivation	25	1.7	0.3	4.0
Irrigation related	64	1.4	0.2	4.0
Irrigation	25	2.5	0.1	5.5
Spraying	7	2.0	0.7	3.0
Harvesting	65	6.5	2.0	8.8
Lunch and breaks	47	0.3	0.0	1.1
Total hours	175	3.9	0.2	9.9

Workers spent a total of 682 person-hours on all production and harvest related tasks on the 8.75 acres of broccoli observed, or 78 person-hours per acre. Person-hours per acre for specific tasks are as follows:

- Cultivation: 4.83 person-hours per acre.
- Irrigation-related:[5] 10.82 person-hours per acre.
- Irrigation:[6] 7.06 person-hours per acre.
- Spraying: 1.57 person-hours per acre.
- Harvest: 53.67 person-hours per acre.

[5] Irrigation-related activities include laying, moving and fixing irrigation pipes.
[6] Irrigation includes turning irrigation on and off and down time during irrigation; this activity entails minimal exposure.

Table 2. Broccoli Production: Person-Hours per Acre

	Cultivation	Irrigation related	Irrigation	Spraying	Harvest	TOTAL
Total Hours	42.27	94.68	61.80	13.75	469.62	682.12
Person-hours per acre	4.83	10.82	7.06	1.57	53.67	77.96

ANALYSIS OF LABOR TRACKING DATA

One of the participating farms provided electronic labor tracking data for all direct hire non-harvest field workers for the period January 1-December 31, 2106. Data for harvest activities were not available, since the harvest was contracted out to a third party firm. The dataset includes aggregate hours worked for 45 fields encompassing 1,000 acres for the following tasks: drip irrigation, listing/sidedress, spraying, and handweeding.

As seen in Table 5, a total of 2,808 hours were required for broccoli production on 1,000 acres, or 2.8 person-hours per acre. Approximately half (49.0%) of all hours were spent on handweeding, followed by sidedressing (34.7%), spraying (12.4%) and drip irrigation[7] (3.8%).

There principal limitation to this dataset is that it includes information for non-harvest workers only, since harvest activities were contracted out to a third party firm.

Table 3. Electronic Labor Tracking Data: Tasks and Hours

TASK	Hours Worked (1,000 acres)	Hours per Acre	Task as Percent of Hours Worked
Drip irrigation	107.50	0.11	3.8%
Listing/sidedress (tractor)	975.14	0.98	34.7%
Spraying	348.50	0.35	12.4%
Handweeding	1,377.33	1.38	49.0%
TOTAL	**2,808.47**	**2.81**	**100.0%**

SURVEY FINDINGS

A survey of 151 farmworkers working in broccoli during the 12-month period preceding the survey was conducted between June-December 2016. Principal findings are presented below.

[7] Only two fields had drip irrigation.

Demographic Characteristics

- **Age:** Respondents reported a mean age of 38.4, with a minimum of 19 and a maximum of 70. Approximately one-fourth (29.3%) of respondents were between the ages of 18 and 29, 44.0% were in the 30-44 year age range, and 26.7% reported ages between 45 and 70.
- **Gender:** Approximately two-third (64.9)% of the sample consisted of men, while 35.1% of respondents were women.
- **Years working in agriculture:** The respondents reported a mean of 14.5 years working in agriculture in the U.S., with a minimum of 0 and maximum of 51 years.
- **Indigenous status:** Identifying indigenous status of immigrants from Mexico and Central America can be challenging, given varying self-perceptions of ethnic identity and stigmas associated with being indigenous. Respondents were asked about languages spoken as a proxy for indigenous status. Only 11 (7.2%) respondents reported speaking an indigenous Mexican language. Languages reported include Maya (n=1), Mixteco (n=1), Nahuatl (n=1), Otomí (n=1), Purépecha (n=3), Triqui (n=3), and Zapoteco (n=1).

Employment Patterns

- Survey respondents reported a mean of 304 days of employment in agriculture during the preceding year, with a minimum of 42 and a maximum of 365 days. (See Appendix C for detailed survey responses.)
- Respondents reported a mean of 102 days of non-agricultural employment during the preceding year, with a minimum of 2 and a maximum of 274 days.
    - 135 (89.4%) respondents reported zero days of non-agricultural employment during the preceding year.
- The respondents reported a mean of 95 days of unemployment, with a minimum of 3 and a maximum of 324 days.
    - 70 (46.4%) respondents reported zero days of unemployment.
- The respondents reported a mean of 2.0 jobs over the course of the previous year, with a minimum of 1 and a maximum of 5. Half of all respondents (50.0%) reported two different jobs over the course of the year. (Note: Leaving and returning to the same place of employment was counted as two jobs.)

