Farm Labor Management Decisions of Organic and Conventional Farms: A Survey of Southeastern Farm Businesses

Florence I. Santos and Cesar L. Escalante
Department of Agricultural and Applied Economics
University of Georgia

INTRODUCTION

Organic farming, an economically and environmentally sustainable farming system, is a more labor-intensive operation compared to the conventional farming system that employs larger farm machineries and synthetic agrichemicals. The organic farms' characteristic limited use of synthetic chemical inputs requires them to implement alternative techniques for pest removal, soil additions and conservation that are usually done manually. For example, certain practices that are apparently more labor-intensive include the replacement of fertilizers with nitrogen-fixing cover crops and composted animal and green manures; cultivations and hand weeding to control invasive plant species; and multi-crop rotations and often a type of comprehensive ecosystem management which creates a build-up of beneficial/predator insect species to suppress pest insects.

Several studies have provided empirical evidence on the organic farms' greater demand for farm labor inputs than their conventional farm counterparts. Bukman (1992) found that farm labor use among Dutch farms is 20% higher in organic livestock breeding and 50% higher among organic crop farms (arable farming and horticulture). Padel and Zerger (1994) analyzed German farms and found that the number of workers employed was 12% higher for organic farms, both on a per farm and hectare bases. Among U.S. farms, estimated labor requirements for a mix of livestock and crop farms in the Corn Belt were 19.8 and 17.8 hours per $1,000 of crop output for organic and conventional farms, respectively, on a whole-farm basis (Klepper, et al., 1977).

Crop choice is an important factor that determines the relative greater use of farm labor inputs among organic farms vis-à-vis conventional farms. The divergence in labor requirements of these two farming systems can be larger when comparing farms growing certain individual crop types. Dubgaard (1994), for instance, found that organic farms in Denmark utilize twice as much labor inputs per hectare as conventional farms. He attributes this result to the larger share of more labor-intensive operations (vegetables and dairy production) in the organic farming systems he analyzed. He estimates a reduction in the difference from ½ to ⅓ if such structural differences are eliminated.

Organic farms in the Southeastern region are poised to experience even more challenging growing conditions than their counterparts in other parts of the country. For instance, farmers in this region need to employ additional soil enhancement management techniques due to the rapid decomposition of organic matter and aggressive emergence of various pests and weeds

attributed to the region's mild winters, long warm summers and abundant moisture. Activities geared towards rebuilding soil organic matter (such as the alley cropping technique proposed by a SARE funded project, #LS06-190) define a much greater need for more labor inputs.

METHODOLOGY

A research project, funded by a grant from the Southern Sustainable Agriculture and Research Education (SARE), was developed to deal with differences in farm labor management strategies of organic and conventional farms. A survey was conducted among organic, transitioning, and conventional farms in Georgia, North Carolina, South Carolina, Alabama, and Mississippi. Target respondents were identified through contacts with organic farming associations, commodity groups and local USDA agencies. The survey questionnaire was designed to gather information on the farms' labor requirements and how these requirements have been previously and were (at the time of the survey) currently met by the respondents.

Through this survey, this research will fill in organic farming data gaps in the Southeast, which has been poorly represented in survey data collected by the Organic Farming Research Foundation (OFRF) (Walz, 2004). In the 4th National Organic Farmers' Survey, for instance, five Southeastern states (Alabama, Georgia, Mississippi, South Carolina and Tennessee) were not represented as not a single farmer responded to the OFRF's survey request. The other states in the region are not adequately represented as the states of Florida, Kentucky, Virginia, and West Virginia only had 8, 16, 1, 9, and 7 respondents, respectively, out of a total 1,034 responses.

This survey was conducted in the latter half of 2007. The survey instrument was mailed to 518 organic and conventional farm operators in Georgia, South Carolina, North Carolina, Mississippi, and Alabama. Of these farms, 83 responses were received, representing a response rate of 16.0%.

The following sections summarize the major findings of this survey according to demographic and structural characteristics, labor management strategies, and reactions to changes in the farm labor market. Please be cautioned that certain response categories might contain missing observations as certain respondents could have skipped some questions.