Principal Crops

- Respondents reported a mean of 255 days of employment in broccoli during the preceding year, with a minimum of 2 days and a maximum of 365.
- Respondents reported a mean of 161 days of employment in other crops, with a minimum of 18 days and a maximum of 365.
    - Other crops reported include strawberries, caneberries, onions, nuts, grapes, asparagus, spinach, cabbage and green beans.

- Two-thirds (67.6%) of respondents reported agricultural employment only in the broccoli sector, while 32.4% reported employment in additional crops.

Principal Tasks and Duration

For each period of employment, respondents were asked about the principal crop they worked on and up to three main tasks. The most commonly reported activities across all crops were harvesting, packing, bunching (Table 6). (Note: Percentages are based on the 456 activities reported by respondents in the sample.)

Agricultural tasks were categorized as activities involving contact with plants and fruit and those not involving contact. Respondents reported engaging in activities involving contact with plants and fruit an average of 286 days per year, with a minimum of 31 days and a maximum of 365 (n=137).

Table 4. Principal Agricultural Activities: All Crops (n=151)

Activity	Frequency with which task mentioned	Percent
Harvest	181	39.7
Packing	83	18.2
Bunching	47	10.3
Tractor driver	24	5.3
Miscellaneous	21	4.6
Pruning	13	2.9
Soil preparation	12	2.6
Assembling boxes	11	2.4
Weeding	11	2.4
Planting/transplanting	10	2.2
Laying irrigation pipe	9	2.0
Supervisor	9	2.0
Bagging	8	1.8
Taping	7	1.5
Deleafing	4	0.9
Spraying	4	0.9
Sorting	2	0.4
Total	456	100

Employment on Organic Farms

For each distinct period of agricultural employment, respondents were asked whether the farm used organic production practices.

- 44 (29.1%) respondents reported employment on farms using organic production practices during the course of the previous year.
- Respondents with employment on organic farms reported working a mean of 249 days on those farms, with a minimum of 13 days and a maximum of 365.
- Note: A number of respondents reporting employment on farms utilizing organic and conventional production practices. For purposes of the analysis, days worked on those farms was counted as employment on organic farms.

Geographic Location and Migratory Patterns

The work history elicited information regarding the location of each activity (agricultural employment, non-agricultural employment, unemployment).

- Respondents reported living and working in California (including non-agricultural jobs and unemployment) a mean of 340 days over the course of the year, with a minimum of 45 days and a maximum of 365.
- The overwhelming majority of locations reported by respondents are on the Central Coast (90.0%) (Table 8).

Table 5. Geographic Location: Agricultural Employment and Other Activities

Location	Frequency	Percent
Central Coast	351	90.0%
Mexico	16	4.1%
Imperial/Yuma	9	2.3%
Central Valley	7	1.8%
Southern California	5	1.3%
Central America	1	0.3%
Coachella Valley	1	0.3%
Total	390	100%

The U.S. Department of Labor's National Agricultural Workers Survey (NAWS) defines a migrant farmworker as "a worker who traveled a distance of more than 75 miles between two farm jobs or between a farm job and a usual residence during the past year."[8] Since the survey did not gather detailed geographic information, farmworkers were considered migratory if they reported living or working in two or more of the regions listed in Table 8 during the course of the year, with the assumption that distances between regions are 75 miles or more. Based on that, 30 respondents (19.7%) were considered migratory, while 122 respondents (80.3%) reported living and working in the Central Coast region during the entire year. (Note: While some respondents reported working in different cities on the Central Coast during the year (e.g. Watsonville and Salinas), they were not considered migratory, given the short distances.)

[8] The National Agricultural Workers Survey. http://www.doleta.gov/agworker/naws.cfm. Retrieved April 1, 2015.

Bathing and Laundering

The survey included questions regarding bathing and laundering. Almost all (98.0%) respondents reported they were able to bathe or shower after the last time they had engaged in agricultural work. Additionally, 97.3% of respondents reported wearing freshly laundered clothes the last time they had engaged in fieldwork.

CONCLUSIONS

Findings from this pilot assessment indicate that fieldworkers spent a total of 682 person-hours on production and harvest related tasks on 8.75 acres of broccoli, representing 78 person-hours per acre. Given the small number of farms observed and the significant variations in hours between these two farms, findings should be used with caution.

Appendix A: Worker Observation Form

Date:		Farm:						
Worker ID	**Task**	**Start Time 1**	**Stop Time 1**	**Start Time 2**	**Stop Time 2**	**Start Time 3**	**Stop Time 3**	**Notes**

Breaks	**Start Time**	**End Time**	**Lunch/ Break Location**	**Washed hands before eating?**	
Break 1					
LUNCH					
Break 2					
Task Codes	1=Tilling; 2=Move irrigation pipe; 3=List fields; 4=Irrigation ; 5=Bed prep; 6=Planting greenhouse=; 7=Transplanting; 8=Planting direct); 9=Cultivation/weeding ; 10=Spraying ; 11=Hand weeding; 12=Fertilize/Side dress; 13=Harvest; 14=Post-harvest; 15=Packing; 16=Break/lunch; 17=Other, specify				
Break Location Codes	1=field, on ground; 2=field, off ground; 3=away from field, on ground; 4=away from field, off ground; 5=car/truck; 6=lunchroom; 7=lunch truck; 8=other, specify				
Handwashing Codes	0=No; 1=Yes, soap and water; 2=Yes, water only; 3=Yes, sanitizer; 4=NA, did not eat				

Appendix B: Farmworker Survey

FARMWORKER TIME AND ACTIVITY SURVEY

SCREENER QUESTIONS

A. Have you worked in raspberries or blackberries during the past 12 months?

☐ Yes ☐ No ☐ Don't Know/Refuse

→IF "NO" OR "DON'T KNOW/REFUSE" END HERE

B. Are you 18 years old or older?

☐ Yes ☐ No ☐ Don't Know/Refuse

→IF "NO" OR "DON'T KNOW/REFUSE" END HERE

→IF "YES" TO "A" AND "B" OBTAIN INFORMED CONSENT AND ADMINISTER SURVEY

WORK HISTORY

1. **I have some questions about your work and other activities during the past 12 months**
   a) What type of work were you doing this month last year?
      FW=Farm Work
      GL=Gardening/Landscaping
      NF=Non-Farm Work
      NW=Not Working
   b) **IF FARM WORK:** Which crop(s) were you working in? (IF SEVERAL CROPS, ASK FOR MAIN ONE)
   c) What were you doing in that crop? (TOP 3 ACTIVITIES)
   d) What date did you start working in that crop?
   e) What date did you end working in that crop?
   f) Were you working on an organic farm?
   g) Where were you working?

→ ASK ABOUT ACTIVITIES AFTER THAT:

   a) What type of work did you do after that?
   b) **CONTINUE WITH B-G ABOVE**

CONTINUE GETTING WORK HISTORY FOR LAST 12 MONTHS

	(a) Type of Activity	(b) Main Crop	(c) Tasks	(d) Start Date	(e) End Date	(f) Organic?	(g) City, State, Country
1	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
2	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
3	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
4	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
5	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	

	(a) Type of Activity	(b) Main Crop	(c) Tasks	(d) Start Date	(e) End Date	(f) Organic?	(g) City, State, Country
6	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
7	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
8	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
9	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	
10	☐ FW ☐ NFW ☐ GL ☐ NW		a. b. c.			☐ Yes ☐ No ☐ DK	

BATHING AND LAUNDERING

2. Were you able to wear clothes that had just been washed the last time you worked in the fields?

   ☐ Yes ☐ No ☐ Don't Know/Refuse

3. The last time you worked in the fields, were you able to take a bath or shower the same day after work?

   ☐ Yes ☐ No ☐ Don't Know/Refuse

DEMOGRAPHICS

4. What year were you born? _____

5. What year did you start working in the fields in the US? _____ (OR # years working in US: _____)

6. Do you speak any languages besides English or Spanish?

   ☐ Yes ☐ No ☐ Don't Know/Refuse

   a. IF YES → Which languages do you speak?