A. DEMOGRAPHIC AND STRUCTURAL CHARACTERISTICS

A.1 Respondents' Location and Type of Farm

Farming System	*State*					*Totals*
	Alabama	*Georgia*	*Mississippi*	*North Carolina*	*South Carolina*	
Conventional	9	11	9	8	3	40
Organic	6	8	4	20	5	43
Totals	15	19	13	28	8	83

A.2 Experience, Educational Attainment, Gender, and Age of Farm Operators, By Farm Type

Farming System	*Farming Experience (Years)*	*Educational Attainment (Refer to categories below)**	*Age (Years)*	*Gender*	
				Male	*Female*
Conventional Farms				32	8
Mean	20.18	4.49	53.28		
Standard Deviation	15.35	2.98	15.17		
Minimum	2	1	16		
Maximum	65	20	82		
Organic Farms				20	23
Mean	13.79	4.70	48.35		
Standard Deviation	11.18	1.73	12.02		
Minimum	2	2	26		
Maximum	50	7	78		

* **Educational categories are defined as follows: 0 for no formal education, 1 for some high school education, 2 for completed high school education, 3 for some college education, 4 for completed junior college/trade school degree, 5 for completed bachelor's degree, 6 for some graduate work, and 7 for earned graduate degree.**

Of the 83 respondents of this survey, the two largest participant groups (from table A.1) are farms operating in North Carolina (34%) and Georgia (23%). The responding farms are almost evenly divided among conventional and organic farms. North Carolina farms comprised a large percentage (47%) of the organic farms in this dataset while Georgia supplied 28% of the participating conventional farms in this study.

In terms of gender groups, conventional farms are predominantly operated by male farm operators (32 out of 40 farms) while male and female farm operators seem to almost evenly share the management of the organic farms in this survey.

Conventional farms altogether seem to have been in the farming business much longer than the organic farms as their collective average farming experience is about 20 years, compared to 14 years for organic farms.

Based on the educational categories provided at the bottom of table A.2, organic farm operators seem to have almost completed on average a college degree while the average educational attainment of conventional farm operators is around junior college/trade school level.

Consistent with earlier result establishing that conventional farm operators are more experienced, these operators are also older than their counterparts in the organic farming category. The average age of conventional farm operators in this sample is 53 years, with 16 and 82 years as the youngest and oldest ages recorded in this survey. Organic farm operators are about 48 years old on the average.

B. FARM BUSINESS ARRANGEMENTS

B.1 Business Organizational Structure, By Farm Type

Farming System	*Business Organizational Structure*				*Totals*
	Sole Proprietorship	*Partnership*	*Corporation*	*Others*	
Conventional Farms	30	5	4		39
Organic Farms	29	4	8	1	42
Totals	59	9	12	1	81*

Note: Two farms did not provide any answer to this question.

There appears to be not much variation in the distribution of conventional and organic farms across the various business organizational structures. Majority of the farm businesses in this sample (69% or more) are organized as single proprietorships. The rest are classified as either partnerships or corporate entities.

B.2 Time Devoted to Farm Business, By Gender and Farm Type

Gender and Farm Types	*Full-Time Farmers*	*Part-Time Farmers*
By Farm Type		
Conventional	23	17
Organic	25	18
By Gender		
Male	28	24
Female	19	12

There is also not much variation in the classification of conventional and organic farmers as full-time and part-time operators. These two farm types have 58% to 60% of their operators working full-time on the farm.

Percentage-wise (calculated within each gender class), female farm operators tend to work full-time on the farm (61%) compared to 54% of the male farm operators who are willing to do so.

B.3 Percent of Time Devoted to Off-Farm Employment/Investments, Percentage of Household Income Derived from Farm Business, and Gross Farm Income, By Farm Type

Farming System	Variable	Mean	Standard Deviation	Minimum	Maximum
Conventional Farms	*% of Time Devoted to Off-Farm Work*	43.68	28.94	2	95
	Farm Income's Contribution to Household Income (%)	41.45	38.39	0.05	100
	Gross Farm Income in 2006 ($)	200,192	475,159	2,500	2,450,000
Organic Farms	*% of Time Devoted to Off-Farm Work*	35.81	25.32	0	95
	Farm Income's Contribution to Household Income (%)	50.88	34.71	1	100
	Gross Farm Income in 2006 ($)	34,969	53,415	2,500	275,000

The above summary establishes the size dominance of conventional farms over organic farms in terms of gross farm incomes (GFI) in 2006. Conventional farms registered a mean GFI of $200,192 compared to only $34,969 for organic farms.

Organic farms, however, are more dependent on their farm operations as only their farm operators devote only an average of 36% of their time to off-farm employment and/or income-generating activities. Their conventional farm counterparts devote 44% of their time in similar gainful activities outside the farm.

These results are further supported by the mean contributions of income from farm business operations to the overall household income. Organic farm households rely on their farm businesses to account for an average of 51% of their total household income. Conventional farm operations, on the other hand, chip in only about 41% to their total household income. This is consistent with the earlier finding that conventional farm operators tend to devote a larger percentage of their time to off-farm income activities than organic farm operators.

The following table provides the motivations of these two groups of farm operators in engaging in off-farm income activities.