   _____

7. **INTERVIEWER, NOTE GENDER:**

   ☐ Male ☐ Female

8. **SURVEY DATE: _____**

9. **INTERVIEWER:**

10. **INTERVIEWER COMMENTS:**

APPENDIX C: OBSERVATION DATA TABLES

Table 1: Hours: Cultivation

Hours: Cultivation	Frequency	Percent
0.3	1	0.6
0.5	6	3.4
0.7	1	0.6
0.8	1	0.6
1.0	3	1.7
1.3	1	0.6
1.5	1	0.6
1.8	2	1.1
2.0	1	0.6
3.0	5	2.9
3.3	1	0.6
3.8	1	0.6
4.0	1	0.6
Total	25	14.3
Missing	150	85.7
TOTAL	175	100

Table 2: Hours: Irrigation Related

Hours: Irrigation Related	Frequency	Percent
0.2	7	4.0
0.3	7	4.0
0.3	1	0.6
0.3	3	1.7
0.4	1	0.6
0.5	1	0.6
0.7	2	1.1
0.8	3	1.7
1.0	1	0.6
1.3	5	2.9
1.5	6	3.4
1.8	3	1.7
1.9	1	0.6
2.0	10	5.7

2.1	3	1.7
2.7	1	0.6
3.0	6	3.4
4.0	3	1.7
Total	64	36.6
Missing	111	63.4
TOTAL	175	100.0

Table 3: Hours: Irrigation

Hours: Irrigation	Frequency	Percent
0.1	1	0.6
0.8	1	0.6
1.0	2	1.1
1.5	3	1.7
1.8	1	0.6
1.8	1	0.6
1.9	1	0.6
2.0	4	2.3
2.1	1	0.6
2.7	1	0.6
3.0	3	1.7
3.5	1	0.6
4.0	2	1.1
5.0	1	0.6
5.0	1	0.6
5.5	1	0.6
Total	25	14.3
Missing	150	85.7
TOTAL	175	100

Table 4: Hours: Spraying

Hours: Spraying	Frequency	Percent
0.7	1	0.6
1.5	3	1.7
2.6	1	0.6
3.0	2	1.1
Total	7	4.0
Missing	168	96.0

TOTAL	175	100

Table 5: Hours: Harvesting

Hours: Harvesting	Frequency	Percent
2.0	21	12.0
8.5	21	12.0
8.8	23	13.1
Total	65	37.1
Missing	110	62.9
TOTAL	175	100

Table 6: Hours: Lunch and breaks

Hours: Lunch and Breaks	Frequency	Percent
0.0	128	73.10
1.0	21	12.00
1.1	26	14.90
TOTAL	175	100

Table 7: Hours: Total

Hours: Total	Frequency	Percent
0.2	2	1.10
0.3	5	2.90
0.3	1	0.60
0.4	1	0.60
0.4	1	0.60
0.5	7	4.00
0.7	2	1.10
0.8	1	0.60
0.8	3	1.70
1.0	5	2.90
1.2	1	0.60
1.3	5	2.90
1.3	1	0.60
1.4	3	1.70
1.5	10	5.70
1.5	1	0.60
1.8	3	1.70

1.8	4	2.30
1.8	1	0.60
1.9	1	0.60
2.0	36	20.60
2.1	3	1.70
2.3	1	0.60
2.3	1	0.60
2.4	1	0.60
2.6	1	0.60
2.7	2	1.10
3.0	13	7.40
3.2	1	0.60
3.3	1	0.60
3.5	1	0.60
3.7	2	1.10
3.8	1	0.60
4.0	6	3.40
5.0	1	0.60
5.0	1	0.60
5.7	1	0.60
9.5	21	12.00
9.9	23	13.10
TOTAL	175	100

APPENDIX D: FARMWORKER SURVEY DATA TABLES

Table 1. Days Working in Agriculture

Days Working in Agriculture	Frequency	Percent
42	1	0.7
92	1	0.7
122	1	0.7
130	1	0.7
132	1	0.7
136	1	0.7
138	1	0.7
167	2	1.3
184	1	0.7
195	1	0.7
197	1	0.7
205	1	0.7
214	2	1.3
219	2	1.3
222	1	0.7
223	1	0.7
229	4	2.6
233	2	1.3
238	1	0.7
240	1	0.7
242	1	0.7
243	1	0.7
245	1	0.7
248	1	0.7
250	1	0.7
256	1	0.7
260	4	2.6
261	4	2.6
263	1	0.7
264	3	2.0
273	2	1.3
275	6	4.0
277	1	0.7
279	4	2.6