B.4 Reasons for Engaging in Off-Farm Income-Generating Activities, By Farm Type

Reasons	*Farm Type*		*Total*
	Conventional	*Organic*	
To subsidize farm and capital investments	9	10	19
For health insurance and other benefits	9	7	16
As a primary source of income	11	11	22
As a secondary source of income	3	12	15
As primary career	9	6	15
For personal interest	2	5	7
No off-farm employment or investments	18	18	36

C. PRODUCTION AND MARKETING PROFILES

C.1 Total Acreage and Farmland Control Arrangements By Farm Type

Farm Type	*Farmland Control Arrangement*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Conventional Farms	*Owned*	193.92	296.54	1	1,000
	Rented	373.57	434.65	12	1,500
	Others	86.60	89.82	1	290
	Farm Size	385.62	568.46	1.5	1,500
Organic Farms	*Owned*	25.67	34.92	1	150
	Rented	3.79	3.26	1	10
	Others	13.00	9.06	1	20
	Farm Size	26.69	36.05	1	150

The summary in table C.1 indicates that conventional farms tend to be significantly larger in size than organic farms. Conventional farms in this sample have an average farm size of 386 acres while organic farms operate an average of 27 acres. In terms of farmland control arrangements, conventional farms seem to be more dependent on the leasing alternative while organic farms own most of the acreage they farm on. On average, 374 acres of land operated by conventional farms are classified as rented, although as can be gleaned from their responses, some farmers seem to have misconstrued the question on rented land to include both acreage rented from other landowners for use in their farm operations and acreage owned by the operator that is rented out for others' use.

C.2 Acreage Allocated for each Enterprise, By Farm Type

Farm Type	*Farm Enterprise*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Conventional Farms	*Vegetables*	163.94	365.76	1.00	1,500.00
	Nursery, floriculture and/or greenhouse crops	2.37	2.85	0.25	6.50
	Tree or vine fruit and/or nut crops	120.44	289.37	0.25	1,100
	Grains, alfalfa, mixed hay and/or field crops	227.40	273.41	6.00	1,000
	Pasture	93.47	88.48	1.00	300.00
	Fallow or idle	82.43	94.75	1.00	300.00
	Others	247.00	393.74	12.00	1,200.00
Organic Farms	*Vegetables*	2.43	2.46	0.25	10.00
	Herbs	0.96	1.19	0.01	4.00
	Nursery, floriculture and/or greenhouse crops	1.76	3.01	0.01	11.50
	Tree or vine fruit and/or nut crops	6.07	8.14	0.25	30.00
	Grains, alfalfa, mixed hay and/or field crops	9.92	10.03	1.00	25.00
	Pasture	18.96	33.68	0.50	149.00
	Fallow or idle	17.13	14.09	1.00	42.15
	Others	14.88	26.76	1.00	55.00

The above summary shows that the most prevalent enterprises (in terms of farm acreage allocation) among conventional farms belong to the classification for grains, alfalfa, mixed hay, and/or field crops as well as to the vegetable group. These two groups have an average of 227 and 164 acres allocated to each of them, respectively. On the other hand, the larger acreage allocations among organic farms belong to the pasture and grains/alfalfa/hay/field crops groups that registered mean acreages of 19 and 10 acres, respectively.

C.3 Form of Final Product (Percent of Total Production), By Farm Type

Farm Type	*Form of Final Product*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Conventional Farms	*Fresh Commodity or Unprocessed Product*	86.48	31.52	2.00	100.00
	Value-Added Product (processed prior to sale)	47.43	45.31	5.00	100.00
	Sold to Processors for processing	8.59	10.79	1.00	30.00
Organic Farms	*Fresh Commodity or Unprocessed Product*	82.92	27.68	7.50	100.00
	Value-Added Product (processed prior to sale)	32.44	33.28	2.00	100.00
	Sold to Processors for processing	33.33	26.73	0.67	38.28

In terms of the nature of farm outputs produced by the sample farms, the bulk of conventional farms' products are accounted for by unprocessed, fresh produce and value-added farm products that have been further processed for sale. These two product categories account for an average contribution of 86% and 47%, respectively, to conventional farms' outputs.

Fresh produce also dominates the production of organic farms in this sample accounting for an average output contribution of 83%. Farm products sold to processors for further processing and value-added products that have been further processed in the farm prior to sale have mean output contributions of 33% and 32%, respectively, for the organic farms in this sample.