281	1	0.7
285	1	0.7
288	1	0.7
289	3	2.0
290	1	0.7
302	1	0.7
304	2	1.3
306	1	0.7
312	1	0.7
316	1	0.7
320	2	1.3
322	1	0.7
331	1	0.7
335	2	1.3
338	1	0.7
341	3	2.0
344	1	0.7
345	1	0.7
346	1	0.7
349	2	1.3
351	1	0.7
352	2	1.3
358	1	0.7
359	2	1.3
363	1	0.7
366	58	38.4
Total	151	100

Table 2. Days Working in Non-Agriculture

Days Working in Non-Agriculture	Frequency	Percent
2	1	0.7
20	1	0.7
21	1	0.7
31	1	0.7
35	1	0.7
39	1	0.7
70	1	0.7

75	1	0.7
91	1	0.7
126	1	0.7
143	1	0.7
147	1	0.7
161	1	0.7
171	1	0.7
228	1	0.7
274	1	0.7
Total	16	10.6
Missing	135	89.4
TOTAL	151	100

Table 3. Days Unemployed

Days Unemployed	Frequency	Percent
3	1	0.7
7	2	1.3
8	1	0.7
14	2	1.3
15	1	0.7
17	2	1.3
22	1	0.7
25	3	2.0
28	1	0.7
31	1	0.7
44	2	1.3
46	1	0.7
50	1	0.7
52	1	0.7
53	1	0.7
54	1	0.7
60	2	1.3
62	1	0.7
64	1	0.7
77	3	2.0
78	1	0.7
81	1	0.7

85	1	0.7
87	4	2.6
89	1	0.7
91	6	4.0
93	1	0.7
102	3	2.0
103	1	0.7
105	4	2.6
106	4	2.6
110	1	0.7
112	1	0.7
116	1	0.7
118	1	0.7
121	1	0.7
123	1	0.7
124	1	0.7
128	1	0.7
133	2	1.3
137	4	2.6
147	1	0.7
152	2	1.3
169	1	0.7
199	2	1.3
230	1	0.7
234	1	0.7
236	1	0.7
244	1	0.7
324	1	0.7
Total	81	53.6
Missing	70	46.4
Total	151	100

Table 4. Days Worked in Broccoli

Days Worked in Broccoli	Frequency	Percent
2	1	0.7
8	1	0.7
14	1	0.7

31	1	0.7
32	1	0.7
42	1	0.7
44	1	0.7
45	1	0.7
62	2	1.3
66	1	0.7
78	1	0.7
86	1	0.7
91	1	0.7
92	3	2.0
130	1	0.7
132	1	0.7
136	1	0.7
138	1	0.7
151	1	0.7
152	1	0.7
154	1	0.7
161	1	0.7
167	2	1.3
183	1	0.7
184	1	0.7
191	1	0.7
195	1	0.7
205	1	0.7
214	3	2.0
219	3	2.0
224	1	0.7
229	5	3.3
233	2	1.3
238	1	0.7
240	1	0.7
242	1	0.7
243	1	0.7
245	3	2.0
248	1	0.7
249	1	0.7
250	2	1.3
256	1	0.7

258	1	0.7
260	7	4.6
261	4	2.6
263	1	0.7
264	3	2.0
270	1	0.7
273	2	1.3
275	8	5.3
277	1	0.7
279	5	3.3
281	1	0.7
282	1	0.7
284	1	0.7
285	1	0.7
288	1	0.7
289	5	3.3
290	1	0.7
292	1	0.7
302	1	0.7
304	1	0.7
311	1	0.7
320	2	1.3
322	1	0.7
331	1	0.7
335	2	1.3
338	1	0.7
345	1	0.7
348	1	0.7
352	1	0.7
358	1	0.7
359	1	0.7
363	1	0.7
365	29	19.2
Total	148	98.0
Missing	3	2.0
TOTAL	151	100

Table 5. Days Worked in non-broccoli crops

Days worked in non-broccoli crops	Frequency	Percent
18	1	0.7
29	1	0.7
52	1	0.7
55	1	0.7
61	1	0.7
70	1	0.7
72	1	0.7
74	1	0.7
77	4	2.6
81	1	0.7
82	1	0.7
83	1	0.7
86	1	0.7
88	1	0.7
89	1	0.7
91	4	2.6
96	1	0.7
104	1	0.7
117	1	0.7
121	1	0.7
123	1	0.7
131	1	0.7
147	1	0.7
150	1	0.7
151	1	0.7
152	1	0.7
153	1	0.7
183	2	1.3
214	1	0.7
215	1	0.7
260	1	0.7
275	1	0.7
278	1	0.7
304	2	1.3

316	1	0.7
321	1	0.7
334	1	0.7
352	1	0.7
357	1	0.7
358	1	0.7
365	2	1.3
Total	50	33.1
Missing	101	66.9
TOTAL	151	100

Table 6. Contact Days with Plants

Contact Days with Plants	Frequency	Percent
31	1	0.7
42	1	0.7
44	1	0.7
47	1	0.7
55	1	0.7
92	1	0.7
117	1	0.7
119	1	0.7
130	1	0.7
132	1	0.7
136	1	0.7
138	1	0.7
167	2	1.3
184	1	0.7
195	1	0.7
197	1	0.7
200	1	0.7
214	3	2.0
219	2	1.3
222	1	0.7
223	1	0.7
229	4	2.6
233	2	1.3
238	1	0.7

240	1	0.7
242	1	0.7
243	1	0.7
245	1	0.7
248	1	0.7
250	1	0.7
256	1	0.7
260	4	2.6
261	3	2.0
263	1	0.7
264	3	2.0
273	2	1.3
275	7	4.6
277	1	0.7
279	4	2.6
281	1	0.7
282	1	0.7
285	1	0.7
288	1	0.7
289	4	2.6
302	1	0.7
304	2	1.3
306	1	0.7
312	1	0.7
316	1	0.7
320	1	0.7
322	1	0.7
331	1	0.7
335	1	0.7
341	3	2.0
344	1	0.7
346	1	0.7
349	2	1.3
351	1	0.7
358	2	1.3
359	2	1.3
363	1	0.7
365	42	27.8
Total	137	90.7

Missing	14	9.3
TOTAL	151	100

Table 7. Days Worked on Organic Farms

Days Worked on Organic Farms	Frequency	Percent
13	1	0.7
17	1	0.7
31	1	0.7
62	1	0.7
91	2	1.3
92	1	0.7
97	1	0.7
131	1	0.7
136	1	0.7
177	1	0.7
214	1	0.7
224	1	0.7
229	4	2.6
245	1	0.7
250	1	0.7
260	1	0.7
261	1	0.7
275	2	1.3
277	1	0.7
279	1	0.7
282	1	0.7
304	1	0.7
316	1	0.7
320	1	0.7
322	2	1.3
331	1	0.7
352	1	0.7
357	1	0.7
358	1	0.7
363	1	0.7
365	8	5.3
Total	44	29.1

Missing	107	70.9
TOTAL	151	100

Table 8. Respondent Age

Age	Frequency	Percent
19	5	3.3
20	3	2.0
22	4	2.6
23	5	3.3
24	6	4.0
25	3	2.0
26	5	3.3
28	7	4.6
29	6	4.0
30	2	1.3
31	6	4.0
32	4	2.6
33	2	1.3
34	3	2.0
35	2	1.3
36	5	3.3
37	6	4.0
38	3	2.0
39	3	2.0
40	6	4.0
41	4	2.6
42	7	4.6
43	4	2.6
44	8	5.3
45	2	1.3
46	2	1.3
47	3	2.0
50	2	1.3
51	4	2.6
52	6	4.0
53	2	1.3
54	4	2.6
55	1	0.7
56	2	1.3

57	2	1.3
58	1	0.7
60	1	0.7
61	2	1.3
62	1	0.7
65	1	0.7
66	1	0.7
67	1	0.7
68	1	0.7
70	1	0.7
Total	149	98.7
Missing	2	1.3
TOTAL	151	100

Table 9. Respondent Gender

Gender	Frequency	Percent
Male	87	57.6
Female	46	30.5
Total	133	88.1
Missing	18	11.9
TOTAL	151	100

Table 10. Indigenous Status

Indigenous Status	Frequency	Percent
Indigenous	11	7.3
Non-Indigenous	140	92.7
Total	151	100