C.4 Marketing Arrangements (Percent of Total Goods Sold), By Farm Type

Farm Type	*Marketing Arrangements*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Conventional Farms	*Direct-to-consumer sales*	72.05	37.80	2.00	100.00
	Direct-to-retail buyer sales	40.97	37.23	0.40	100.00
	Grower or Marketing Cooperative Sales	40.92	42.18	1.00	100.00
	Other wholesale market channels	73.30	36.54	0.50	100.00
Organic Farms	*Direct-to-consumer sales*	78.11	28.90	3.60	100.00
	Direct-to-retail buyer sales	31.60	34.50	0.38	100.00
	Grower or Marketing Cooperative Sales	38.83	38.43	1.78	100.00
	Other wholesale market channels	16.50	9.98	1.25	25.00

The primary markets for conventional farms in this sample seem to be wholesale market channels (73%) and direct consumers (72%). In contrast, direct consumers are the primary clients of the organic farms in this study. This market sector absorbs 78% of the products of the organic farms. Grower-marketing cooperatives is the second largest consumer group patronizing products of the sample organic farms, accounting for 39% of total farm outputs sold.

D. FARM LABOR PROFILE

D.1 General Farm Employment Profile, By Farm Type, Number of Workers

Farm Labor Categories	*Conventional Farms*		*Organic Farms*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*
Family Workers	3.32	2.98	2.46	2.28
Non-Family Workers	40.52	5.24	74.84	13.98
Full-Time Labor	23.03	2.03	60.05	1.22
Part-Time Labor	11.76	5.25	25.87	12.07
Year-Round Employees	27.71	5.79	61.03	13.00
Seasonal Employees	6.98	2.20	25.95	1.74

In terms of family members working on the farm, there does seem to be much difference in the calculated mean values for conventional and organic farms. To verify whether these values are significantly different from each other, a statistical test is conducted based on the mean, standard deviation, and number of farms in each category. Results of this test indicate that those mean values are indeed not significantly different from each other.

The rest of the mean values are significantly different from each other. Specifically, organic farms in this study have, on the average, hired more non-family workers (mean of 75) than conventional farms, which hired an average of 41 non-family workers.

Organic farms also have hired more full-time and part-time workers, on average, as reflected by their means of 60 and 26 workers, respectively, compared to conventional farm's mean hiring rates of 23 and 12 workers, respectively.

Mean year-round employees for organic farms is 61 employees compared to 28 for conventional farms. Organic farms also hire more seasonal workers, with an average hiring rate of 26 workers compared to 7 workers for conventional farms.

D.2 Household Size, Nature of Employment of Family and Non-Family Farm Workers, By Farm Type

Farm Labor Categories	*Farm Type*			
	Conventional Farms		*Organic Farms*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*
Household Size (#of family members)	2.80	2.57	1.79	1.69
***Family Farm Labor** (Number of Workers)*				
Year-round, full-time	1.18	1.00	1.08	0.93
Year-round, part-time	0.71	0.92	1.17	1.26
Seasonal, Full-time	0.38	0.30	0.98	0.69
Seasonal, Part-time	0.90	0.82	1.56	1.94
***Non-Family Farm Labor** (Number of Workers)*				
Year-round, full-time	3.03	0.21	13.95	0.61
Year-round, part-time	2.10	0.15	12.00	0.43
Seasonal, Full-time	13.28	0.03	49.69	0.16
Seasonal, Part-time	4.95	2.38	19.52	10.39

Conventional farms have significantly larger households, with a mean size of 3 members compared to 2 for organic farm households. In breaking down the nature of family members' employment in the farm, the average numbers of workers employed full-time year-round in both conventional and organic farms are not statistically different. However, mean year-round part-time employment and both full-time and part-time seasonal employment figures are larger for organic farms vis-à-vis those of the conventional farms.

Organic farms also produced significantly larger mean values for all employment categories (year-round and seasonal, full-time and part-time) than conventional farms.

D.3 Annual Farm Labor Requirements of Different Farm Enterprises, By Farm Type, In Man Hours

Farm Enterprises	*Conventional Farms*		*Organic Farms*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*
Vegetables	2,973.00	1,622.76	6,187.02	2,046.33
Herbs	0.61	155.48	3.90	388.86
Nursery, floriculture and/or greenhouse crops	1,616.25	1,245.46	2,188.89	1,914.89
Tree or vine fruit and/or nut crops	8,097.00	1,340.28	22,649.20	2,328.43
Grains, alfalfa, mixed hay and/or field crops	1,494.50	125.50	2,370.13	183.44
Pasture	410.29	960.42	405.71	1,287.83
Others	617.93	140.90	3,294.78	396.76

In almost all enterprise groups, except for pasture, organic farms require significantly more man hours of farm labor (on average) than conventional farms.

The employment profiles shown in the earlier tables match these recent results that establish the relatively larger labor requirements of most organic farm operations vis-à-vis their conventional counterparts. In terms of numbers of workers, organic farms tend to hire more non-family workers to supplement labor supplied by family members. They also maintain larger worker bases for full- and part-time labor as well as year-round and seasonal employees.

Prepared by: Florence I. Santos, Graduate Assistant
Cesar L. Escalante, Associate Professor

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